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THE CANADIAN MINING JOURNAL

OL. 32 TORONTO No.

FRASER & CHALMERS Ltd.

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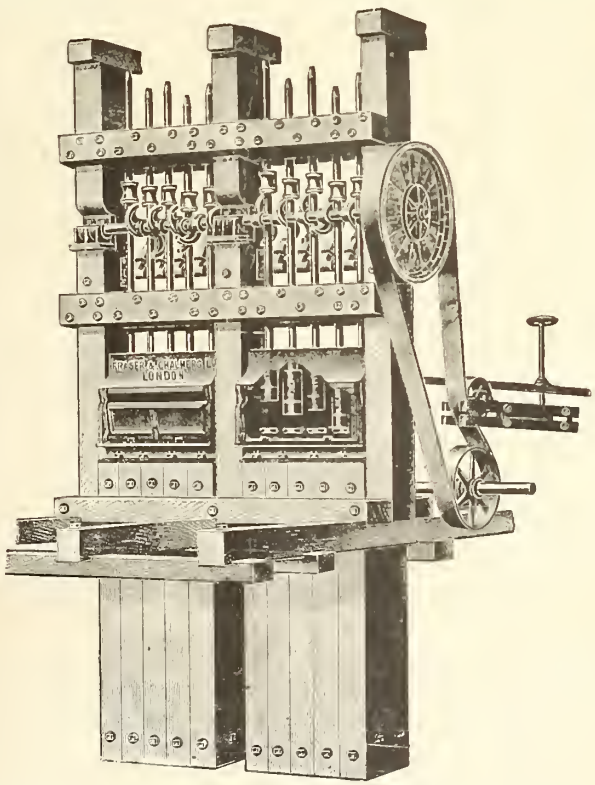
Swedish Steel Stems



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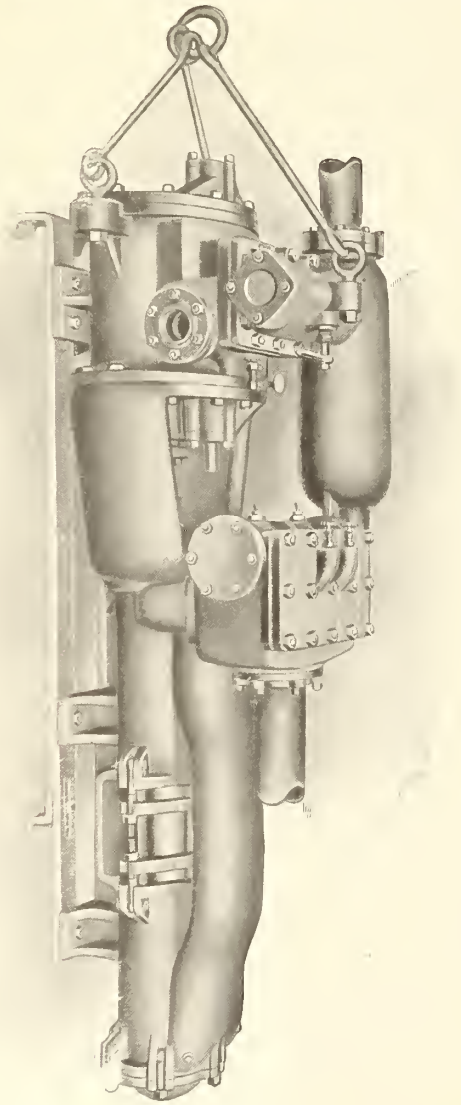

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Works: 512 William Street, Montreal. Sales Offices: Montreal, Toronto, Cobalt, Winnipeg, Calgary, Vancouver.

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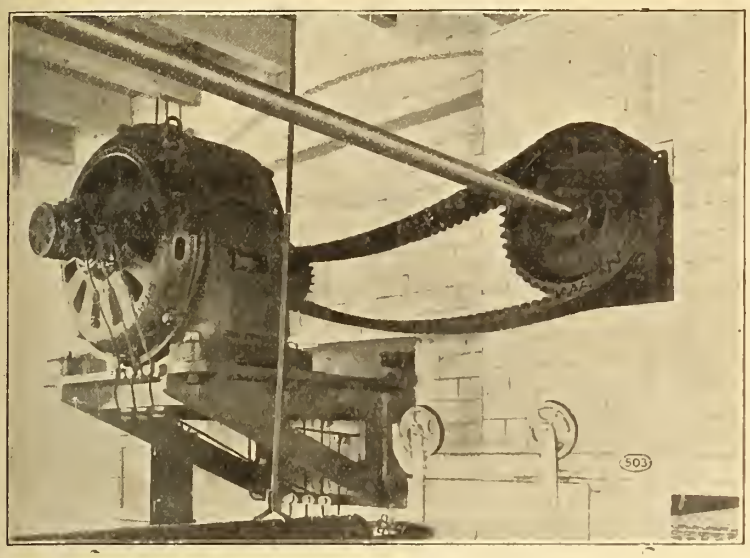

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Run slack,

No tension beyond the actual pull,

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Quiet. Durable.
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EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

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Bulletin 40-A

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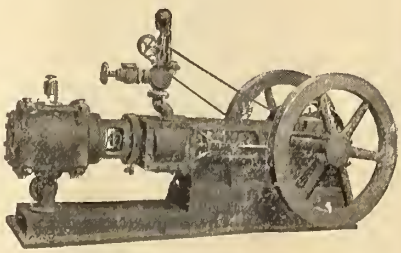
New Sullivan Air Compressors

Steam, "WA 4" Belt "WG 4"

Mining Companies will find these two new small Sullivan Compressors desirable on account of their ability to give continuous "year in, year out" service.

These machines are simple and plain in design, but in proportion to size, they are stronger and more durable than large "heavy-duty" compressors.

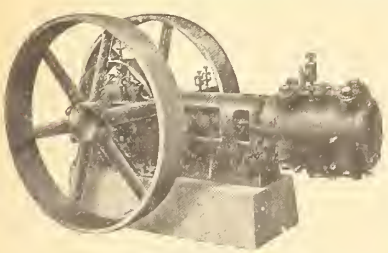
Efficiency-making details have not been omitted.



Single Stage, Steam

BULLETINS { Steam 658H / Belt 658F

COAL CUTTERS HAMMER DRILLS ROCK DRILLS DIAMOND DRILLS



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Sullivan Machinery Co.

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Printing a Specialty.

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Amatite has a genuine mineral surface.
This means that it requires no painting.
Contrast this with the fact that all ready roofings of smooth surface require painting regularly.
Figure out how much it costs you to paint the roofs of your mill, your shaft-house, repair shop and the other buildings?
Think of saving this amount not once—but three, four or five times—smooth-surfaced roofing requiring painting about every other year.
Amatite does not require any attention whatever after it is once laid.
Another point that recommends it to the Mine Manager is that it is easily laid and has galvanized nails and liquid cement in the center of each roll.
We can offer no more convincing argument in favor of Amatite than a sample of the roofing itself. The practical man recognizes its value immediately—its thickness, strength and durability.
We also have a booklet of facts. **Send your request for this free sample to the nearest office.**

THE PATERSON MANUFACTURING CO., LTD.

MONTREAL TORONTO WINNIPEG
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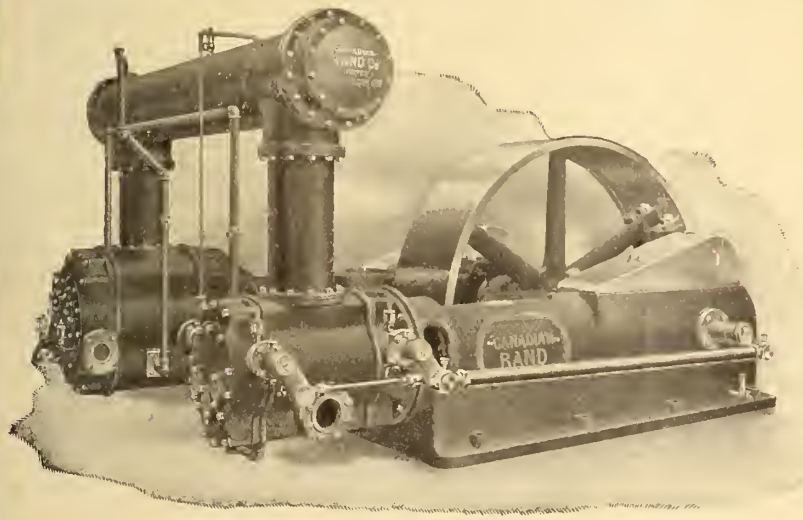
CLASS "RP-2" AIR COMPRESSORS



The Rand Class "RP-2." Duplex Power Driven Air Compressor combines the good principles of modern engine design with the best pneumatic practice.

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Large free air ports, correctly controlled by improved Corliss Inlet Valves and "Imperial Cushioned High Speed Outlet Valves" insure highest compression efficiency.

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ROCK DRILLS
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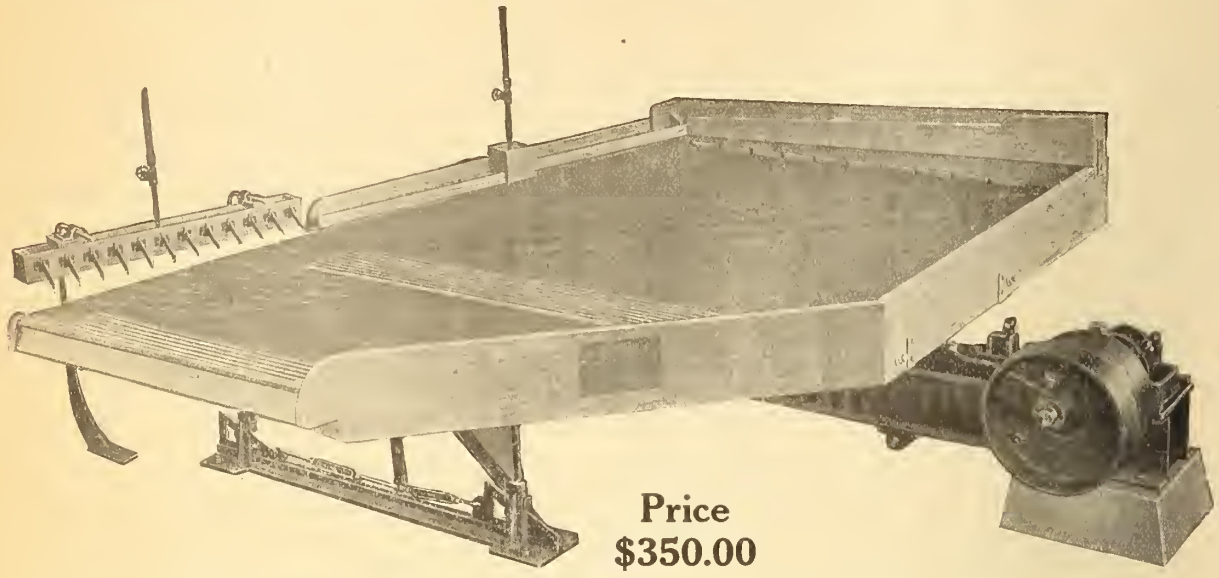
Another Victory for the "DEISTER"



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By JAMES A. BARR

216 pages
Illustrated
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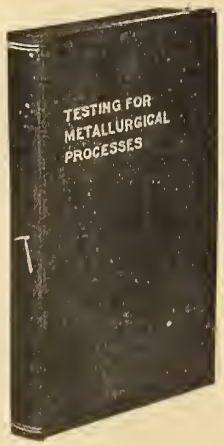

This book is designed to assist in the selection of the process of treatment for any ore. The author describes the apparatus employed in making laboratory and small-lot tests. It is founded upon experimental work at the Michigan College of Mines, and the methods recommended have been tested in practice. It is brief and practical, equally valuable to the student and the practicing engineer.

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Canadian Mining Journal, Toronto

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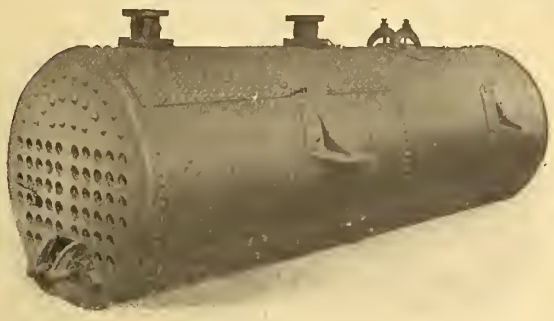

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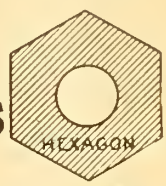
"STAG" BRAND

SOLID OR HOLLOW

Mining Drill Steels

All Sizes and Sections from Stock



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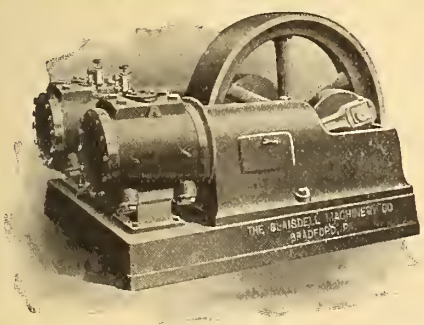

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STEAM---ELECTRIC---POWER

FOR ALL CLASSES OF SERVICE WRITE US YOUR REQUIREMENTS

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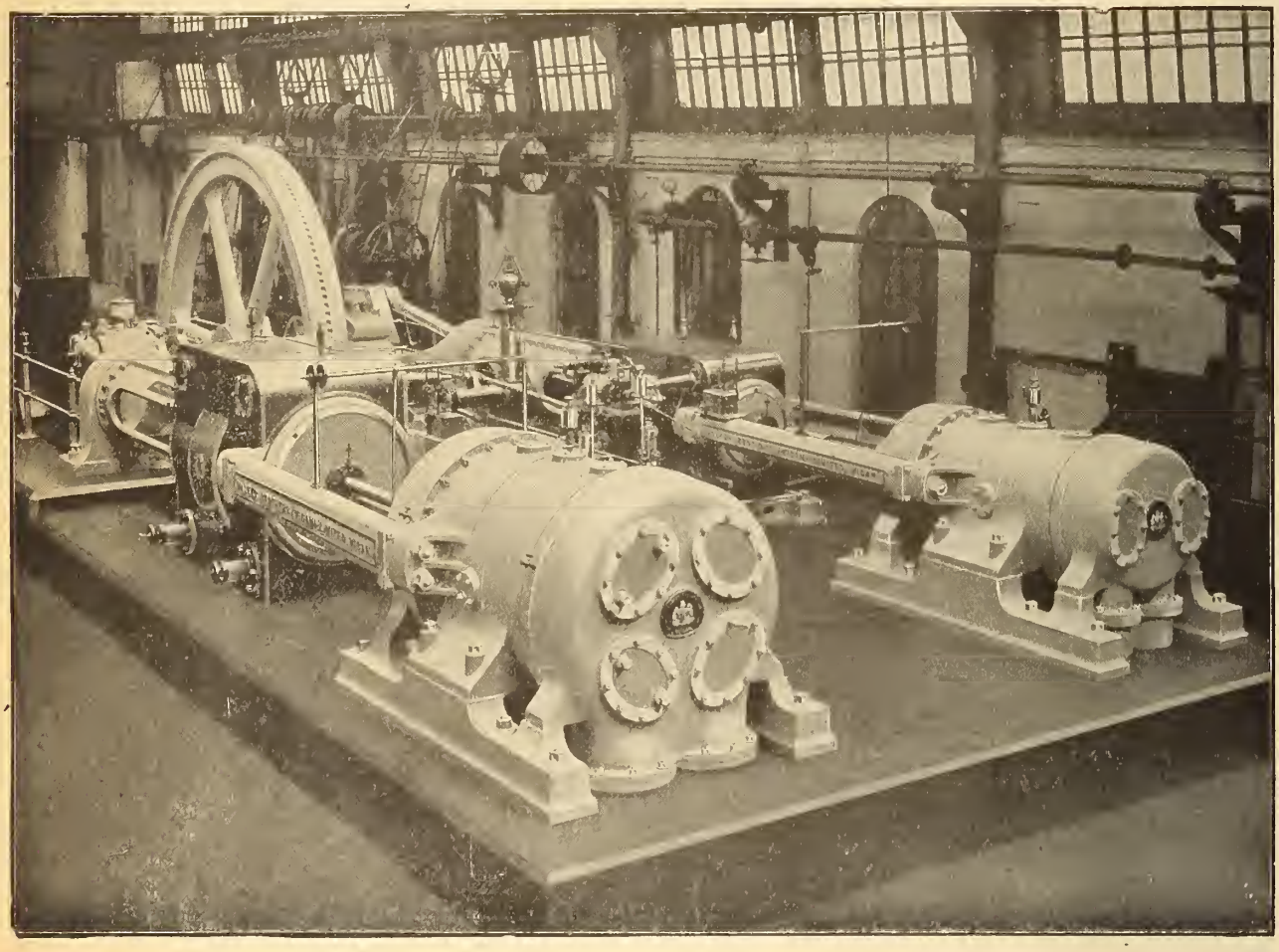

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Air Valves to New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. **(Applicable also to Existing Engines.)**

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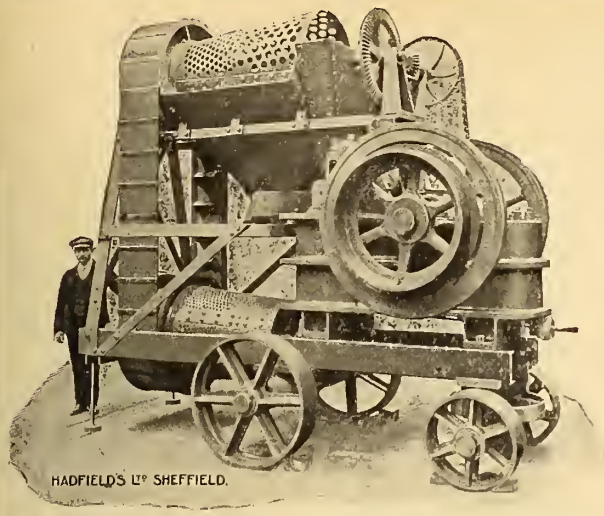

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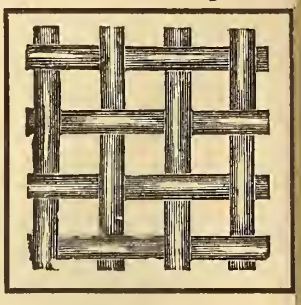

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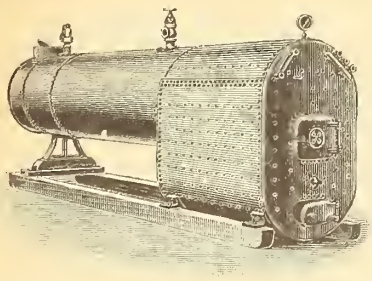

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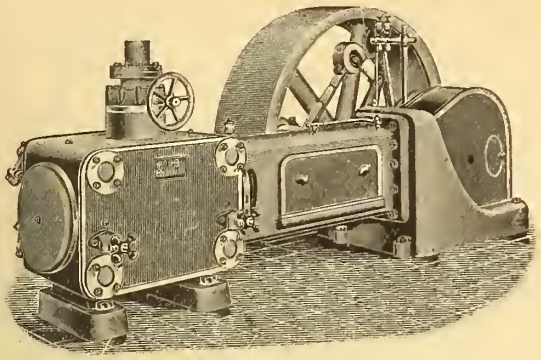

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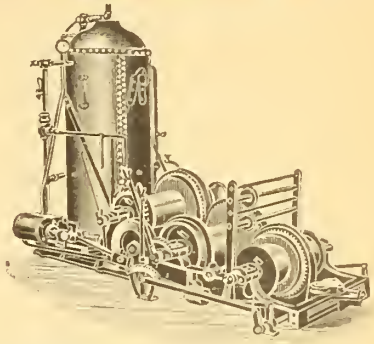

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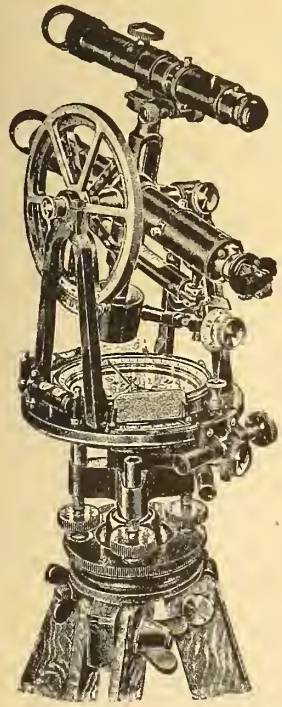

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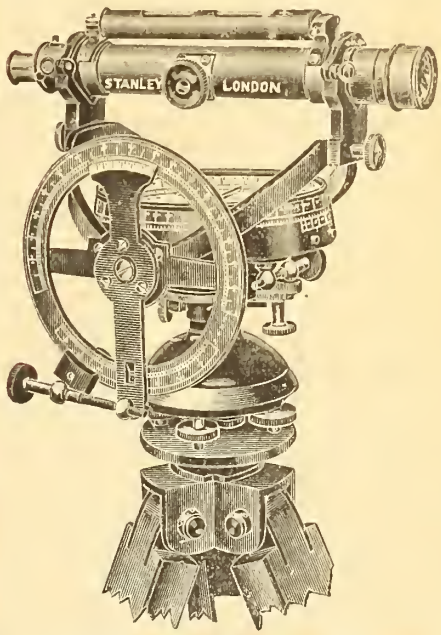

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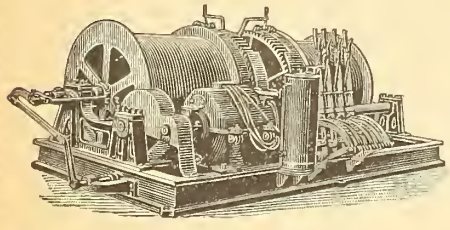
The FLORY CABLEWAY SYSTEM is Superior to any on the Market



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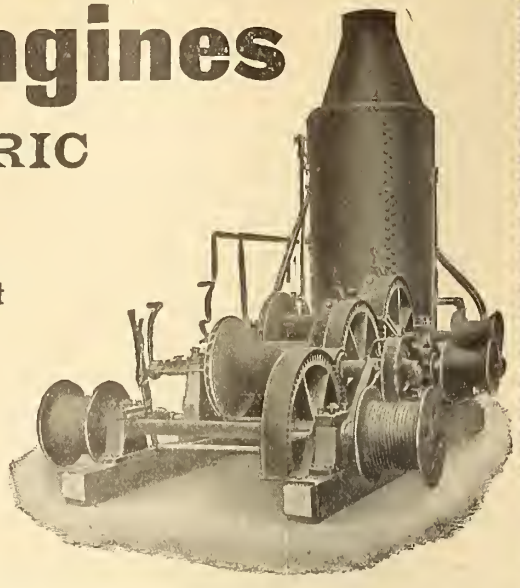

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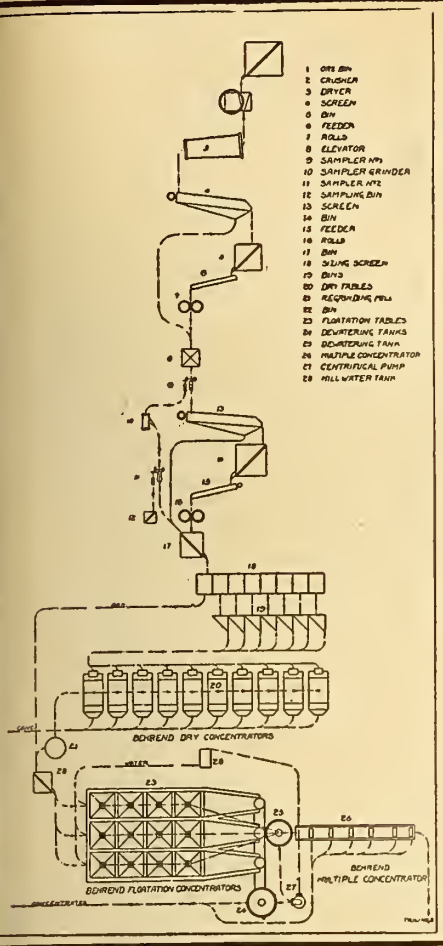

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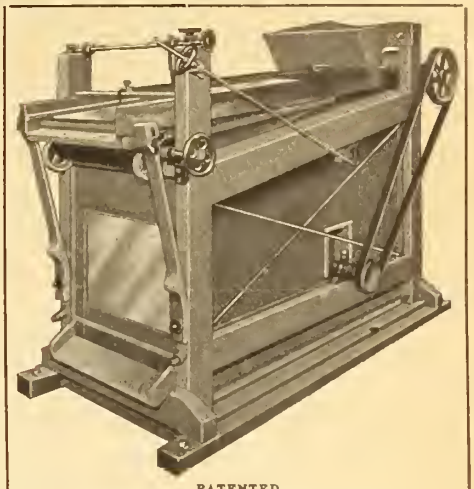

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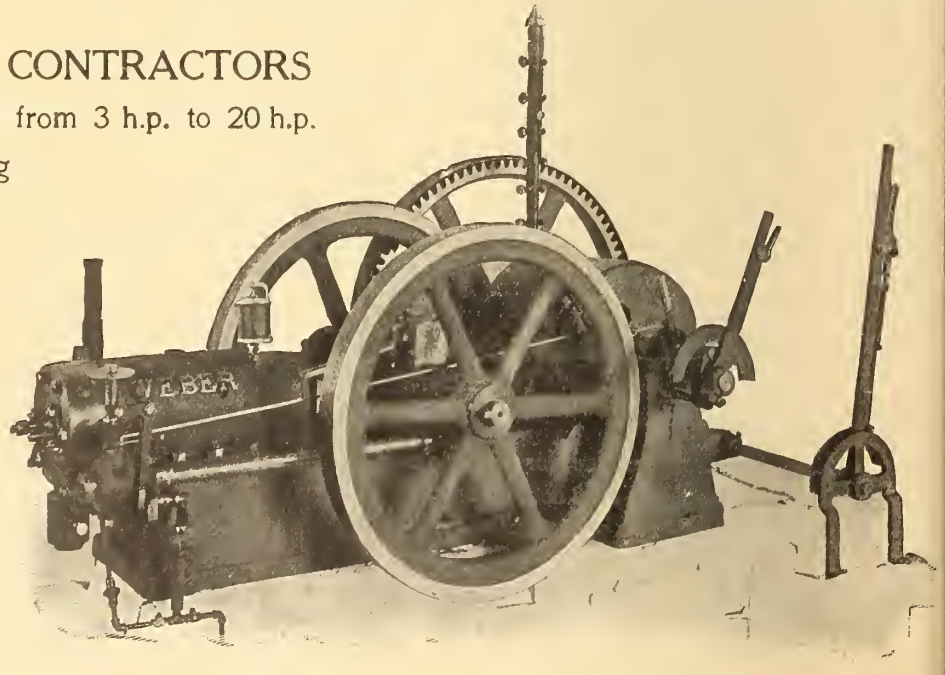

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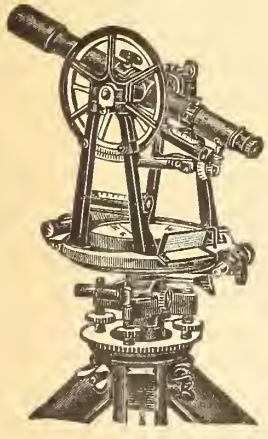

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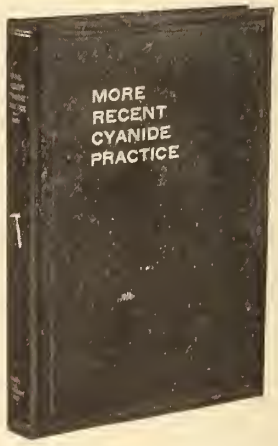

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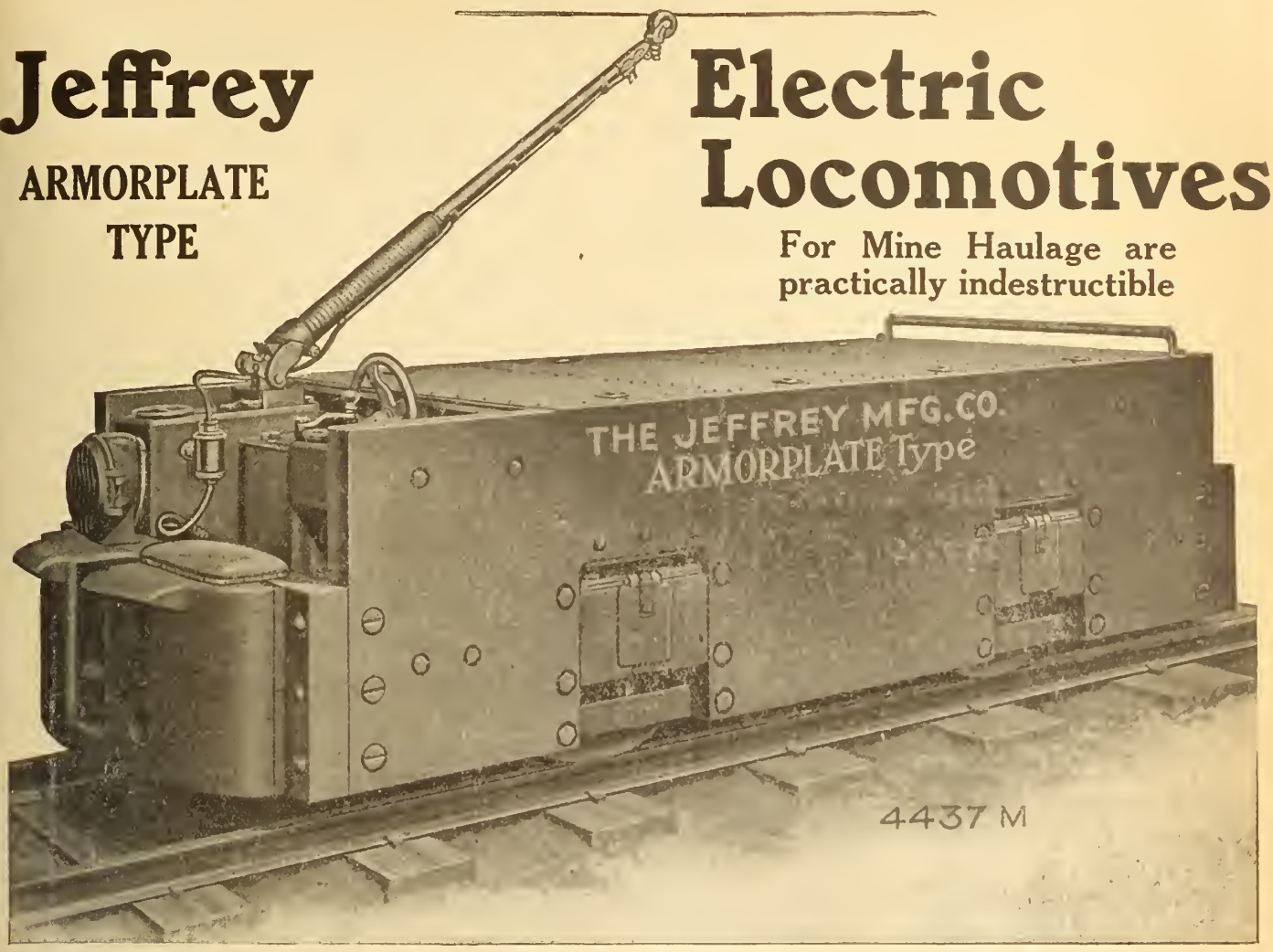

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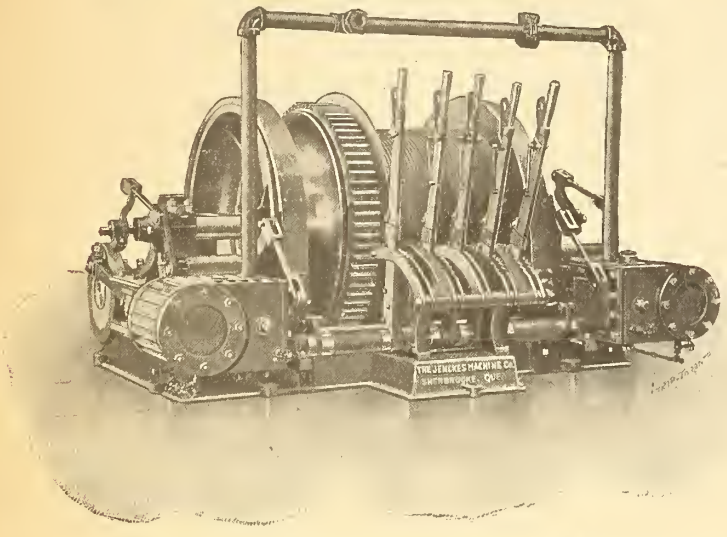

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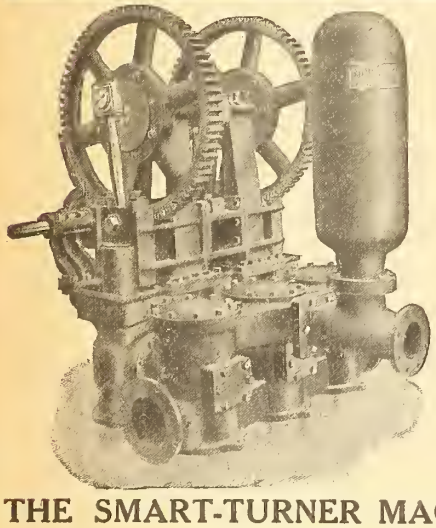

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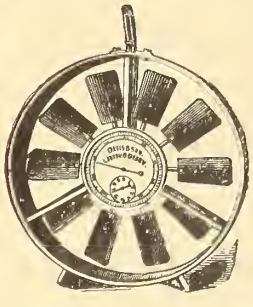

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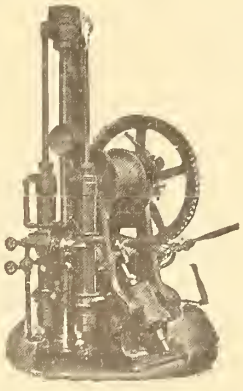

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THE YEAR 1910.
A Review.

Twelve months ago to-day we ventured to predict a prosperous year for the mining industry of Canada. The year 1910 has come and gone, and with it came much profitable growth. and much encouragement for the future. Our confidence in Canada's ability to take a leading place amongst mineral producing nations has been strengthened. Every year brings us a substantial step nearer our goal of self-reliant nationhood. The chief industrial foundation-stone of that nationhood is the possession and proper use of varied mineral wealth. Although the mining industry has not yet received from our law makers and from our great transportation corporations the recognition that is its due, yet that recognition is measurably greater to-day than it was a year ago.

The pressing need of codifying the heterogeneous mass of mining laws that now encumbers us, has been taken in hand. For this advance, the executive officers of the Canadian Mining Institute are to be thanked. The Federal Government, also, has shown enlightenment in giving moral support and financial assistance to the movement. We pray that before another year has passed, the way shall have been cleared for the enactment of mining laws that will supersede the present anomalous and conflicting Federal and Provincial Acts, and that will insure fair treatment for the investor.

While, since our last annual review, we have witnessed a distinct change for the better in the attitude of our law makers towards mining, there is still little or no amelioration of transportation conditions. Our railway corporations are blind to the needs of the industry, and, consequently, blind to their own best interests. Carriage of low grade ores is unbelievably costly. Coal freight rates, more especially in the west, are not based upon a rational schedule, but are fixed at the highest possible figure that consumers will pay. In one instance in the east, an iniquitous freight rate is charged by a company owning a coal mine and operating its own railway. The high rate shuts a competing mine out of a part of its legitimate market. Many such instances could be adduced. Such commodities as talc, gypsum, pyrites, iron ore, ores of the precious metals, etc., etc., provide opportunities for like exactions. One reason for this situation is that what protests are made come from individual operators, and not from the mining fraternity as a whole. However, an increasingly effective "big stick" is at the disposal of the public; we refer to the Board of Railway Commissioners. This tribunal has rendered many decisions that bear directly upon the transportation of minerals

and mineral products. Several of its decisions, notably one in which the White Pass and Yukon Railway Company was involved, gave immediate relief to mines that had been struggling under the incubus of prohibitively high freight charges. Well-founded grievances will receive prompt consideration from the Board. These grievances exist; and many more should be laid before the Commissioners at once. The fact that nearly all our railways are amenable to the decisions of the Board appears not to be fully appreciated by mine operators.

Standing in bold relief among the official acts of the Federal Department of Mines is the belated, though welcome interest evinced in colliery rescue and salvage work. A much better start has been made in controlling the manufacture and use of explosives. Both of these official efforts will be absolutely wasted unless a simultaneous attempt be made to improve and standardize mine inspection. This, of course, refers especially to coal-mining. And in the Province of Alberta the Federal Government is responsible for a regrettable state of affairs. As at present the Dominion receives all the fees and royalties, and as inspection and salvage are left to the province, it is not to be wondered at that slackness obtains. In view of the recent loss of more than a score of lives in an Albertan colliery, the Government will be chargeable with criminal negligence if provision for modern inspection and salvage be not made without delay. This is absolutely the most vital question confronting the Federal Department of Mines, primarily because it involves the problem of saving human lives, and secondarily because it involves the prevention of enormous loss by underground fires. And the whole value of any measures adopted will depend upon those measures being complete. Rescue stations are of little use if inspection is not efficient and frequent. Prevention in the mine is not to be neglected merely because emergencies apparatus is installed above ground. Briefly, while the Federal Government's action in investigating explosives and in encouraging the use of rescue apparatus is most praiseworthy, it will lose significance unless it is rounded out in the directions alluded to above.

We have dwelt upon mining legislation, the relation of transportation to mining, and the duty of the Federal Government from a humanitarian point of view, because these three features command the interest of all concerned in the industry. While part of our remarks may not be directly pertinent to an annual review, yet there could be no more suitable time than the present for impressing our readers.

Without further delay let us glance at the mining progress made in each Province during 1910.

Nova Scotia.—Much has transpired in Nova Scotia during the past year. The event of greatest moment in mining circles was the amalgamation of those two great protagonists in the legal battle of two years ago, the Dominion Coal Company and the Dominion Iron and Steel Company. This union is already bearing fruit. Under the general management of Mr. M. J. Butler, formerly Deputy-Minister of Railways and Canals, a policy of expansion has been adopted. The recent acquisition of the Springhill collieries is the first important step. More details of the vast plan will come to light during 1911.

The coal outputs of the Dominion collieries have increased by nearly a million tons as compared with the previous year. The Nova Scotia Steel and Coal Company has shipped nearly thirty-five thousand tons more than during 1909. In fact, all but two of the collieries appear to have produced larger quantities of coal than ever before. The year, therefore, has been marked by progress in coal mining.

The output of pig iron and steel products also shows a pleasing enlargement. This was to be expected. At very few places in the world are fuel, ore, and flux assembled so cheaply as at the industrial ports of Cape Breton. At few places also are operating costs so carefully controlled.

Most helpful to coal mining has been the utter rout of the United Mine Workers of America. The men and methods employed by this foreign organization were unworthy of respect and unsuited to a country where civilized habits of thought and decent systems of government prevail.

The recent anti-reciprocity movement amongst the coal operators of the province was badly conceived and unskillfully executed. Whilst the opponents of reciprocal free trade with the United States in coal have strong cause to fear the removal of the present tariff, they have not yet succeeded in stating their case in a way that might appeal to the judicial mind. However, the question is a live one, and no doubt more will be heard of it presently.

Although, apparently, there has been more activity in gold mining during 1910 than throughout 1909, yet the total production will be slightly lower. The cause of this will be discussed at a later date. Suffice it to say that part of the work done during the past year will not bear fruit until well on in the coming year.

The output of gypsum will probably be larger than previously. Slowly, though surely, the idea of manufacturing plaster in Nova Scotia is gaining ground. Infusorial earth is again being worked and prepared for market. This enterprise, in which there are substantial profits, was dormant for some years. The quarrying of building and monumental stone shows little change.

The new tungsten district near Moose River, Halifax County, is being quietly and sanely developed. Everything indicates that a high grade ore will be obtainable in sufficient quantity to meet any probable demand for a long time to come.

In the main, Nova Scotia has improved her position as a mineral producer.

New Brunswick.—This Province continues loitering by the way. The Bathurst iron ore deposits are being rapidly exploited by the Canada Iron Corporation. No doubt these will become the backbone of a large industry. The quarrying of gypsum and limestone continues on about the same small scale as heretofore. The recently resuscitated antimony mine is apparently abandoned.

The outlook is brightened, however, by the successful development of the gas and oil region in the vicinity of Bathurst, and by the promised opening up of the extensive oil-shale deposits in the same region. The rumoured discovery of tungsten ore has not yet been corroborated.

Amongst the mineral possibilities of New Brunswick are copper, nickel, and manganese. None of these has been systematically examined. The Provincial Government is lamentably inert.

Quebec.—Inspired by the good fortune of her neighbour to the west, Quebec has bestirred herself to good effect. The appointment of a strong Commission to report upon the mining potentialities of the Chibougamau country, and the revision of the mining laws, were but an earnest of more radical improvements in the future. The Government's wisdom in selecting Mr. Theo. Denis for the post of Superintendent of Mines needs no further proof than the fact that he was the active cause of both the steps mentioned above. Incidentally, nothing has as yet been divulged officially as to the result of Chibougamau commission.

The principal mining industry of Quebec is, of course, asbestos mining. On January 1st, 1910, the aggregate capitalization of asbestos companies operating in the Province was reported to be more than thirty-five million dollars. The gross earning capacity of these companies at the same date was less than two and one-half million dollars. Mr. Denis, Superintendent of Mines, refers on another page in this issue to the overproduction that marked the past year. We are pleased to notice that he also alludes to the excellent condition of mines and mills, and that he expresses the conviction that, judging by the past, the present depression is only temporary. "From an annual production of a few tons thirty years ago," writes Mr. Denis, "the industry has grown to 65,000 tons, or more, and no one doubts that in a few months matters will have re-adjusted themselves, and the steady development will continue. On a smaller scale this has happened before, and periods of over-production and consequent depressions have been followed by periods of healthy growth."

The Weedon copper mine is a new producer. This is situated in Weedon Township. The Eustis copper mine has been a steady producer. Copper is being saved here from the mine water by precipitation with scrap iron. Copper mining, with the exception of these two mines, is not particularly active, although more prospecting is being done than heretofore.

The investigation of the alluvial gold deposits of Beauce County is the principal activity so far as this precious metal is concerned. A Montreal syndicate has obtained encouraging results and will commence operations next spring.

Graphite mining is looking up. The recent reorganization of the Buckingham Graphite Company,

Chrome ore mining has made no advance during the year. The mines and mills have been idle. The mica industry, also, has been sluggish. What orders are placed were filled from stock in hand. Iron ore mining, also, has preserved the even tenor of its way, the only room for expansion being limited by the investigation of titaniferous iron ores. The outputs of magnesite and of building material have increased.

Altogether the mineral products of the Province of Quebec have been augmented in value during 1910. During 1911 there should be an enlargement in the production of iron ore, copper ore, and asbestos.

Ontario.—The Province of Ontario has enjoyed a most prosperous year. Cobalt has more than held its own. This year's output of silver will probably exceed that of 1909 by twenty to twenty-five per cent. And Porcupine, appearing on the horizon at the psychological moment, has been accorded a better chance of rapid development than any other Ontario gold camp has ever had.

In Eastern Ontario much unobstrusive advance has been recorded. The introduction of cheap hydro-electric power has infused new life into several districts. Iron mining is active. Several old gold mines are being reopened. The production of talc is growing rapidly. Decorative marble, also, is being successfully quarried.

The output of nickel and copper from the Sudbury region has exceeded that of former years. The silver mines of Thunder Bay have been practically idle; but persistent efforts have been made to revivify several of the gold mines in the Lake of the Woods district.

The blast-furnaces of Ontario have had a busy year. Whilst the number of working iron mines is still very small, the outputs are increasing. The removal of the bounty does not appear to have affected the industry materially.

The yield of oil from Southeastern Ontario has continued to fall off, whilst the yield of natural gas has been larger than ever before.

In nearly all directions the mineral industries of Ontario have waxed stronger during 1910. The year has been marked by the continued utilization of natural water powers.

Alberta.—Alberta's output of coal for 1910 will exceed that of 1909 by a considerable amount. Many new coal prospects have been opened, and large areas have been staked in the western sections of the province. European, Canadian and American capital is flowing in. There is no doubt that Alberta will rapidly forge ahead in coal mining.

The snuffing out of twenty-four lives at the Bellevue colliery of the West Canada Coal Company marred the closing month of the year.

Closer and more efficient inspection of collieries is an absolute necessity in Alberta, as also is the removal of the administration of mining lands from the Department of the Interior at Ottawa.

British Columbia.—The annual returns of mineral production will show a fair net gain for British Columbia throughout 1910. and this, despite a falling off in lead, copper, and zinc. Serious fires checked the production of all three metals. In the case of copper, also, revision of the estimates made by the provincial mineralogist, which were based on assays of the ore instead of on actual smelter returns, contributed to pull down the annual total.

Gold, silver and coal were produced in larger quantities than those recorded for 1909. The outputs of coal from Vancouver Island and from Crow's Nest Pass were much enlarged.

The Portland Canal mining excitement subsided early in the summer. In some respects the district has been disappointing, but several genuinely encouraging mines are being worked by the best type of operators.

More attention is being paid to the Queen Charlotte Islands. Indeed, the west coast bids fair to grow into a very important mining region.

The Sheep Creek gold district has been the centre of sound work, and, incidentally, of some unnecessary stock manipulation.

Taken as a whole, the mining industry of British Columbia was never in healthier condition. The foundations are well laid for pronounced expansion in the future.

Yukon.—News from Yukon has not been plentiful this summer.. It is evident, however, that the gold output has been larger than that of 1909. Quartz mining, also, has been conducted on a small scale. More will be heard of this branch of the industry.

GENERAL.

Technical Education.—The appointment of the Commission on Technical Education was, amongst the import events of the year. That commission has held sessions in several mining towns, and in its final report will be much matter relating to mining education. As noted last year, New Brunswick is now the only province that has made no adequate provision for the technical training of the rising generation.

Conservation of Natural Resources.—The Federal Conservation Commission has been carrying on a campaign of useful publicity. The unfortunate incidents that marked the Commission's first attempt to deal with mining problems have been practically forgotten. There is little danger of a repetition.

The fact that the mining engineer has always applied the principle of conservation has been overlooked.

There is, of course, a notable mission for the Commission to perform. So far as it educates the public up to the ideals of conservation, it is doing a noble work. But more pains should be taken to consult with leading mining men, and to secure the sympathy of the whole mining fraternity.

Legislation.—As pointed out above, mining legislation is engaging the full attention of a strong committee of the Canadian Mining Institute, acting in collaboration with the authorities at Ottawa. Progress has been made and it is hoped that before the year is over a draft of new mining statutes will have been completed.

In each of the provinces minor changes have been made in the mining laws. The changes and improvements in the Quebec law have been the most radical.

Departmental.—Both the Geological Survey and the Mines Branch have done good service for the country at large. The Survey is getting closer to the actual needs of the country. Its system of periodical press bulletins has been resumed. The Mines Branch, although showing a tendency to dissipate its energy on labours that are only of remote value to the country, has taken hold of problems touching the use and handling of explosives, and the introduction of breathing apparatus in coal mining centres. Both branches need larger appropriations.

The Provincial Mines Departments of Nova Scotia, Quebec, Ontario, and British Columbia have been vigorous. Particular mention is due the British Columbia Department for the excellence of its reports. The Ontario Bureau of Mines is also to be commended in this respect.

Canadian Mining Institute.—The membership of the Institute has been added to considerably during 1910. West of Montreal the different branches are active. In Nova Scotia a branch is needed badly, as the Mining Society of that province shows no signs of life.

Generally, whilst the Institute has had none but local meetings since the annual dinner, it is quietly progressive, and is taking a leading part in the formulation of legislation.

There is to be no stir over the annual elections. For this we are sorry. An occasional difference of opinion is by no means an unmixed evil.

The Profession.—That the profession of mining engineering is playing a larger part in Canada is evidenced by the fact that never before have so many investors sought technical advice. Both Portland Canal and Porcupine are shining illustrations of this fact. Had it not been for the mining engineer, Porcupine would have been swamped with every variety of unmitigated fraud. We believe that the mining engineer is at last in a fair way to gain proper recognition.

* * *

For Canada and, quite incidentally, for ourselves the year 1910 has been a year of peace and prosperity. To all our readers we beg to extend the compliments of the season. May the New Year bring nothing but peace, progress, and profit!

RECIPROCITY IN COAL.

In our issue of November 15th there appeared an editorial upon the same vital subject that gives title to this. The former editorial has aroused the Maritime

Mining Record, Stellarton, N.S. It may be explained that the Record is a fortnightly that represents the coal mining interests of the Province. It is an open and perfervid opponent of reciprocity.

The Record's remarks concerning ourselves we shall willingly overlook. It has permitted its keen partizanship to cloud its judgment. In so far, however, as the Record represents eastern opinion, the opinion, at least of those who control the coal mining industry, and of a greater proportion of those whose livelihood depends upon that industry, it is entitled to a full hearing. Incidentally, discretion bids us have a care. The editor of the Record, a well-seasoned veteran, survivor of innumerable inky encounters, is not lightly to be challenged.

Apart, however, from the perilous pen of our maritime brother, we are deterred from entering into a war of words. This would only befog the real issue. That issue needs unbiased statement. The object of our former editorial was to emphasize this point.

We can assure the Record and the eastern operators that the CANADIAN MINING JOURNAL is strictly non-partizan. The reasonable claims of both the east and the west will have our instant support. But neither will find us a special advocate.

In more than one statement the Record is in error. For instance, when it asserts that we favour reciprocity, it is labouring under a complete eclipse of mental vision. The assertion, also, that the desire for reciprocity in coal is limited to "a score or so of American immigrants and a half score of small colliery operators in the west," was manifestly written in a moment of high excitement. It carries its own refutation.

One other misapprehension to which expression is given, is indicated in the last paragraph of our contemporary's interesting editorial. In this paragraph our suggestion that the whole matter be threshed out by the Canadian Mining Institute is vehemently damned; and the Institute is bluntly described as existing only for the benefit of the West. This is entirely erroneous. The Institute is a national body with international affiliations. It is the only national mining society in Canada. It is dominated by no sections or cliques. It is representative. The coal operators of Nova Scotia have always had more adequate representation in the Council of the Institute than the western operators have had. The Institute is not a tribunal; neither is it a star chamber. It is an organization whose only aim is to safeguard the mining industry of Canada. And its recommendations carry weight at Ottawa.

We regret, therefore, that our contemporary has so mistaken the spirit of our suggestion. The problem of reciprocity will be discussed at the annual meeting of the Canadian Mining Institute. It is fitting and necessary that it should be. And we sincerely trust that Nova Scotia's claim will be presented clearly, calmly, and without the accompaniment of fireworks. There are numerous aspects of the question that need investigation. We are of the opinion, for instance, that railway freight tariffs will provide food for thought. But the one essential is that the subject be approached with deliberation and courtesy.

We congratulate the believers in reciprocity on having so vigorous and so fearless an evangel and we merely suggest that smokeless powder can advantageously replace the older brand.

BANKS AND BUNKUM.

The Farmers' Bank of Canada suspended payment on December 20th. One of the incidents that led to the suspension was the investment of the bank's funds in the Keeley mine, South Lorrain, Ontario. In the course of a lawsuit that was settled adversely to the Farmers Bank immediately before it closed its doors, the judge commented harshly upon the unwisdom of the management, and sweepingly condemned the policy of mining investment on the part of such financial institutions.

With the wisdom or unwisdom of the Farmers Bank we are not concerned. It is humanly probable that the management's chief mistake lay in getting caught. Its larger brothers are not without sin; but they have more substantial reserves. They can drop incidental millions in Mexico without batting an eye. They can finance trusts and combines and promotions to any extent with profit to themselves, merely because it is their fixed habit to make the public pay. They have all the machinery necessary. The Farmers Bank had neither the machinery nor the cash. Therefore, its sister institutions will quietly appropriate its assets at a singularly low valuation.

This, however, is a digression. We referred to the judicial condemnation of mining investment. That condemnation was uncalled for. An investment may be either good or bad. The bank's investment, if it was bad, was not so merely because it was a mining investment. Properly controlled mining investments are as sound and as profitable as any other. It implies sheer ignorance of facts to dispute this, and to sound a warning against mining investment *per se* for the sole reason that one particular venture has been badly managed, is illogical in the extreme.

It is obviously true that a chartered bank has no right to speculate in mining. Investment, however, is a totally different thing. The investment of money in developed ore reserves may not only be justifiable, but it may also be extremely profitable. But it must always be postulated that the investment be directed on proper banking principles, and that advances be made against ascertained physical assets.

It will be a happier day for Canada when more of our banks put their (or, rather, our) money into Canadian mines rather than into tropical indiscretions and awful amalgamations.

If, for instance, the caution that is exercised in real estate investment, obtained in what is popularly known as mining investment, then no one would have ground for complaint. That this is possible is proved by the fact that leading English, French, and German financial houses are heavily interested in mines. The attitude of Canadian banks is neither sane nor business-like.

A TRUE HERO.

To the roll of heroes must be added the name of Fred Alderson. Alderson was a fire-boss at Hosmer, B.C. When news of the coal-mine disaster at Bellevue reached Hosmer, Alderson was amongst the first to volunteer as one of the rescue party immediately formed. After assisting in bringing out two men, he returned alone to the mine to attempt to rescue a third. He was then overcome by afterdamp, and all efforts to resuscitate him were unavailing.

Particularly grievous circumstances surround the death of Alderson. He left a wife and four young children in England. As his services were voluntarily given, no one is liable for compensation. His friends and associates are collecting money for the bereaved family, but no collection of this kind can be adequate.

Alderson was the best type of intelligent, loyal and brave Englishman. He hesitated not one moment in laying down his life in the attempt to save his fellows. No nobler death can be hoped for.

The Government of Alberta should act without delay. Such occasions do not arise often. The Government's manifest duty is to provide handsomely for Alderson's family. We cannot believe that any discussion of this point will be considered necessary.

PORTLAND CANAL.

Through the clear and forceful prelimanry report on the Portland Canal Mining Division, written by Mr. W. Fleet Robertson, we are enabled to give our readers a well-balanced idea of that much talked of camp. Mr. Robertson is satisfied that the camp has realized reasonable expectations so far as it has been developed. He deprecates strongly foolish attempts to circulate inflated reports.

An abstract of Mr. Robertson's report appears in this issue of the CANADIAN MINING JOURNAL.

BOOK REVIEWS.

RECORD OF THE FIRST SERIES (1908-09) OF THE BRITISH COAL DUST EXPERIMENTS CONDUCTED BY THE COMMITTEE APPOINTED BY THE MINING ASSOCIATION OF GREAT BRITAIN. 212 PAGES — ELABORATELY ILLUSTRATED WITH HALF-TONES, DIAGRAMS AND COLOURED PLATES. PRICE, $3.00 NET. PRINTED AND PUBLISHED BY THE COLLIERY GUARDIAN COMPANY, LIMITED, 30 FURNIVAL STREET, HOLBORN, LONDON, E.C.—1910.

This record of the coal-dust experiments carried out during 1908 and 1909 at the Altofts Experiments Station, is decidedly the most notable contribution to the literature of a subject that sorely needs attention. At no time could the appearance of such a volume be more timely than at present. The loss of nearly three score lives in a Canadian colliery has been followed by an awful coal mine disaster in Great Britain.

The magnificently illustrated volume before us is the first of a series. It presents the results of experiments dealing with the effect of dustless and stone dust zones upon explosions of a mixture of coal dust and air. Other investigations are not yet sufficiently advanced to warrant publicity. One definite result of the experiments under consideration is that the explosive nature of a mixture of coal dust and air in the absence of inflammable gas has been conclusively proved. The experiments were conducted in the absence of inflammable gas, and without permitted explosives.

The book is divided into two parts. Part I. covers the equipment used and the work done in determining the explosive nature of coal dust. In Part II. the mode of propagation of coal dust explosions is discussed.

A lucid summary of the work accomplished is appended, along with a synopsis of supplementary experiments with Welsh, Scotch, and South African coals.

The work herein described was begun and carried out by the Mining Association of Great Britain. A sum of £10,000 was raised by means of a levy on a tonnage basis, to which all the collieries in the association subscribed, Altofts, Yorkshire, was chosen as a suitably central location, and Mr. W. E. Garforth was placed in charge of the construction and operation of the gallery. The gallery was built on lines suggested by the same gentleman.

The gallery was constructed of second-hand boiler shells, principally made of wrought iron, 7-16 inch thick, but in some cases of steel. The main gallery was given a length of 600 feet; the return gallery a length of 295 feet. The main tube, or intake, is 7 feet 6 inches in diameter, and the return gallery 6 feet. The main tube is one straight length. The return is zig-zag in form, and 6 feet in diameter. Both are strengthened with hoops and chains. Full details of the construction are given in Part I., Chapter 2.

Suitable power equipment was also installed to run a "Siroceo" fan capable of passing 80,000 cubic feet of air per minute, with a water gauge of 3 inches. Many measuring and special devices were added, including a kinematograph.

Most interesting is the description of the expedients resorted to in conducting the coal dust experiments. These cannot be detailed here. But it is appropriate to remark that each step was conceived and completed with admirable care and thoroughness.

Chapter 3 of Part I. treats of the explosiveness of coal dust when raised as a cloud in air. Chapter 4 takes up fully the chemical analysis of coal dust. Then follows a description of the instruments used in measuring pressure, velocity, products of combustion and temperature. Next come chapters on experiments in checking explosions with stone dust, laboratory investigations and microscopical investigations.

The contents of Part II. have already been indicated.

The summary contains an outline of the objects and results of the coal dust experiments. Here, also, allu-

sion is made to the many important questions that are to be tackled in the future.

Three paragraphs are herewith quoted, one to define the object, one to define the results, and one to show the future direction, of the present enquiry.

"The main objects of this enquiry are (1) to demonstrate, as conclusively as possible, the danger that exists from the presence of fine coal dust in the roadways of mines; (2) to discover, if possible, an effective remedy as an alternative to watering; and (3) to investigate the chemical and physical phenomena that accompany coal dust explosions."

"The fact that coal dust, in the complete absence of fire-damp, is explosive when raised as a cloud in air and ignited, has, in the opinion of all who have witnessed the experiments, been definitely established. The information which the Royal Commission on Accidents in Mines desired . . . has thus been obtained, and the controversy which has existed for more than a quarter of a century has been finally set at rest."

"Of the many other questions, (to be attacked in the future), perhaps the most important are:

(a) The determination of the maximum and of the minimum quantity of coal dust that will allow explosion to be propagated; either in pure air or in air containing a small percentage of fire-damp.

(b) The testing of permitted explosives under various conditions.

(c) The determination of the minimum volume, intensity and duration of flame necessary to cause ignition of coal dust when raised as a cloud in air."

* * *

It is not hyperbole to state that the volume before us is the most important pronouncement upon certain phases of the coal dust problem that has ever been printed. In fact it is, so far as we are aware, the only final and authoritative exposition extant. Without doubt, no coal mine operator can afford not to study it carefully.

As regards the typography and general presswork it is difficult to speak too highly. The type is large; clear, and clean. The paper is of excellent quality. The photogravures and coloured plates are as near perfection as can be. The price is disproportionately low. Possibly this may account for the one incidental shortcoming, the flimsy binding.

Both the compilers and the publishers deserve praise for the standard that they have set.

PRACTICAL SHAFT SINKING, BY FRANCIS DONALDSON, M.E., CHIEF ENGINEER THE DRAVO CONTRACTING COMPANY, 143 PAGES, ILLUSTRATED WITH HALF-TONES AND DIAGRAMS. PRICE $2.00, NET. McGRAW-HILL BOOK COMPANY, 239 WEST 39TH STREET, NEW YORK, 6 BOUVERIE STREET, LONDON, E.C. 1910.

For Canadian operators no book could be more timely than this. At the present time hundreds of new shafts are being sunk in opening up new properties. It is not unusual to see painfully careless work done. This is needless and costly. A good shaft is cheaper than a bad one.

The ten chapters are headed thus:—

1. Some deep shafts—features of contracts for sinking—form of contract.

2. Plant required—boilers, hoisting engines, headframe, and bucket—air compressors.

3. Sinking through surface—soft ground—wooden sheeting—steel sheeting—caissons of steel, wood, or concrete.

4. Sinking through soft ground—pneumatic process—shield method.

5. Sinking in rock—arrangement of holes—tools and methods used in drilling—costs and speed.

6. The sinking-drum process—mammoth pump—the freezing process.

7. The Kind-Chaudron boring process—cementation of water-bearing fissures.

8. Lifting water—horizontal vs. vertical pumps——handling pumps in shaft—Cornish pumps.

9. Shaft linings.

10. Concrete linings—costs per linear foot for rectangular, elliptical, and quadrilateral shafts.

"Practical Shaft Sinking" is intended rather for the engineer in charge of very large operations, than for the small operator. For instance, in the section on cementation of water-bearing fissures, the use of core drills is advised for locating the fissures. This presupposes a class of work that the engineer is very rarely called upon to undertake. Hence the volume may fairly be placed in the category of specialized hand-books.

MORE RECENT CYANIDE PRACTICE, EDITED BY H. FOSTER BAIN, 424 PAGES, ILLUSTRATED. PRICE $2.00 POSTPAID. PUBLISHED BY THE MINING AND SCIENTIFIC PRESS, 667 HOWARD STREET, SAN FRANCISCO, AND THE MINING MAGAZINE, 819 SALISBURY HOUSE, LONDON, E.C. 1910.

Like its predecessor, "Recent Cyanide Practice," the volume before us is a compilation of articles culled from Mining and Scientific Press. "More Recent Cyanide Practice" not only supplements the former book, but also touches new fields.

As there are some dozens of contributors, there are, necessarily, conflicting views expressed. No effort has been made to smooth over these differences of opinion. Each article is given for what it is worth.

The articles are arranged logically, the first dealing with ore-crushing, sliming, tube-mill practice, and so on; and the rest touching successive phases of mill work. Filtering, agitation, assaying, testing, and kindred topics are discussed.

"More Recent Cyanide Practice" is by no means a complete handbook; it is a suggestive collection of practical data, of data that will help the millwright, the operator, the chemist, and the general reader.

COMPRESSED AIR PLANT—THE PRODUCTION, TRANSMISSION AND USE OF COMPRESSED AIR, WITH SPECIAL REFERENCE TO MINE SERVICE. BY ROBERT PEELE, PROFESSOR OF MINING IN THE SCHOOL OF MINES, COLUMBIA UNIVERSITY. SECOND EDITION—REVISED AND ENLARGED; 502 PAGES, ILLUSTRATED. PRICE $3.50 NET. PUBLISHED BY JOHN WILEY & SONS, NEW YORK, 1910.

"Compressed Air Plant" has already been reviewed in these columns (see page 505, Vol. 229, 1908) The second edition is larger and more complete. Attention is paid to the construction and operation of rock-drills, coal-cutting machines, and channeling machine. Chapter X. is a record of compressor tests made in Cobalt. The material of the chapter appeared first in the CANADIAN MINING JOURNAL February 15, 1910. Acknowledgement of this fact is omitted.

The increase in price—the former price was $3—is quite justified.

"Peele's Compressed Air" is now accepted as a standard work. The engineer who is armed with it and with another book reviewed in this issue, is fortified against all the slings and arrows of refractory compressors and inefficient drills.

COAL MINING IN CAPE BRETON DURING 1910.

(A Resume by our Glace Bay Correspondent.)

The year 1910 has been one of consistent progress and compares very favourably with the years before the labour troubles that have disturbed Nova Scotia so recently, and have not yet entirely disappeared. With the single exception of the Cumberland Coal & Railway Company, the outputs of all the Nova Scotian Coal Companies will equal the figures of 1907 and 1908.

The outstanding features of the year have been the "merger" of the Dominion Coal Company with the Dominion Iron & Steel Company, under the common control of the Dominion Steel Corporation, and the ending of the United Mine Workers' strike at Glace Bay. Early in the year the new management of the Dominion Coal Company announced that recognition of the United Mine Workers was against the policy of the company, who were, however, and always had been, perfectly willing to receive committees of their workmen. During the first quarter of the year several attempts were made to end the strike, but proved unsuccessful, owing to the insistence of the United Mine Workers upon formal recognition of their union. At the end of April the U.M.W. leaders abandoned their position, recognizing that it was an untenable one, and advised the strikers to return to work. They commenced to do this at the beginning of May, and by the end of that month places had been found for the majority of the men who had been on strike.

Beyond the ordinary accident rate, it is gratifying to relate that there have been no serious disasters in Cape Breton coal mines during the year. In February what might very easily have been a serious cage accident at No. 2 Colliery was averted by the successful operation of safety detaching hooks. In this accident several men were injured, but there was no loss of life. In March, two corps of trained men, with Draeger apparatus and accessories, were sent from the Nova Scotia Steel & Coal Company and the Dominion Coal Company to aid in fighting a mine fire at the Albion mine of the Acadia Coal Company, and they were able to afford valuable assistance.

The final report of the Eight-Hour-Day Commission was presented to the Nova Scotia Legislature at the spring session. The gist of the report, so far as it related to coal mining, was that the Commission were unable to report in favour of a shorter day, although it was stated that they would gladly have done so had the facts permitted. The report stated that a general and compulsory eight-hour law "would be at present a fatal blow to the industrial prospects of Nova Scotia."

Some rather extraordinary legislation was proposed arising out of the U.M.W. strike. One bill proposed to enact compulsory recognition of labour unions by employers of labour under penalty of fines, such fines to be collected by the union demanding recognition. It is needless to state that such a proposal did not become law.

The report of Mr. T. E. Forster, of Newcastle-on-Tyne, on the future methods to be pursued in the extraction of the submarine coal areas of the province was presented to the House, but no legislation in connection therewith was proposed.

The Government introduced a Workmen's Compensation Act, which followed closely the lines of the British Compensation Act. The proposed legislation met with opposition from the Colliery Relief Societies, and committees from these represented to the Government that the Compensation Act proposed would, in all probability, react disastrously upon the societies, which had been in satisfactory operation for some fifteen years. Acting upon the representations made by these committees, the Government exempted from the operation of the Compensation Act such steel works and collieries at which properly constituted relief societies were in existence, provided that such societies had the approval of the Government and were able to afford adequate relief to disabled members. The Relief Societies at the collieries of the Dominion Coal Company, hitherto existing as independent societies, amalgamated at the first of July into one large society, now known as the Dominion Coal Company Employees' Benefit Society. This organization is supported by a contribution of 50c. per man per month from the members, 50c. per month per member from the Coal Company, and a contribution from the Government of three-quarters of one cent per ton on all coal paying royalty. The Government's contribution amounts to about 12c. per month per man, thus the society has an income of, approximately, $1.12 per member per month. The relief paid is $6.00 per week for twenty-six weeks for disability to work, whether caused by accident or by sickness, followed by half pay for a further period of twenty-six weeks; then by $2.00 per week for two years. After which time, if the disability continues, a special grant may be made at the discretion of the society. At death, whether from natural causes or accident, a payment of $100.00 is made immediately to the dependents of the deceased, and an allowance of $8.00 per month for five years is made to the widow, with $3.00 per month for each child until it attains the age of fourteen years. In addition to these regular benefits, special grants may be made for loss of limbs, total disability or loss of eyesight. After four months operation, the total funds to the credit of this society amounted to $83,000. When circumstances will allow, it is proposed to inaugurate an old age pension scheme, for which purpose the sum of $25,000 has already been set aside. By the end of the year it is expected that the membership of the society will be over seven thousand. One of the chief reasons advanced by the Relief Societies in asking that no legislation should be enacted which would interfere with their continuance was that the greater proportion of the relief paid in the past had been for sickness. The experience of the old societies was that, while 35 per cent. of the moneys paid out in relief was for disability caused by accident, 55 per cent. was paid for disability resulting from sickness. In the operation of the new society, so far, the same thing has been observed, more particularly as the year 1910 has been remarkable for the large number of cases of infectious diseases which have occurred in the colliery districts. The consolidation of the funds of the branch societies into one central treasury has made it possible to obtain a higher interest rate on the accumulated funds than was previously possible, and it is expected that the cost of management will be also considerably reduced. The consolidation has further given greater stability and permanence to the societies, particularly at old collieries which before many years have passed will be abandoned by reason of exhaustion.

In August the Royal Commission appointed by the Federal Government to inquire into the status of technical education in Canada, visited Glace Bay and Sydney.

The sitting at Glace Bay was noteworthy by reason of the evidence given by colliery officials of all grades who had achieved their present positions largely through the facilities for technical education in mining afforded by the Nova Scotian Government.

At the end of 1909 the Coal Companies of Nova Scotia at whose works strikes of the United Mine Workers were in progress, were proceeded against at the instance of this union on a charge of conspiracy to raise the price of coal and increase the cost of mining. After a protracted trial, chiefly remarkable for the amusement which the statements of the witnesses afforded the public, the grand jury of the Supreme Court of Nova Scotia found "No Bill."

In September, the Federal Government called a conference of manufacturers of explosives, mine managers and others interested in the manufacture and use of explosives, to confer as to suitable legislation in connection therewith. The Canadian Government has obtained the services of Captain Desborough, of the Woolwich Arsenal Testing Station, and it is expected that a bill governing the manufacture and use of explosives in Canada will be drafted for presentation to Parliament during the winter. This is a matter which intimately concerns all interested in coal mines, and it may be observed in passing that the Nova Scotian regulations governing the use of explosives in mines are comprehensive and based on large experience.

The most marked development has taken place in the Lingan-Victoria field, worked by the Dominion Coal Company. No. 12 Colliery is now producing about 1,000 tons per day, and No. 14 Colliery (which is also on the Victoria seam) will be in a position by next spring to produce up to 800 tons daily. No. 15 Colliery (on the Lingan seam) is in the developing stage, and will have an output in the 1911 season of about 250 tons daily. The permanent bankhead and other colliery erections will be undertaken next year. The site of No. 16 Colliery (Lingan seam) is cleared and the work of development will be proceeded with at a rate which will bring this colliery to its average production in 1913. It is less than three years since the first openings were made in this district, and it now has a population approaching two thousand, and a monthly production of 30,000 tons of coal. A project is under consideration to extend the tram lines of the Cape Breton Electric Company to the new collieries, and give communication with Glace Bay and Sydney. The extension of the Dominion Coal Company's operations to this coalfield has resulted in a great increase in property values, and it will not be many years until the Lingan district will rival Glace Bay.

Considerable underground development work has been done at the new mine of the Dominion Steel Corporation at Birch Grove. This is situated on what are known as the Cumberland areas, lying immediately to the rear of the Dominion Coal Company's areas in the Glace Bay basin. As yet no permanent surface buildings have been erected.

An innovation in colliery practice in Nova Scotia which is likely to be largely followed is the exhaust steam turbine which has been installed at Dominion No. 2 Colliery. This turbo-generator unit consists of a Rateau impulse-type, five-stage, multi-cellular, low-pressure turbine directly connected with a Brown Boveri 1,000 k.w. alternator. The plant includes a barometric condenser with the necessary air pumps and centrifugal pumps for the condensing water. It is more than probable that a second turbo-unit will be installed side by side with the present one, as there is still a large amount of waste steam which it is possible to utilize. This is the first application of exhaust-steam turbines to colliery power requirements which has been made in Canada.

An automatic coal-handling plant for the large boiler house at Dominion No. 2 Colliery is to be installed shortly, the contract for this having been already let.

The Dominion Coal Company has decided to erect a modern coal washery having a capacity of 120 tons per hour. It is probable that the washer will be of the Baum type, but the contract is not let at the time of writing. No washer on this principle has as yet been erected on this side of the Atlantic.

THE MINING INDUSTRY IN THE PROVINCE OF QUEBEC DURING, 1910

(Written for the CANADIAN MINING JOURNAL, by Theo. DENIS, Superintendent of Mines for Quebec.)

The radical changes introduced in 1909 in the Quebec Mining Law have now been in force for over a year, and all the mining rights which were held under the old prospecting licenses were not renewed after their expiration on the first of January, 1910.

The results of the new provisions of the mining law have been very satisfactory, and although one year is too short a period from which to draw definite conclusions, it is gratifying to note that during 1910, prospecting in the Province of Quebec received a decided impetus, which, in a great measure, was stimulated by the changes in the Mining Law.

Figures of production for the year are not yet at hand, as returns from mining companies are received during January, but it may be said that everything points to an appreciable increase in the total figures, which in all likelihood will reach the $6,000,000 mark.

Asbestos.

Asbestos is, of course, the backbone of the Quebec mining industry. It is now ancient history that eighteen months ago some of the important mines at Thetford, Black Lake, were consolidated into two large syndicates with a capitalization of $25,000,000 and $5,000,000 respectively. It was claimed at the time of the promotion and organization of these mergers that very beneficial results could be derived from such a policy. Among these are economy in management and in the sales department, campaigns of publicity to extend the uses of asbestos and a consequent stimulation of the industry. Great stress was laid on the question of standardizing the grades of asbestos, which, up to the time of the merging had to be sold practically on samples, as each mine had a different grading of the various products of the mills. As a matter of fact, in 1909 some 35 names of

grades of "mill-stock" were used, to designate the various qualities produced by the different mills of the district, and this must have been rather bewildering to the buyer. A great improvement in the standardizing has since taken place; but, on the other hand, it must be owned that all the benefits derived from the consolidation of interests could just as well have been attained with a lower capitalization. A glance backward will show that on January 1st, 1910, the total capitalization of the asbestos companies which sent in returns of production was over thirty-five million dollars, whereas the total value of the products of the mines was slightly under two and a half million dollars.

The stimulus which asbestos mining received in 1910 was indeed very notable during the first seven months of the year. The mines were working night shifts, as well as day shifts, and the mills were producing actively. In some cases this activity was probably induced by the hope of making a creditable financial showing in spite of the heavy obligations always inherent to high capitalization. Unfortunately, the consumption of asbestos did not keep pace with the increase of production, the latter gradually creeping ahead of the former, and, as a result, the industry is at present going through a crisis, the severity of which, however, must not be exaggerated. Stocks on hand are very large, a great many mines have had to shut down altogether, and all the others have curtailed their production. The aim in view was certainly not attained, and the high pressure production did not result in high dividends.

That the present tightness of the asbestos market is only temporary is very patent by the past records. From an annual production of a few tons thirty years ago, the industry has grown to 65,000 tons or more, and no one doubts that in a few months matters will have readjusted themselves and the steady development will continue. On a smaller scale this has happened before, and periods of overproduction and consequent depressions have been followed by periods of healthy growth.

From the technical standpoint the mines and mills are in splendid shape. Economics of all sorts have been introduced in all the branches of the industry.

The Bell mines have gone on steadily with their underground development work, and they now have a proved territory representing a large tonnage all blocked out. In depth, the mines of the district show no decrease whatever in the asbestos content of the rock and faith in the life of the deposits has been shown by the construction of new mills and the extension of old ones.

The Black Lake Consolidated has erected a new mill of a capacity of some 1,200 tons of rock a day, adopting the new Torrey Cyclones, which proved so satisfactory at Danville.

The Jacobs Asbestos Company, who re-opened the old Murphy mine in 1909, erected a large mill and both the mine and the mill are giving satisfactory results.

The Bell Asbestos Mines enlarged their mill, which has now a capacity of about 1,000 tons of rock a day.

The figures of shipment of asbestos will show a substantial increase over those of the previous year, in spite of the comparatively large stocks on hand.

Copper.

A new mine has been added to the list of shipping mines. This is the Weedon mine, situated on Lot 22, Range II., of Weedon Township. The deposit worked here was discovered by Mr. McDonald, a couple of years ago. After proving the existence of an important deposit of cupriferous sulphides, the Eastern Canada Smelting Company acquired the property and is now working it systematically.

The nature of the deposit greatly resembles the one successfully worked at the Eustis mine. But the copper contents of the Weedon ore shipped so far are higher than in the Eustis ore.

The slope of the Eustis mine has now attained a length of 3,000 feet and ore has been shipped steadily. It is interesting to note that the manager, Mr. Adsit, is now saving an appreciable amount of copper by passing the mine water over scrap iron.

The small copper smelter at Actonvale was completed and operations begun, but it is yet in the experimental stage. It consists in the main of a water jacketed furnace of a capacity of 80 tons a day, with the accessory apparatus, blower, forehearth boiler, etc. The original intention was to treat the large dumps of the old Actonvale mine, but this is low-grade and will require concentrating.

Mr. A. O. Norton went on with the development work at the Suffolk mine, but no shipments were effected.

The old Ascot mine, the Harrington mine, and the Hepburn mine also received attention, but on a small scale, and all the work done was of a prospecting nature.

Some work was also effected on copper deposits in the Beauce district, near St. Joseph, on veins containing an appreciable quantity of bornite and chalcopyrite.

Gold.

The alluvial deposits of the Beauce region have been the object of special attention on the part of a Montreal Syndicate, incorporated under the name of the Dominion Gold Fields Company. This syndicate, in the latter part of 1909, acquired the gold and silver mining rights of the de Lery estate over the whole of the Rigaud-Vaudreuil Seigniory, and immediately set to work to do systematic prospecting. During 1910 several series of bore holes, by means of Empire drills and a Keystone drill, were put down to test the gravel down to bed rock. The results have been very encouraging, and after testing the auriferous ground, on the Gilbert River, the Des Plantes River, and the Meules Creek, the company has decided for the present to concentrate operations on the last-named stream. Water for hydraulicking is obtained from Lake Fortin, a sheet of water 1¼ miles by ¾ mile, and is to be brought to the workings by a ditch 7 miles long, part of which is flumed. The tailings will be disposed of by an elevator and stacker 45 feet high, and the ground attacked by two monitors under a head of water of over 200 feet. The ditch is now practically finished, the elevator is being constructed by the New York Engineering Company, and it is expected that early next spring the plant will be in operation.

Graphite.

Three companies have been working the graphite deposits of the Buckingham district, and substantial shipments of the refined products are said to have been made. The success of the graphite industry in Canada resolves itself into a question of concentration. That the deposits of disseminated graphite are very extensive has been known for a number of years; during 1910 improvements have been introduced, and it is claimed that the question is satisfactorily solved and that the graphite industry is now on a more solid basis than ever before.

A new important deposit has been opened on lots 20 and 21, Range V., of the township of Buckingham, on what is known as the Stuart property. The ore has been exposed over a large surface, and is said to average 15 per cent. graphite of which 10 to 12 can be saved. The erection of a 200-ton mill is contemplated.

A new syndicate, "Graphite, Limited," is opening a deposit on Lots 16 and 17, Range VII., of the township of Amherst.

On the whole, the outlook of the graphite industry for 1911 is promising.

Chrome Iron Ore.

Practically nothing was done in chrome mining during 1910. All the mines and mills were closed down, and if any shipments were made it was from stocks on hand.

The chrome deposits of the serpentine belt are essentially concentrating propositions, and are at a disadvantage when competing with New Caledonia and Turkish ores. It is said that these can be delivered in New York at $14.00 and less per gross ton, or $12.50 per ton of 2,000 lbs., whereas under present conditions $15.00 for Canadian ore does not leave much margin for profit.

Mica.

The mica industry was very quiet throughout the year. During 1909 the prices had been unsatisfactory and large stocks had accumulated. The greater part of the shipments effected during 1910 was from the stocks.

Iron.

Nothing of note occurred in the iron industry. The furnace at Radnor Forges produced steadily, but as in past years the greater part of the ore used comes from Ontario.

Titaniferous Iron Ore.

The very large deposits of titaniferous iron ore of the province attracted a great deal of attention during the year. Numerous enquiries concerning these were received at the Bureau of Mines and several deposits were examined by American engineers. Experiments on mechanical elimination of the TiO_2 have been going on for some time in the United States, and some iron producers are willing to enter into contracts for ore of 50 per cent. iron and 20 per cent. TiO_2. Several thousand tons have been shipped from the St. Urbain deposits to titanium steel manufacturers.

Magnesite.

The Canadian Magnesite Company is working the deposit in the township of Grenville and production this year will be appreciably greater than in 1909. This magnesite is used in the manufacture of aerated waters and also in the manufacture of a flooring cement of high quality.

Building Materials.

The development of the building material industries is, of course, steadily increasing with the growth of population and expansion of the other industries. The output of the quarries of limestone, granite, and other stone will certainly show a substantial increase. We note the opening of a new marble quarry at South Stukeley, which is now producing a beautiful ornamental stone. The marble quarries of Philipsburg have worked steadily throughout the year, and their stone finds a very good market both in Canada and in the United States.

The northern part of the Province of Quebec is beginning to attract a well deserved attention, more especially in the northwest parts of the province in the Temiskaming and Abittibi regions. The extensive patches of Huronian rocks, which will be made comparatively accessible by the Transcontinental Railway, will in all probability well repay thorough and systematic prospecting operations. A promising deposit of gold is being developed at Lake Opasatica. Large quantities of molybdenite are said to be available at Lake Kewagama and a great deal of development work was done on this deposit during the summer by a Quebec syndicate. On the whole, we may look forward to a substantial development and an expansion of the mining industry in both the settled parts of the Province of Quebec and in its "hinterland."

ONTARIO IN 1910

Written for the CANADIAN MINING JOURNAL by T. W. GIBSON, Deputy Minister of Mines.

The mining industry of Ontario continues to make rapid and steady progress. In money value at the point of production and in the form produced, the output of the mines and mineral works for 1910 was worth about 30 million dollars, while, if based upon the refined metals or products, the value would be increased by about 13 millions—say 43 millions in all. The aggregate for the whole of Canada on this basis in 1909 was 90 million dollars; consequently, Ontario is now turning out in value almost one-half the total production of the Dominion. As this province produces no coal—the output of which in Nova Scotia, British Columbia and Alberta amounts to about 24 or 25 million dollars per annum—it is apparent that in the production of metals Ontario easily takes first place among the provinces.

Silver.

In the list of Ontario metals silver and nickel are the chief, claiming the Cobalt and Sudbury districts as their respective places of production. The yield of silver from the Cobalt mines began in 1904 with 206,875 ounces; in 1910 it may be put down at not less than 27 million ounces. For the first nine months of the year the yield was 19,791,033 ounces, and, as the last quarter is expected to show a somewhat increased production, 27 million ounces may be accepted as a conservative estimate. For the seven years, 1904 to 1910 inclusive, Cobalt has added over 90 million ounces to the world's stock of silver. Ontario's annual production is now about three-eighths that of Mexico, and fully one-half that of the United States, the two leading silver-producing countries.

An analysis of the shipments for the first nine months of last year does not show that there has as yet been any serious diminution in the silver contents of the Cobalt ores. In 1904 the average of the shipments was 1,309 ounces per ton; in 1905, 1,143 ounces; in 1906, 1,013 ounces. During these first three years of the camp's existence, high-grade ores only were shipped, and the figures showing the average silver contents reflect this fact. In 1907 low-grade ores began to be sent out freely, and the average fell to 667 ounces per ton. Concentration plants came into use in 1908, and ore shipments that year averaged 736 ounces silver per ton, rising in 1909 to 809 ounces. The ore shipped during the first nine months of 1910 contained on an average 767 ounces. Shipments for this period were ore, 19,191 tons; concentrates 4,633 tons.

The list of producing mines remained much the same as in 1909. It included Nipissing, Crown Reserve, Kerr

Lake, La Rose, McKinley-Darragh-Savage, Coniagas, O'Brien, Temiskaming, Buffalo, Hudson Bay, Trethewey, etc. One feature of the year was the rise of Temiskaming.

In South Lorrain, Wettlaufer is attracting considerable attention, and in Gowganda, Millerett and Miller Lake-O'Brien, particularly the former, have shipped considerable high-grade material. Neither of these fields, however, has as yet shown the qualities of a Cobalt.

It is satisfactory to know that a large part of the Cobalt production is now treated in refining works within the boundaries of the province. At Deloro, Thorold and Copper Cliff well-equipped smelters are now turning out merchantable bars which go direct to the great silver marts of the world, principally London.

Nickel.

The second staple of the mining industry of Ontario is nickel, the output of which is increasing with much rapidity. Ten years ago the nickel mines yielded 3,540 tons of the metal; five years later this had risen to 9,503 tons, while in 1910 the output will be in the neighbourhood of 18,000 tons. It is curious that in the ores of both nickel and cobalt, the French penal island, New Caledonia, has until lately been the chief competitor of Ontario. The advantage in each has proved to be with this province, and the nickel and cobalt deposits of New Caledonia are now but little worked.

At the Sudbury mines, as is well known, the ore is a pyrrhotite carrying both nickel and copper, the former predominating. After being raised and crushed the ore is roasted in the open air and afterwards smelted in blast furnaces to a bessemer matte, containing say, eighty per cent. of nickel and copper. A considerable quantity of ore, however, is now smelted without preliminary roasting. The matte is exported to the United States and England where final separation of the metals takes place. The producers are the Canadian Copper Company and the Mond Nickel Company, the former being the larger concern. The principal deposits worked by the Canadian Copper Company are the Creighton and Crean Hill mines, the former being richer in nickel than in copper, the latter vice versa. The Mond Company has for years worked the ore bodies at Victoria Mines, but, latterly, has operated as well the Garson mine in the township of that name, and is contemplating the removal of its smelter to a point on the railway nearer that property. The outcrop of nickeliferous pyrrhotite in Dundonald Township, on the T. & N. O. Railway, which so much resembles the Sudbury ores, did not undergo any further development during 1910. It is said that the result of diamond drilling by the Canadian Copper Company did not prove the existence of large bodies of ore.

Gold.

There is ground for hope that the long record of disappointment in connection with gold mining in Ontario is about to be broken. The spectacular showings of free gold in the quartz outcrops at Porcupine have been worked to considerable extent during the past year, and further discoveries as well have been made. It is fortunate that some of the most promising finds passed into the control of capitalists well able to test them, as in the case of the Timmins and the Dome mines. At both, small experimental stamp mills are being replaced by larger plants. Now that nature and winter have given Porcupine passable roads, machinery and supplies are pouring into the camp, and next year will undoubtedly make or break its reputation as a gold producer.

The Ontario Government has intimated its intention of building a branch of the T. & N. O. Railway from the main line near Kelso into the new gold field, a distance of about 30 miles. The country is not rough and there are large areas of farming lands surrounding the mining camps. The gold at Porcupine is found in veins contained in Keewatin and Huronian rocks, the veins themselves being mostly composed of quartz, and also in some instances of ferruginous carbonate cut by quartz stringers. At Long Lake, on the Sault branch of the C.P.R., a promising gold prospect is being operated by the Canadian Exploration Company, of Montreal. The ore contains some arsenic.

Iron.

The mines producing iron ore are, Helen mine at Michipicoten, Moose Mountain, Atikokan, and Bessemer, the last-named being in the County of Hastings. During the first nine months of 1910 the output was 121,488 tons. The blast furnaces at Port Arthur, Sault Ste. Marie, Midland, Hamilton and Deseronto during the same period produced 319,698 tons of pig iron, and the total production for the year will probably be 425,000 tons.

Copper.

The chief source of copper is the Sudbury pyrrhotite, and, to some extent, this metal is a by-product of nickel mining. For the first nine months of 1910 the matte product of the Sudbury furnaces contained 7,168 tons of copper, and the yield for the full year would, at this rate, be in the neighbourhood of 9,500 tons, which is 1,500 tons more than the output for 1909. There are deposits of chalcopyrite at Bruce Mines and elsewhere on the north shore of Lake Huron, and also on the north shore of Lake Superior, but at present these do not contribute largely to the production of copper.

Cobalt.

An interesting example of the disturbance of market conditions, caused by excessive production of any one useful commodity, is afforded by the present condition of the cobalt oxide industry. The enforced production of cobalt ore at the silver mines in the Cobalt district is now far beyond the world's capacity for consuming cobalt products, the principal of which is the oxide, mainly employed to give a beautiful blue colour in the china and enamelled ware trade. In consequence the price has fallen from $2.50 to 80 cents per pound, with the possibility of a further decline. It may be that the cheapness of cobalt will open up new uses for the metal or its compound. An alloy of cobalt and chromium has been invented and is said to be very suitable for the manufacture of cutlery.

Southwestern Ontario.

It must not be overlooked that the southwestern peninsula of Ontario is an important source of production for a number of useful mineral substances, including petroleum, natural gas, salt and gypsum. The output of crude petroleum has been declining for a number of years, and the downward curve continued during 1910. The yield in 1909 was 14,723,105 imperial gallons, while in 1910 the output will probably prove not to be in excess of 11,000,000 gallons. The decrease is apparent not only in the older oil fields of Petrolea and Oil Springs, but also, and even in a greater degree, in the new districts of Tilbury and Romney, and this, in despite of the bounty of 1 1-2 cents per gallon of crude petroleum, paid by the Dominion Government.

Natural gas wells are, on the contrary, yielding more freely than ever before, and the output which in 1909 was valued at $1,888,179 will probably be exceeded by the yield of 1910. The benefits of this cheap and most

efficient fuel are now being enjoyed by the villages, towns, and cities of Southwestern Ontario, and, to a considerable degree, by the farming population as well. The gas fields are confined to the counties lying on the north shore of Lake Erie.

The salt industry has its seat along the eastern shores of Lakes Huron and St. Clair, the Canadian Salt Company, of Windsor, being the largest producer. Brine is pumped and evaporated.

Water Power.

The abundance of water power in the mining districts of Ontario is a favourable feature, conducing to economy in the operation of mines. In the Cobalt camp generation of power from wood or coal has practically come to an end, and the mines and mining works are now almost wholly operated by means of electricity obtained from water power situated on the Montreal and Matabitchouan Rivers. The cost of power in this way has been reduced from $150 or $175 per horse power per annum to $50. A similar development has taken place in the nickel region. The Canadian Copper Company and the Mond Nickel Company have developed water powers, one on the Spanish and the other on the Vermillion River, and both now work their mines and operate their machinery by the electric current. The Helen mine is also being operated by electric power derived from the Michipicoten River. In the Porcupine gold camp there are falls within convenient distance capable of affording all the power which the camp will require. Similar conditions exist in the mining districts of Eastern Ontario, where mines of graphite and pyrites, cement works and, at least, one smelting plant are operated by electric power produced by falling water. In estimating the advantages of the mining regions of Ontario this feature should not be left out of account.

Minor industries, yet in the aggregate of considerable importance, based on such materials as corundum, mica, graphite, pyrite, talc, etc., do not exhaust the long and varied list of the mineral resources of this province. Clay for brick and tile-making is abundant; so is limestone for building purposes and the manufacture of lime, and many varieties of granite and sandstone are easily procurable. Beds of the most beautiful varieties of marble for decorative interiors have been located, and are now being worked in the County of Hastings.

BRITISH COLUMBIA.

By E. Jacobs, Victoria, B.C.

An estimate of the mineral production of British Columbia in 1910 gives a net increase in value of $1,550,665, as shown in the accompanying table. It will be seen, though, that this is chiefly due to a substantial increase in coal, for with the exception of gold and a small addition to last year's total of silver, there was a decrease in the other minerals, these including lead, copper, zinc, and coke. Speaking generally, there has been a check in the production of lead, copper, and zinc, of the metalliferous minerals. In the case of copper, though, the opinion may be expressed that it is more apparent than real, for there appear to be grounds for concluding that last year's copper returns supplied to the Department of Mines in one or two important instances gave the assay value of the ore rather than the quantity of copper actually recovered at the smeltery. On the contrary, it is believed the figures used in the estimate presented herewith show the copper recovered. The estimate for 1910 follows:

Gold, placer, oz..	24,100	$482,000	I. $5,000
Gold, lode, oz...	257,000	5,312,190	I. 388,100
Total gold, oz.	281,100	$5,794,190	I. $393,100
Silver, oz	2,500,000	1,282,500	I. 43,230
Lead, lb.	37,000,000	1,480,000	D. 229,259
Copper, lb.	39,000,000	4,972,500	D. 946,022
Zinc, lb.	4,000,000	184,000	D. 216,000
Total metalliferous		$13,713,190	D. $954,951
Coal, tons, 2240 lb.	2,799,000	9,796,500	I. 2,773,834
Coke, tons, 2240 lb.	214,000	1,284,000	D. 268,218
Building materials, etc....		1,200,000	.....
Total mineral production.		$25,993,690	I. $1,550,665

In making calculations, the Engineering and Mining Journal average prices of metals for eleven months, to December 1, have been taken approximately. Following the official custom in the province, deductions have been made of five per cent. off silver, and ten per cent. off lead. Only 85 per cent. of the value of the spelter in the zinc concentrate has been allowed for. The prices used are: For placer gold, $20 per oz.; lode gold, $20.67 per oz.; silver, 51.3 per oz.; lead, 4 cents per lb.; copper, 12.75 cents per lb.; zinc, 4.6 cents per lb. Coal is at $3.50 per long ton, and coke at $6, these being regarded as fair average prices for British Columbia. Taking the several minerals separately, the following comment is submitted:

Gold.—The year's placer gold mining shows a small net increase. The season was not favourable for hydraulicking operations in Cariboo district, a shortage of water having prevented cleaning up at several of the larger mines, consequently only 10,100 oz. was recovered, as against 12,350 in 1909. Several small losses brought the total decrease up to 2,750 oz. Against this, however, Atlin, in Cassiar district, made a gain of 3,000 oz., so that there was a net increase of 250 oz., or $5,000 in the whole province.

In lode gold, the gain was 18,776 oz. Approximately one-half of this was made by the Hedley Gold Mining Company, operating the Nickel Plate mines, in the Similkameen, and the remainder coming in large part from mines in Sheep Creek camp, Nelson mining division, and in smaller degrees from Rossland mines. The British Columbia Copper Company's Wellington group mine—a new producer—also made an appreciably large addition to the year's lode gold production. There were not any decreases worth mentioning, the various mining divisions well maintaining their gold output. The outlook is favourable for a further increase in 1911.

Silver.—The quantity of silver produced was practically the same as in 1909. There were decreases in East and West Kootenay, chiefly in Ainsworth mining division, of the latter district, but these were compensated for by corresponding increases in the Slocan and Coast districts. Between 500,000 and 600,000 ounces of silver was recovered from copper-gold ores by smelteries; the greater part of the remainder came from galena ores. The recovery of silver at the Consolidated Mining and Smelting Company's lead and copper reduction

works at Trail was about 2,000,000 ounces, or four-fifths of the total of the province. For the first time, a Portland Canal mine contributed to the year's production.

Lead.—The decrease in this metal is about 7,000,000 pounds. The St Eugene mine, East Kootenay, was 8,500,000 pounds short of its 1909 production, but against this loss the Sullivan, in the same district, formerly idle, produced approximately that quantity. In Ainsworth division two of the larger mines were, together, 7,500,000 pounds short, in one case owing to the destruction of a concentrating mill by fire and the consequent loss of the greater part of the season's production. There were several gains in the Slocan—at the Richmond—Eureka, Van Roi, and Standard, notably at the last with an increase over 1909 of about 1,500,000 pounds. Summer fires cut down the production of silver, lead, and zinc at several important Slocan and Ainsworth division mines, destroying surface works at the mines and bridges and trestles along six or seven miles of railway, thereby practically stopping production for six months.

Copper.—Compared with the 1909 official figures production in 1910 was less by about 6,600,000 pounds. A reason for much of this seeming loss has already been given. The proportions of production by districts were: Boundary, 31,500,000 pounds; Rossland, 3,600,000 pounds; Coast, 3,200,000 pounds, and the remainder from other parts. The Granby Company's output was reduced following a destructive fire at the mines, which

interfered with ore-shipping and necessitated blowing out several furnaces at the smeltery until fresh arrangements could be made for resuming the normal output. The British Columbia Copper Company made a gain of about 1,000,000 pounds. Both the Consolidated Company, at Trail, and the Tyee Copper Company, on Vancouver Island, also made increases in production of this metal.

Zinc.—The production of zinc was seriously checked by the forest fires already mentioned. The Whitewater mill, up to last July, produced much zinc concentrate, and in 1909 the Lucky Jim mine shipped 5,000 tons of crude ore averaging about 45 per cent. spelter. The latter mine was within a week of being ready to ship on a larger scale than formerly, when the destruction of the railway took away its transportation facilities. Shipments will be resumed next year. The Ruth has 450 tons zinc concentrate not yet shipped from its mill at Sandon, Slocan. The Van Roi produced until August, when its lease of a concentrating mill expired; it is now building its own mill on Four-Mile Creek, 2,000 feet from portal of mine tunnel No. 5. This property is in the Slocan Lake district.

Iron.—While there are deposits of iron ore in various parts of the province there has not been any production in recent years.

Coal and Coke.—The comparatively large net increase in coal was the result of a general enlargement of operations at the ten collieries that have passed the preliminary stage of production. This is evident from the following approximate figures of net production: Vancouver Island collieries (5), in 1910, 1,616,000 long tons; in 1909, 1,386,000 tons. Nicola Valley colliery, in 1910, 141,000 tons; in 1909, 62,000 tons. Crow's Nest Pass collieries (4) in 1910, 1,026,000 tons; in 1909, 558,000 tons. One new colliery, in Similkameen district, commenced producing and added to the total. There was, however, less coal made into coke, which accounts in small part for the increase in coal sold as such. The gross production of coal during the year under review was 3,119,000 long tons, as compared with 2,400,000 tons in 1909. The opening of several new fields, or extensions of fields already producing, is in progress. These are, respectively, the Upper Elk River and the Flathead fields, which are northerly and southerly extensions of the present Crow's Nest Pass field; about Princeton and Granite Creek, in the Similkameen; in Nicola Valley; in the Skeena district, through which the Grand Trunk Pacific Railway is being constructed; on Graham Island, of the Queen Charlotte group, and on Vancouver Island. Prospecting for coal is being carried on north of Kamloops along the route of the Canadian Northern new railway, and as well in Northern Cariboo.

Notes of Progress.—In Cariboo, the producing capacity of Mr. John Hopp's hydraulic placer gold mines was considerably increased, and the Quesnelle Hydraulic Gold Mining Co. of Philadelphia, Pennsylvania, made much progress with construction of its 17-mile ditch and flume. In Atlin, a small but rich gold-quartz mine was opened on Taku Arm of Tagish Lake. In East Kootenay, the Consolidated Company put in an ore-testing plant at the St. Eugene mill, and re-opened the Sullivan lead mine, while the Provincial Government established a mine-rescue station at Hosmer, Crow's Nest Pass. In Slocan, the Van Roi Mining Company made progress with building a concentrator, and at the Standard a big shoot of galena ore was developed. At Rossland, another valuable shoot of gold ore was found in the War Eagle, and Le Roi No. 2 Company opened an ore body on the 1,300-foot level. In the Boundary, the British Columbia Copper Company commenced shipping gold ore from its Wellington group mine, and increased the blast furnace capacity of its smeltery at Greenwood 50 per cent. In the Similkameen, the Hedley Gold Mining Company put in a larger power plant and added fine-grinding and more gold-saving appliances at its 40-stamp mill. On Vancouver Island, the Tyee Copper Company increased its custom ore smelting business, while the Canadian Collieries (Dunsmuir), Limited, made important additions to its plant. Up North, the Portland Canal Mining Company built and equipped a concentrator and commenced production at its mine.

MINING IN BRITISH COLUMBIA

Preliminary returns, obtained unofficially from nearly all the producing mining companies, appear to warrant the conclusion that, in value, the mineral production of British Columbia was higher in 1910 than in any previous year in its history. A carefully prepared estimate, based on the returns above mentioned, gives a total value of all minerals produced in the province in that year of nearly $26,000,000. If this estimate shall prove approximately correct—and it is believed it will—when the revised statistics shall be received by the Provincial Department of Mines, it will substantiate the present tentative claim that last year was a record year for British Columbia in point of total value of its mineral production, the highest previous total having been that of 1907, when official records gave $25,882,560 as the value for that year, in which the quantities of alluvial gold, silver, lead, and copper were larger, while in 1910 lode gold and coal were produced in such greater degree as to more than compensate for the excess in 1907 of the first-mentioned minerals.

In briefly reviewing the progress of production in 1910 the probable misleading tendency of comparisons of value rather than quantity is kept in mind, for since yearly average prices of these minerals the market value of which fluctuates, at times considerably, vary widely in the course of say five or ten years, it is manifest that comparisons of value may fail to exhibit the true condition of an industry in one year as compared with another. However, it happens that average prices for 1909 and 1910, respectively, differ but little, so that in this particular instance the unfairness to one year as compared with the other is unimportant.

The striking decreases in production last year as compared with 1909 were in lead and copper, and in smaller degree in zinc, which last, however, is not yet produced in the province in sufficiently large quantity to greatly affect the year's total of mineral production. The estimated quantity of lead produced in 1910 (37,000,000 pounds) compares unfavourably with that in 1909 (44,396,000 pounds). Again, copper, with an estimated total last year of 39,000,000 pounds, compares with 45,597,000 pounds on official record as the production of 1909. In regard to lead, the chief falling off, it must be frankly admitted, resulted from the practical exhaustion of the known ore bodies in the St.

Eugene mine, East Kootenay, heretofore the largest lead-producing mine in Canada. It is yet too soon to conclude that the present failure of supply will be permanent, for there is, in the St. Eugene group, much ground still unexplored; the present condition is, however, as here shown. On the other hand, the company owning the St. Eugene last year acquired possession of another lead mine, situated in the same division, which yielded sufficient lead to make good the shortage from the St. Eugene. Two mines, in another mining division, however, were also short in their production of lead—together 7,600,000 pounds, which comparatively large decrease was not made up by other mines in the province. In neither of these, though, is the ore exhausted, the stoppage of production for the time having been the result (so it is stated) of dissensions among some of the larger shareholders in the company owning it, and at the other of the destruction by forest fires last summer of the mine concentrating mill and numerous trestles and bridges of the railway that afforded the property transportation facilities. As to copper—the opinion may be expressed that the decrease is more apparent than real, for some copper producers who had previously shown in their annual returns to the Department of Mines the assay value of their ores, gave for 1910 the quantity of copper actually recovered at the smeltery. The material difference in the returns will be evident when it is remembered that one company having an ore production of 1,000,000 and losing five pounds of copper per ton of ore in the slag from the blast furnaces, would necessarily show a difference in production of 5,000,000 pounds of copper. It would seem, therefore, that the 1910 returns exhibit more nearly the actual quantity of copper recovered.

While there was last year an increase of nearly $400,000 in the value of the gold production, this amount is not important enough to call for comment, other than mention of the fact that of this increase $86,000 came from Rossland lode mines, and $190,000 from the Nickel Plate mine, Hedley, Similkameen. The increase in the production of coal is specially noteworthy, though, for the total value of coal and coke for 1910—$11,080,000—was $2,505,000 greater than that for 1909. In this connection, prices used in calculating value are not subject to fluctuation, so the comparison may be taken to indicate correctly increase in quantity of coal produced. Of the net increase—approximately 792,000 tons, after deducting that made into coke—some 468,000 tons is to the credit of four collieries in the Crow's Nest Pass district, Southeast Kootenay, and 324,000 tons to that of six collieries in the Coast district, five of which are on Vancouver Island. The year's gross production of coal, including that made into coke, was approximately 3,119,000 tons (2,240 pounds) as compared with 2,400,000 tons in 1909.

In passing, mention will be made of the fact that several mining companies operating in British Columbia paid dividends in 1910 to their respective shareholders. These were: The Hedley Gold Mining Company, four quarterly dividends at the rate of 12 per cent. per annum, on its issued stock, $1,200,000, total of these payments for year, $144,000; Le Roi No. 2, Ltd, three dividends each of two shillings per share on 120,000 shares, total of these payments £36,000; the Hastings (British Columbia) Exploration Syndicate, Ltd., one dividend of sixpence per share, total of this payment being £1,509 7s. 6d.; the Crow's Nest Pass Coal Company, two dividends, each of one per cent., total amount paid $124,253, and the Granby Consolidated Mining, Smelting and Power Company, one dividend of one per cent., amounting to nearly $150,000. The last mentioned company had at the close of its last fiscal year on June 30th, 1910, about $1,000,000 in cash and unsold copper, but this available credit was held in case it should be required for purchase of new mines, which is the policy of the directors at present. Among others, the Consolidated Mining and Smelting Company of Canada made a net profit in its fiscal year, ended June 30 last, of $309,945, bringing its Profit and Loss account credit balance up to $671,011. and the British Columbia Copper Company's last fiscal year's profit was $204,973, making a total credit of $474,704. Both companies have since made additional profits out of their later operations. As they are adding to their mining property holdings as favourable opportunities to do so are found, and are extending their smelting works, they can not also distribute their profits among their shareholders.

As giving much promise of enlarged operations in the early future, the activity of the larger companies especially is worthy of note. The Consolidated Mining and Smelting Company of Canada, which has large lead and copper smelting works, also an electrolytic lead refinery, at Trail, West Kootenay, in 1910 smelted 445,000 tons of ore and produced gold, silver, lead, and copper of a total value of $5,543,000. This company supplies practically all the refined pig lead used in Canada for the manufacture of lead pipe, shot, white lead, and other lead manufactured products, and as well exports lead to the Orient and Australia. Refined gold and silver are sold to the branch at Ottawa of the Royal Mint, gold to the United States Assay Office, Seattle, State of Washington, and silver to China. Incidentally it will here be stated that in 1910 about 58,000 ounces of gold was sent from British Columbia to the United States Assay Office, Seattle, and this, notwithstanding that there is in Vancouver, B.C., a Dominion of Canada Assay Office.

The Granby Consolidated M. S. & P. Co. smelted about 1,100,000 tons of low-grade copper ore, from its own mines, in 1910. The average of metals recovered from 1,178,853 tons of ore, during this company's last fiscal year, was, per ton: Copper, 18.70 pounds; gold, 0.0370 ounces, and silver, 0.2281 oz. The cost per ton of ore, exclusive of the cost of marketing the product, was $2.50. The British Columbia Copper Co. smelted approximately 456,000 tons, which contained 25,640 ounces gold, 85900 ounces silver, and 7,351,000 pounds copper. Both these companies have large and modernly equipped copper smelteries, with copper converter departments. The blast furnace capacity of the former is 4,000 to 4,500 tons of ore per diem, and of the latter a maximum of 2,600 tons.

The Hedley Gold Mining Company has lately added much new plant, including improved gold-saving appliances, to its 40-stamp mill, and has materially increased its gold-producing capacity.

If space were available much of interest might be added concerning the development of the coal resources of the province, in connection with which there is more activity in new fields, as well as old, than at any previous time. Some idea of the vastness of the coal resources of the province may be given by mentioning that Mr. D. B. Dowling, of the Geological Survey of Canada, in his last-published report (Geological Survey Publication No. 1035, p 33) estimates one coal field only (of the six or eight known fields in British Columbia) to contain 36,600,000,000 tons of coal, as follows:

Elk River Field (Crow's Nest Pass), Southeast Kootenay.

Southern portion, estimated area, 230 square miles; workable seams, 22; workable coal, 22,600,000,000 tons.

Northern portion, estimated area, 140 square miles; workable seams, large number; workable coal, 14,000,000,000 tons.

In conclusion, a few general facts will be stated. The Dominion Department of Mines, every year, sends several parties to do topographical and geological work in the province, and afterwards publishes valuable reports illustrated by sketches and maps. The Provincial Department of Mines, similarly makes investigations and issues official bulletins and an annual report. Dominion officials are now making elaborate investigations and experiments in connection with the reduction of zinc ores of which there is, in British Columbia, a very large tonnage available, awaiting the provision of low-cost smelting or other reduction facilities, to admit of the utilization of these ores at a profit. Mr. F. W. Harbord, London, and Mr. W. R. Ingalls, New York, are engaged in an advisory capacity in connection with these important investigations. Advances in the metallurgy of other minerals are being made. New mining fields are being exploited. More railways are in course of construction, thus opening to industrial activity districts previously lacking necessary transportation facilities. Last, outside capital is being interested with assurance of being given a "fair run for its money."

PORTLAND CANAL MINING DIVISION

(Notes from Preliminary Report by Wm. Fleet Robertson, Provincial Mineralogist.)

The Portland Canal mining division came into legal existence by Order in Council on August 1st, 1910, with the mining recorder's office in the town of Stewart, at the head of Portland Canal. The notice appearing in the Official Gazette of July 21st, 1910, gives the official description of the boundaries of the new division, which may, however, be summarized as "the drainage area of all streams, in British Columbia, flowing into the Portland Canal."

While the history of mining in the district only began this fall, prospecting has been going on steadily and quietly for ten or twelve years, and the district has been twice visited by the provincial assayer, whose reports have been published by this department—the last in 1909—so that the writer confined his attention this season to seeing what had been done on the more developed claims and on those which report credited with more nearly approaching the production stage. The time available for the inspection was limited, and the season at which it had to be made—in October—was so late in the year that many of the claims at higher altitudes were covered with snow, while on others work had been temporarily abandoned for the winter, so that, but comparatively few of the many claims recorded and partially developed could be inspected; consequently this preliminary report must be taken, not as a complete review of the camp, but as an impression gained from a short visit and the inspection of a few claims.

The Portland Canal camp cannot, as yet, be taken as proven, for, although some prospecting has been going on for years, the great majority of the claims have been staked within the past couple of years, and consequently have not and could not have had sufficient development done on them to prove their value. Only two or three of the older claims have done serious development, and of these, at least one property has shown by such that ore is present in quantity and quality sufficient to justify its being called a mine, and to guarantee extraction from present development for at least two years. On other properties where the actual development is slight, the work done by nature has exposed such an amount of mineral as to give considerable hope for future development.

The camp contains a large number of properties from the prospect workings of which exceptionally high assays have been obtained, giving rise to unwarranted hopes and statements which cannot be borne out on a strict examination. The camp justifies reasonable expectations for the development done, without exaggeration by well-intending though injudicious friends whose wild statements nearly "killed with kindness" the best endeavours of legitimate workers.

Portland Inlet, and its inner extension, known as Portland Canal, form a great continuous fiord or arm of the sea, extending from the Pacific Ocean, at Dixon entrance, in a northerly direction for about 110 miles, and so almost penetrating the Coast range of mountains —a granite range which follows the entire coast-line of British Columbia, and extends northwards into Alaska. This is the only arm of the sea so cutting the mountain range, although the range is cut elsewhere by certain rivers flowing westward from the interior, notably the Stikine, Skeena and Fraser Rivers, the latter two having already been utilized as railway locations.

The Portland Canal for its entire length forms the International boundary—the land to the westward belonging to Alaska, while that to the east is in British Columbia. From the head of the canal this boundary-line follows northerly along the summit of the range of mountains between the Bear and Salmon Rivers for a distance of about ten miles, to Mount Dolly; thence striking in a northwesterly direction, crosses the Salmon River some 14 miles from its mouth, leaving the watershed of Bear River and of the headquarters of Salmon River in British Columbia, while the lower part of Salmon River is in Alaska.

The importance of this arm, from a mining point of view, is that it gives deep seawater navigation to, and so renders easily accessible, a district in which granites of the Coast range came in contact with the sedimentary formations lying to the eastward and farther inland. This region of contact extends for the whole length of the Coast range and, from its geological features, forms a zone of probable mineralization, as has been repeatedly pointed out in these reports and is here again emphasized.

The geology of the Bear River district may be generalized as follows, subject to certain exceptions and variations which will be fully demonstrated in the detailed map and report of Mr. R. G. McConnell, of the Geological Survey, who, with a party, spent the summer of 1910 in making a detailed geological study of the field.

The earth-cleft referred to as forming the valley of Bear River was probably accompanied by considerable movement, and, although the line of the cleft is covered by the valley filling, its effect is noted in the contrasting

geological formation of the east and west sides of the valley.

The west side of the valley is essentially and fundamentally of plutonic and volcanic origin, granites on the lower part of the valley, changing to a dark igneous rock— probably a diabase—farther up the river and showing in the wash from the higher elevations, not visited, fragments of volcanic agglomerates.

This igneous mass has been but little cut by dykes, but the diabase is seamed in all directions by small stringers of white quartz, very sparsely mineralized, while at intervals more important east and west cross-fissurings occur, frequently quartz-filled, and sometimes important lenses or shoots of ore occur, as is demonstrated in several partially developed properties.

The geological formation of the east side of the valley is essentially and fundamentally an argillite, a sedimentary deposit, cut by intrusions of greenstone, and numerous dykes, both basic and acidic, are in evidence, the former being the larger and more plentiful, and seemingly the older, the latter the more recent—apparently in places cutting the older dykes, and also the vein-fissures; these latter are probably connected in some way with an underlying granitic batholith, and seemingly are associated with the silicification which is apparently responsible for the mineralization found. The dyke systems and lines of fissuring on the east side of the valley seem to nearly conform to the bedding planes of the argillite, and have a course approximately north and south, or roughly parallel with Bear River valley.

This generalization applies to the valley of the Bear River below American Creek, whether it will be found applicable to the country back of the first range of hills and surrounding the heads of the smaller tributary streams, at altitudes of from 3,000 to 4,000 feet, cannot be stated from personal observation.

On this eastern slope the, at present, more important properties, such as the Portland Canal Mining Company, the Stewart, Main Reef, Jumbo, and many others, lying south of Bitter Creek, seem to be all located upon the one general zone of fissuring, which is continuous for at least four or five miles, and in this the veins are found. Sometimes the vein formation is represented by a single quartz vein, while farther along it presents four or more veins; the transition from one to more veins is not shown by the work done, nor yet is it exposed by the valley of Glacier Creek, which cuts across and into the formation to a depth of some 1,500 feet, although the latter does demonstrate the veins to continue to that depth. At the present stage of prospecting and development this one main zone of fissuring seems to contain all the more important ore showings, although it is premature to conclude that it is the only zone on the hillside.

While this general fissure continues, as stated, for such a great distance, and the vein formation in it is at least seemingly continuous, as far as demonstrated, the veins being more or less mineralized throughout, still it does not follow that for all this distance the mineralization is sufficiently intense to form profitable ore; such could not be expected and does not occur, but there are parts in these veins in which the amount of mineral in the vein occurs in sufficient quantity to render it workable ore. It is as yet too early in the development to say whether the ore occurs in shoots, chimneys, or some other form, but the tunnel workings of the Portland Canal Mining Company have demonstrated that the "pay-ore," first proved on the surface, extends downward along a defined "pitch" which would seem to mark the northern end of an ore shoot, while the tunnels have not as yet at their faces reached the limit of the body of "pay-ore" to the south. By the term "ore shoot" it is not intended to imply a body of solid ore, but a portion of the length of the vein sufficiently heavily mineralized to be profitably workable.

The chances are that mineralization, generally similar in character ,although varying as to quantity, occurs throughout this main fissure. The character of this mineralization is best demonstrated by the actual extraction of the only producing mine — the Portland Canal Mining Company's—described later, and may be summarized briefly as iron-sulphides carrying gold and silver, galena carrying silver and some gold, and a small quantity of zinc-blende carrying small silver and still smaller gold values. These are essentially the ores upon which the values of the properties will probably be based, although, particularly in the upper or surface workings, specimens of exceedingly rich silver-sulphides and oxides, with also native silver and possibly gold, have been found.

In the opinion of the writer, this portion of the camp will be comparatively low-grade concentrating propositions from $10 to $20 ore, the high-grade minerals being difficult to concentrate and not sufficient in quantity to dispense with this process.

Shipping Facilities.

Seldom in British Columbia has the truth been so clearly demonstrated as at Stewart that the value of an ore-body is dependent upon the faculty of getting its contents to market and still more seldom have the facilities been so quickly obtained. Portland Canal affords a land-locked waterway by which any vessel may approach the town of Stewart where the tidal mud-flats offer proper holding-ground for pile wharves; this has been taken advantage of and a pile wharf with a pile approach from the shore a mile long, is now nearing completion; while a local railway company has built a splendid railway dock and approach, over a mile long, and has equipped it with standard-gauge tracks. The same company has about completed a railway grade up the valley of Bear River to the mouth of American Creek—a distance of approximately fifteen miles— and could, should it desire to push matters, easily have the rails laid over this length before snow falls. A locomotive and a number of cars are now on the ground ready for use, and rails have been laid from the landing as far as the railway-station.

The valley of Bear River on the flat will average about half a mile wide, being rather more than this near its mouth; its course is nearly straight, and it rises at an almost uniform grade—about 500 feet in 15 miles. The valley bottom is gravel, permitting of cheap railway construction, while the first nine miles of the railway grade contains one tangent of four and a half miles in length and many shorter ones. The hills rise abruptly from the valley, affording the best of opportunities for aerial tramways, with ample room on the flat for requisite mill-sites.

The tributary streams are all too steep to admit of railway construction up them; an exception to this rule is, however, presented in Bitter Creek, up which a railway might easily be built for a distance of from six to seven miles, or possibly to the foot of the glacier, with aerial tributaries from the side creeks. Bitter Creek valley is really a branch extension of the river valley, and is similarly filled with detritus from the glacier. The Provincial Government has built a waggon road, with necessary bridges, from Stewart up the river val-

ley, as far as and across Bitter Creek, over which two stages travel daily each way. A further extension of this road as far up as American Creek, including a bridge across Bear River, was under construction this autumn and promised to be completed before snow falls.

Steamer service is maintained from Seattle, Victoria, Vancouver, and Prince Rupert twice a week by the G.T.P. Railway, their fine boats having gone right through to Stewart during the summer months, but in the winter a transfer of passengers and freight is made at Prince Rupert to a small steamer, which serves as a tender to the larger ones. The Union S. S. Company runs its steamer "Camosun" from Vancouver through to Stewart direct without transfer, making a round trip each week. Besides these regular steamers, several coasting and freight boats make Stewart a place of call but at irregular intervals.

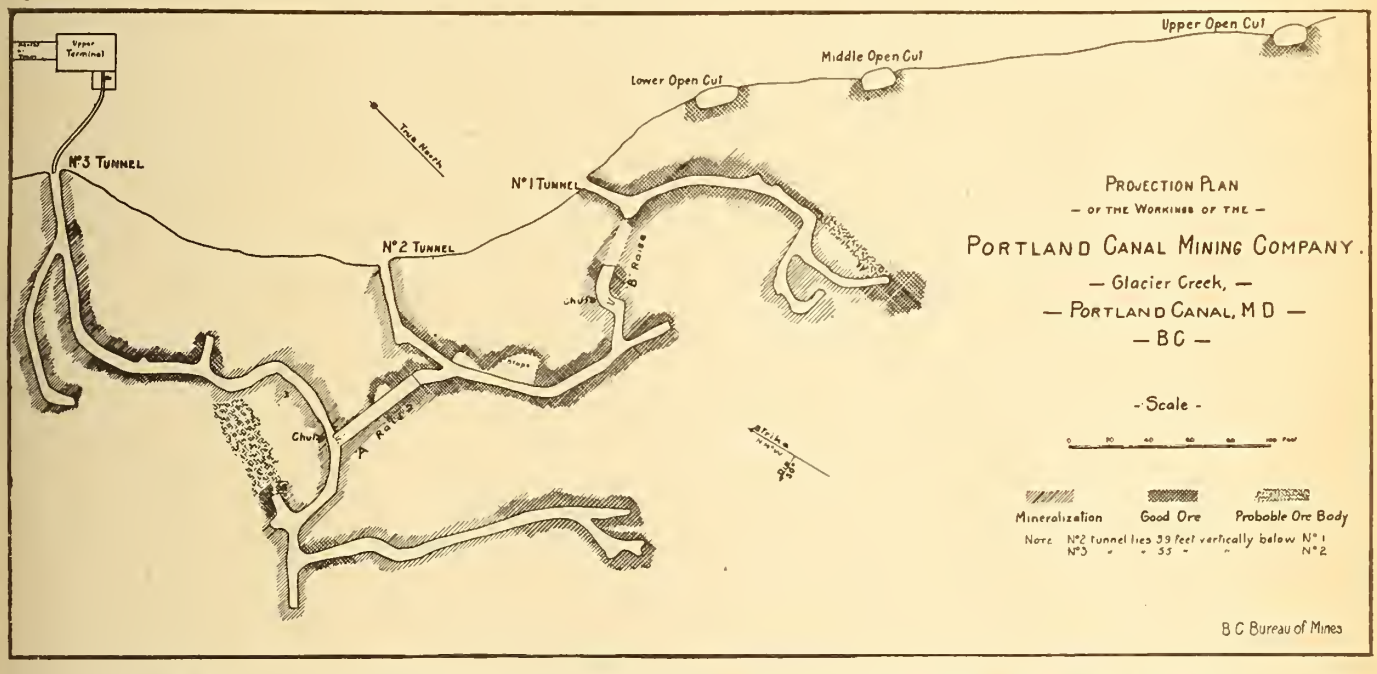
Portland Canal Mining Company.

Interest in the Portland Canal Camp at present naturally centres in the operations of the Portland Canal Mining Company, N.P.L., since the development of this company's property is the furthest advanced and it is the only company as yet in a position to make shipments. The company is a local organization, with head office at Duncan, V.I., the president being Mr. C. H. Dickey, of Duncan. The capital of the company is $1,000.000, divided into shares of a par value of 25 cents. The operations of the company at the property are in charge of Mr. W. J. Elmendorf as engineer and general manager, with Mr. N. C. Sheridan as mine superintendent, while Mr. Otto Abeling has been responsible for the construction and equipment of the concentrator. The company owns some twelve claims and fractions, viz.: Gipsy, Extension, Herbert, Mayflower, Mosquito, Richard II., Barney, Sadie, Eclipse, Little Joe, Little Joe Fraction, and Lucky Seven, all adjoining and situated on the hill forming the eastern slope of Bear River and the southern slope of Glacier Creek valleys. Serious development work has as yet been confined to the Lucky Seven and Little Joe mineral claims.

As has already been noted, the mineralization on these claims is along the line of a great fractured zone which runs in a general north and south direction, about parallel with Bear River, not only for the length of this group of claims, but continues, both to the north and south, through a number of other claims. This zone is of variable and not clearly defined width, but is in places several hundred feet across, and runs through an argillite formation, conforming, at least very nearly, to both the strike and dip of the argillite. Within this zone the argillite has been more or less crushed, and presents, when cemented together by the quartz-vein matter, a brecciated mass. Within this zone there are a number of comparatively small felsitic dykes, running with the fissure, apparently injections after the formation of the fissure, and these dykes seem to be present wherever important mineralization has taken place. Through this general zone of crushing, siliceous infiltration has taken place, the solution naturally following certain channels which the crushing had rendered more open—lines of least resistance to the flow of the solution —and these channels of silicification now form the quartz veins in which the mineral is found.

On the Lucky Seven and Little Joe the silicification seems to be confined to one main vein, as far as present development shows. In the earlier stages there were supposed to be two veins, but the management now considers the second vein as merely an offshoot of the main vein.

Mine.—The mine workings are at an elevation of about 2,400 feet above sea level, and consist of three



tunnels with connecting raises, as shown on accompanying plan.

The lowest, or No. 3 tunnel, is the working tunnel, the tramway therefrom going directly to the bunkers at the upper terminal of the aerial tramway. This tunnel, in October, 1910, was in about 500 feet, and follows in on the vein, which is mineralized all the way; but what is considered pay-ore was only struck at about 100 feet in, from which point it apparently continues to the face, although the tunnel in a couple of places seems, in the driving, to have run away from the ore. From this level a raise has been put up to the No. 2 tunnel, and this acts as an ore-chute from the upper levels.

The No. 2 tunnel is about 55 feet vertically higher than No. 3, the vein dipping at an angle of about 30 degrees, and was in about 200 feet, with a raise being put up to the No. 1 tunnel, and which, in October,

was almost through. At about 25 feet in from the portal the tunnel entered on pay-ore, in which it has continued to the face.

The No. 1 tunnel is about 40 feet higher than No. 2, and has been driven about 180 feet and developing pay-ore for its entire length, the face being in such ore. At one point in the driving the tunnel was deflected to the right and ran out of the ore-shoot, but, upon being brought back to the original course, picked up the ore again.

Above the No. 1 tunnel several open cuts, sunk on the outcrop, have disclosed pay-ore, indicating that this ore shoot continues for at least 350 feet to the south of the portal of No. 1 tunnel. The development work on this ore-shoot, as stated, would seem to indicate an ore-shoot at least 350 feet long, developed below the outcrops, along the plane of the vein for a distance of about 400 feet; the thickness of the pay-ore has been estimated by the management as averaging about 5 feet; this figure being, in the opinion of the writer, under the mark, rather than over it. Should the ore-shoot prove to be as long in the tunnels as the open cuts directly above them seem to indicate, this would argue an amount of ore, from present development, sufficient to keep the present mill busy for three years. The faces of all the tunnels were found to be in ore which was apparently richer than the average of the ore-shoot.

The monthly average assay for September of the face of No. 2 tunnel is reported as being: Gold, $5.20; silver, 61 ounces; lead, 2.5 per cent.; and of face of No. 3 tunnel, about, gold, $4; silver, 15 ounces; lead, 4 per cent. These values vary from month to month, and are quoted merely as an indication of the grade of ore met with.

The ore mined and milled consists of iron-sulphides and galena, both carrying gold and silver, with a small quantity of zinc-blende and occasionally some copper pyrites, all contained in a quartz gangue and mixed with fragments of argillite.

Specimens of the higher sulphides and oxides of silver and of metallic silver are frequently seen in the vein in all the levels, and, though of interest, are not taken into account by the management, nor is any special attempt made to save them. The mine depends entirely on the iron-sulphides and galena for its ore values, which are stated to be in the neighbourhood of $12 a ton of ore. The ore is conveyed from the mine to the mill by an aerial tramway of the Bleichart system.

All mining has as yet been hand drilling, but the company was engaged in laying, and had nearly completed, a pipe line from the mill to the mine for the conveyance of compressed air, and when this is completed an equipment of power drills will be installed in the mine. The compressor was on the ground all ready to be set up at the mill, where it will be driven by water power.

The mine is provided with good and substantial cook and bunk-houses and other buildings, including a house for the mine superintendent.

The development accomplished by the mine workings covers but a small part of the main fissure contained within the company's property, in other portions of which important surface showings of ore have been found, but these have, for the time being, been left dormant, pending the development in the mine workings.

Of these minor developments, one, however, deserves special mention; it is located some distance, about 1,000 feet, to the north of the mine workings and on the same vein, but, owing to the contour of the hill, at a considerably lower elevation, and is so situated that ore mined there could, with slight expense, be delivered to the present tramway for transmission to the mill. At this point the main vein outcrops strongly and is heavily mineralized; it is further developed by a short tunnel in which the mineralization of the vein is satisfactory. This development would seem to indicate another ore-shoot, easy of exploitation, but requires further development to show its extent and ultimate value; it, however, gives ground for the belief that between this point and the mine other ore shoots will eventually be developed.

Mill.—The company had, in October, just about completed a concentrating mill for the treatment of the ores from the mine; this mill is situated in the Bear River valley, at the mouth of Glacier Creek, the lower terminal of the aerial tramway being some 2,200 feet lower than the upper terminal. The mill building is a substantially framed structure, sheathed with double boarding with paper between, built on the lowest slope of the hill. The mill consists of a receiving chute capable of holding 75 tons of ore and a bin holding 175 tons. From this latter the ore is fed through a challenge gate to a 6-inch by 16-inch Sturtevant crusher, which reduces the ore to 1-inch size. The crusher discharges on to a rubber belt conveyor, set with a slight fall, which conveys the ore to another bin holding 175 tons of crushed ore. From the crushed ore bin the ore is fed by an Allis-Chalmers roll-feed automatic feeder to a set of slow-running Allis-Chalmers 12-inch by 24-inch rolls, from which it passes to No. 1 elevator is thus raised to the top of the mill, and is discharged into a revolving trommel, with 5 mm. screen. The oversize from the trommel is returned by a chute to the second rolls, the discharge going to a second trommel which is fitted with two panels of 2 mm. screen and one panel of 3 mm. The oversize from this trommel goes direct to 5 mm. jig, and the 3 mm. screenings to the 3 mm. jig. The 2 mm. screenings go to a classifier, which separates out the 2 mm. and 1 mm. sizes, which go respectively to the 2 mm. and 1 mm. jigs, while the overflow passes on to four suspended iron conical settlers, which in turn distribute their product, the first to a Wilfley table, the second to an Overstrom table, and the third and fourth each to a Frue vanner. The overflow from these settlers passes on to a series of large settling tanks on a lower floor. The middlings from the 5 and 3 mm. jigs go to the second, a finer, set of rolls; thence to the second elevator. The middlings from 1 and 2 mm. jigs go to a 10-foot Lane mill, and after recrushing, pass on to No. 2 elevator.

All these recrushed middlings are then elevated to the top of the mill and discharged into a third trommel, the oversize from which is returned for recrushing, and the screenings go to the classifier, so entering the process again. The tailings from all the jigs and tables, being sufficiently clean, go to the tailings-dump. The concentrates from the jigs and tables discharge by gravity into receiving bins on the lower floor.

The capacity of the crushing, screening, and elevating part of the mill is 100 tons of ore a day; the installation of jigs and tables now in place is for 50 tons only, but provision has been made for doubling this as soon as it is required, so that, while now the mill as a whole has a nominal capacity of 50 tons, this could be doubled at a comparatively small expense. In the construction of the mill the very best and most

efficient construction has been employed, and the machines are of the most modern type.

To accompany this report a flow sheet has been prepared to show graphically the process of concentration employed.

An electric light dynamo to be driven by water-power was being installed, which would light the mill and other surrounding buildings.

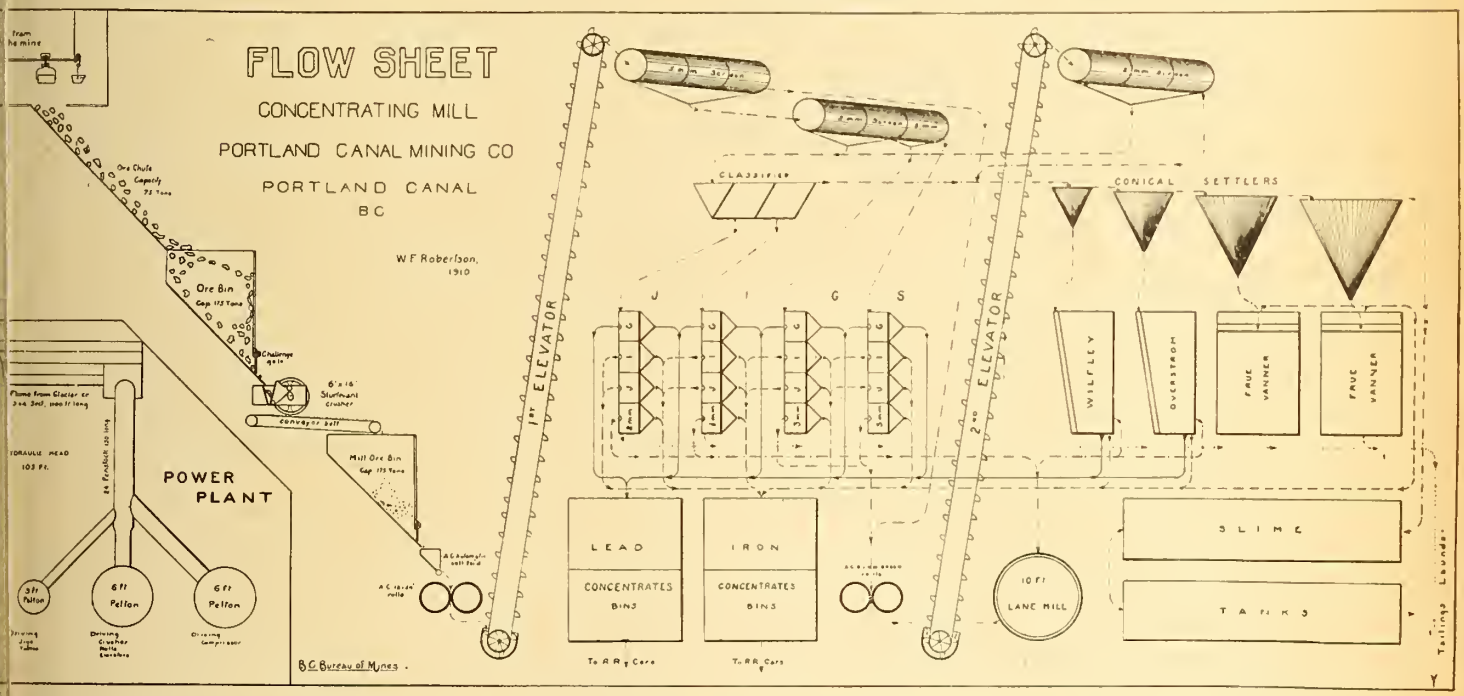
Concentration Effected.—The concentrating plant was only started about October 1st, and when visited by the writer, some ten days later, was only being "tuned up" on a low-grade feed, so that no definite results as to the ultimate percentage of saving, the average assay of tailings, or the rate of concentration could be obtained. The work being done, therefore, represents only the "first try," and, as this was good, better results may be expected after adjustment.*

The rate of concentration will be approximately from 3 to 3 1-2 tons of ore into 1 ton of concentrates; these concentrates consist of iron sulphides and galena, collected separately, in what proportion is not yet definitely demonstrated, but a very clean separation between the two was being effected.

concentrates—gold, from $8 to $10; silver, 15 to 20 oz. per ton. Lead concentrates—gold, from $8 to $10; silver, from 35 to 45 oz. per ton; lead, from 65 to 75 per cent. No zinc concentrates are saved, as they were found by actual test to contain but low assay values in silver—about 1½ oz. to the ton.

The slime-tanks were not at that time in operation, so that it is not as yet known whether any saving will be made of the small quantities of higher silver-sulphides and oxides which are visible occasionally in the ore and which, from their nature, would slime.

POWER PLANT.—The company owns a water record on Glacier Creek which has been developed to supply all the power necessary for the mine and the mill. The water is taken out of the creek canyon at the head of a fall, the intake being well protected by projecting rock from any drift-wood or drift-ice. The intake is for the first few feet in solid rock, when the water enters a flume 3 feet deep by 4 feet wide, built of 2-inch plank with battens, laid on a grade of 1-inch fall in 4 rods. From the intake to the pressure-box the flume is 1,100 feet long; it follows down the north side of the creek for some distance, when it crosses over to the south side



The tailings from each of the machines contained but small values in gold and silver, even with the incomplete adjustment, showing that the process was satisfactory, the separation of the mineral from the gangue being easily and very completely effected.

The separation on the Wilfley table was very nearly theoretically perfect, the lines of galena, iron-sulphides, zinc-blende, and tailings on the table being the most clearly defined that the writer has ever seen.

The concentrates being made, from the class of ore being experimented with, ran about as follows: Iron

*A letter from the general manager to the president of the company, dated Nov. 22nd, received as this goes to press, places the mill feed at that time as about: Gold, $3; silver, 14 oz. to the ton; lead, 3.7 per cent.—about $13 ore. "Our extraction at this time is about 80 per cent., but with the Lane mill in operation and several small changes, now completed, we will raise this to 85 per cent., and I think ultimately to 87 per cent."

on a trestle 100 feet above the creek-bed. The pressure-box is 105 feet above the Pelton wheels, to which the water is conveyed in a wrought-iron penstock 24 inches in diameter and 150 feet long, with suitable branches and valves. The power is developed by two 6-foot and one 3-foot Pelton wheels. One 6-foot wheel drives the main counter-shaft from which is belted the crusher, rolls, Lane mill, and conveyors; the other 6-foot wheel was being held for the compressor. The 3-foot wheel was used exclusively for the jigs and tables, thereby obtaining a steady and constant motion for these machines.

OTHER BUILDINGS.—The company has erected near the mill a large and very complete boarding-house, kitchen, dining-room, sitting-rooms, and bedrooms for the men; there is also a well-equipped laboratory building with rooms for the assayers. The office contains public and private office rooms and living quarters for the manager. Stable, blacksmith, and carpenter shops have been planned out and will be erected at an early date.

TRANSPORTATION.—The Portland Canal Short Line Railway has laid out a spur from its main line to directly in front of the concentrator building, so that ore will eventually be loaded direct from the mill into the cars.

In addition to this, there is from the mill a good Government waggon-road to the town of Stewart, distant about three miles and a half; this road is practically level and has a good hard gravel bottom.

All supplies for the mine are received at the mill and taken up on the aerial tramway.

The mine office and various mill offices are conneeted by telephone and also with an office in Stewart.

Stewart Mining and Development Co.

The Stewart Mining & Development Company has eight or nine claims on the north side of Glacier Creek at an altitude of about 1,000 feet. The company has been at work for the past three years steadily developing its property by means of tunnels, etc. There has been a great deal of surface work done as well, but this becomes of secondary importance since general zone of crushing or fissure upon which the Portland Canal mine ore-body is located passes northward, through the intervening properties, into and through the Stewart claims. In such a crushed zone the mineral-bearing solutions would follow the lines of least resistance, and while in the Portland Canal property these solutions appear to have been confined to one channel, producing one vein, in the Stewart they appear to have produced four veins, all parallel as to strike, though not as to dip, and all contained within the zone of fraeture, which here has a width of about 400 feet.

From Glacier Creek northward, following the fracture zone, there are a couple of deep and precipitous-sided gulches extending up as far as the eabins of the Stewart Mining Company. In the sides of these gulches Nature has caused exposures of the veins, so that but little work had to be done to prove their general conditions. From the bottom of the deepest of these gulches, on the George E. claim, the company has driven a crosscut tunnel to the east, into the bank, for a distanee of about 300 feet, and in so doing has crosscut three veins, known locally, in order of sequence, as No. 1, No. 2, and No. 3 veins—the last being also called the "Green Vein" or "East Vein." The No. 1 vein was struek at 50 feet in, and on this a drift was run to the right for 60 feet, but does not determine the full size of the fissure or vein, which, however, is more fully exposed in a series of cuts higher up the very steep hillside, and there seems to be a well-defined quartz vein, 2 feet to 4 feet wide, and dipping to the west at an angle of about 55 degrees. The vein contains some heavy sulphides of iron, carrying gold values, but no large body of ore has been encountered.

At 100 feet in from the portal of the tunnel the No. 2 vein was cut, and has been drifted upon for 60 feet on either side of the tunnel. The fissure of this No. 2 vein is from 6 to 7 feet wide, and shows a quartz infiltration and replacement of the fractured argillite carrying more or less mineral.

At 300 feet in from the portal, and 150 feet from No. 2 vein, the No. 3 vein was cut, and its general fissure is about 25 to 30 feet wide, while the dip is nearly vertical. In this vein a drift had been made to the right for 50 feet, while to the left one had been driven for 200 feet, and was still being pushed forward, receiving the greater part of the attention of the management; several crosscuts had been put off from the drift at various points to test the width of the fissure. This vein is similar in general character to the others, but in addition to the quartz-gangue matter there was apparent a considerable quantity of calcite. There were some sulphides visible in the vein-matter, but no commercial body had as yet been struck. There were, however, numerous showings of native silver and of the higher silver-sulphides, which, although they gave great encouragement to the management, were not sufficiently plentiful to constitute ore.

On the west side of the gulch, directly opposite to the mouth of the crosscut tunnel already mentioned, No. 4 vein has been opened up by a tunnel driven in along the vein for some 200 feet. This is a large strong vein and seems to earry a greater percentage of heavy iron-sulphides than was then visible in any of the other veins. This vein dips to the west at a flatter angle than the other veins, and the mineralization more nearly approaches in character that found on the Portland Company's property, giving rise to the belief that this vein is the continuation of the Portland vein. This belief, however, lacks definite confirmation, and it is not at all improbable that all the veins are equally continuations of the Portland vein.

Portland Wonder.

The Little Wonder mineral claim, being developed by the Portland Wonder Mining Company, is situated to the south of the eastern portion of the George E. claim of the Stewart Mining Company, and contains within its borders a continuation of the No. 3 vein of the Stewart, which here also is found dipping nearly vertical and is easily traced from the Stewart down Lucky Gulch from Claeier Creek and at an altitude of 700 feet above sea-level; the No. 2 tunnel has been driven in for about 360 feet, of which the first 150 feet is through slide material. Practically all the work is now being done in this tunnel, from whieh a raise has been put up to the old workings on No. 1 tunnel.

The vein here is very similar to the same vein on the Stewart, but seems to have been subjected to a severe disturbance and crushing, subsequent to the formation and deposition of the ore in the vein, since small masses and lenses of solid iron-sulphide are encountered showing straight parallel striæ, which have been crushed by movement into small lenses covered with "slicken-siding" and occurring in a mass of broken and polished graphite argillite. This latter movement would appear to be local in eharacter and has so disturbed the vein in the present workings that little can be definitely said about it, beyond the fact that the amount of solid sulphide present in the crushed vein-matter gives reasonable hope that when the erushed portion of the vein has been passed, a more than usual amount of sulphide ore may be looked for.

The development was being earried on by a force of eight men, with Mr. McCrimmon as foreman. Comfortable eabins had been erected, whieh would enable work to be carried on during the winter. On the dump at the mouth of the tunnel there was a pile containing a number of tons of solid sulphides of iron and lead, from which a rough sample was taken which assayed: Gold, $16.80; silver, 19.4 oz. to ton; lead, 36.5 per cent.

Lulu Mineral Claim.

The Lulu mineral claim lies south of the western portion of the George E. claim, and undoubtedly contains within its borders some of the veins developed on the Stewart property, but the development has not as yet proceeded far enough to demonstrate what they may there contain. A erosscut tunnel is being driven in from a small gulch, with the intention of crosscutting the ledges, and had proceeded some 180 feet.

Minutes of Organization Meeting, International Geological Congress.

At the instance of the Director of the Geological Survey, a meeting of Canadian geologists and mining engineers was called for December 2nd, at 11 a.m., in Toronto, to arrange for the Twelfth International Geological Congress, which is to be held in Canada.

There were present Dr. F. D. Adams, Mr. J. C. Murray, Mr. O. E. LeRoy, Mr. H. Mortimer Lamb, Mr. J. A. Bancroft, Prof. E. Dulieux, Dr. T. L. Walker, Prof. M. B. Baker, Mr. J. B. Tyrrell, Mr. James McEvoy, Dr. W. G. Miller, Dr. W. A. Parks, Mr. J. McLeish, Dr. A. P. Coleman, Mr. R. G. McConnell, Mr. O. N. Scott, Mr. W. McNeill, Mr. W. S. Lecky, Mr. R. W. Brigstock, Mr. G. G. S. Lindsey, Mr. F. Loring, Mr. A. A. Cole, and Mr. R. W. Brock.

Dr. Adams was chosen chairman of the meeting, and Mr. R. W. Brock secretary.

Dr. Adams called the meeting to order and explained the object. On motion of Dr. Miller, seconded by Dr. A. P. Coleman, it was decided that the Congress should be held in Canada in 1913, this date being chosen on account of the British Association meeting in Australia in 1914, and possibly the Winnipeg Exposition in Canada, also in 1914. The meeting then proceeded to elect officers for the Congress.

On motion by Dr. Miller, seconded by Dr. Coleman, Dr. Adams was elected President. Dr. Coleman moved, and Mr. James McEvoy seconded, that Mr. R. W. Brock be elected Secretary. Dr. Miller and Mr. Tyrrell suggested that the offices of Treasurer and Secretary be combined. This was included in Dr. Coleman's motion, and the motion thus amended was carried. On account of the great amount of work which would be necessary to make the meeting a success it was decided that a paid Secretary or Manager should be appointed to assist the Secretary and Executive Committee.

The question of committees was then discussed, but it was decided that before these could be formed it would be necessary to decide upon the place of meeting.

Dr. Miller moved, seconded by Dr. Parks, that the Congress be held in Toronto. This motion was carried.

In the discussion, the point was brought out by Dr. Walker that local meetings might be held in the east and west as well as the main meeting at Toronto. This suggestion met with the approval of the meeting.

The discussion regarding committees was then resumed. In the course of the discussion it was brought out that a large honorary committee, a large general committee, local committees, and an executive committee would be necessary. As a great deal would depend upon the careful selection of these committees, it was decided to appoint a small executive committee who could spend some time and thought on the selection of the other committees. It was moved by Dr. Miller, seconded by Mr. LeRoy, and carried, that the President, Secretary, Dr. Coleman and Mr. Tyrrell should be appointed a committee to recommend to this meeting names for an executive committee. It was moved by Dr. Miller, seconded by Mr. McEvoy, that Dr. Coleman and Mr. Tyrrell be members of the executive committee. The committee nominated then retired, and after fifteen minutes' consultation recommended the following names as an executive committee: F. D. Adams, R. W. Brock, A. P. Coleman, W. A. Parks, G. G. S. Lindsey. The convener pointed out that the names were confined to persons living in the central part of the country on account of the necessity of the committee meeting at frequent intervals.

It was moved by Mr. Cole, seconded by Mr. McEvoy, that the gentlemen recommended be appointed an executive committee of the Geological Congress, with power to add to its members. Carried.

Dr. Walker moved that the general committee, honorary committee and any other committees that might be found necessary be appointed by the executive committee. This was seconded by Mr. M. B. Baker and carried.

Dr. Walker moved, seconded by Dr. Miller, that the executive committee be authorized to appoint vice-chairmen of committees who could act in case of the absence of the chairman.

An informal discussion then took place regarding the excursions which it was felt should be the main feature of the Congress in Canada. Various suggestions were made and it was decided to have the members consider this question carefully and send their suggestions to the executive committee, who would go thoroughly into the matter.

On the question of major subjects for the Congress it was felt that it might be advisable to get up a special memoir on Coal, similar to the one on the Iron Ores of the World, prepared for the past Congress, as this subject would be supplementing the Iron Memoir.

The Secretary stated that Dr. J. G. Anderson, Secretary of the Eleventh Congress, had called attention to the fact that the Congress had accepted the proposal of Dr. Hobbs that an international inquiry on the subject, "The Fracture System of the Earth's Crust." should be undertaken; that Congress in accepting this proposal expressed its opinion that the manner employed by the Swedish executive committee when undertaking inquiries on the iron ore resources and the post-glacial climates, could serve as a model to the coming executive committee of Canada when organizing the proposed enterprise, and charged the named committee to arrange the matter together with Dr. Hobbs.

The subjects for the Congress were left to the executive committee.

The meeting then adjourned to attend a lunch given by the Toronto branch of the Canadian Mining Institute.

Ore Dressing--Coniagas Concentrator.

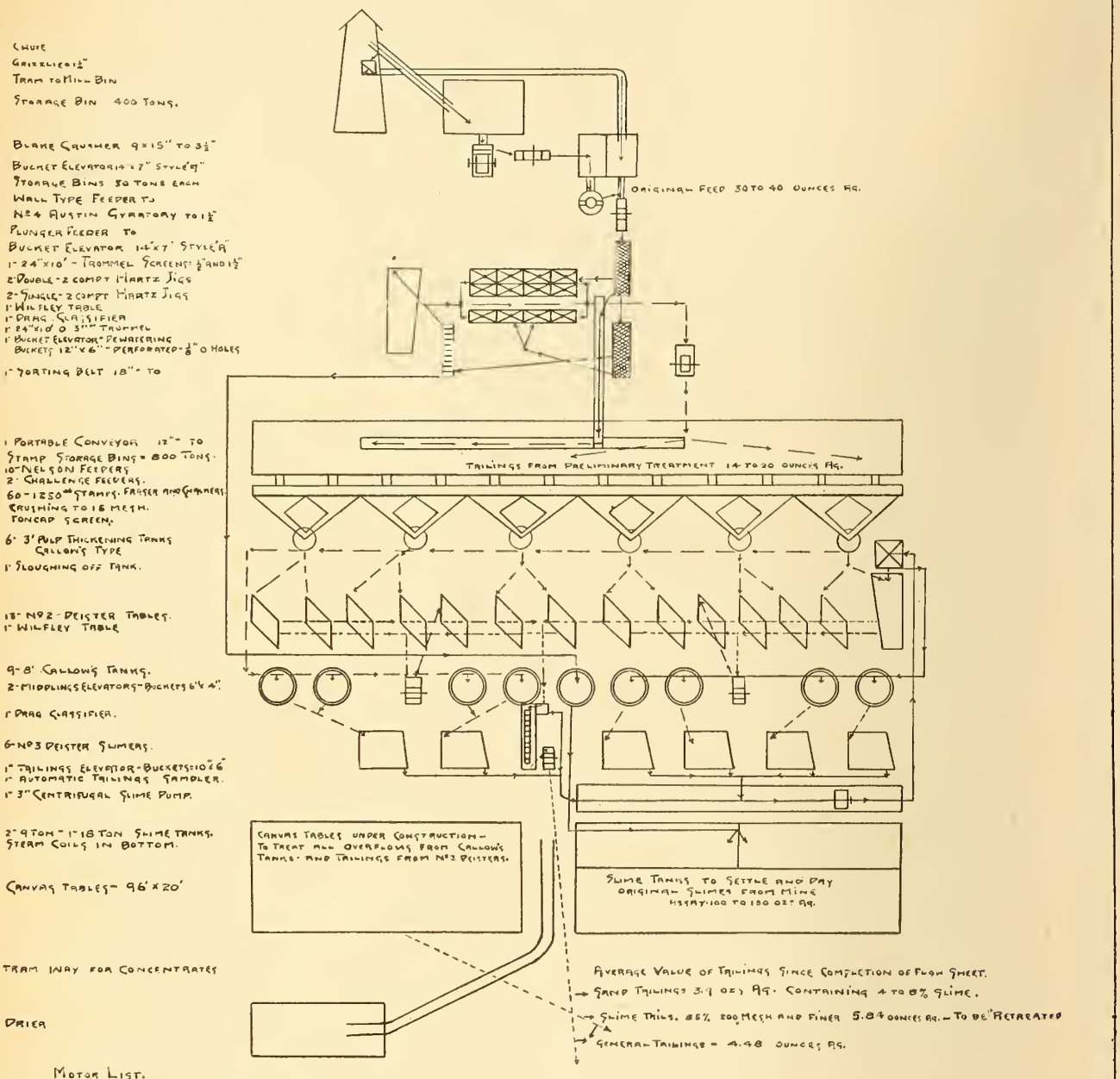
(Written for the CANADIAN MINING JOURNAL by Fraser Reid.)

[Editor's Note.—This succinct account of concentrating practice and results at the Coniagas mine will repay careful study. It is the product of much thought and experimentation. The treatment of slime is an outstanding feature.]

The minerals of economic value in the veins and wall rock of the Coniagas mine are native silver, argentite, parargarite (ruby silver), smaltite and niccolite.

The argentite is confined usually to the contact of the conglomerate with the Keewatin, while the parargarite occurs in the form of a drusy coating, or wash, in the wall rock of some of the workings.

The specific gravity of the vein matter varies from native silver sp.g. 10.5, to calcite sp. g. 2.7; intermediate


CHUTE
GRIZZLIES 1½"
TRAM TO MILL BIN
STORAGE BIN 400 TONS.
BLAKE CRUSHER 9"x15" TO 3½"
BUCKET ELEVATOR 13"x7" STYLE "A"
STORAGE BINS 30 TONS EACH
WALL TYPE FEEDER TO
No 4 AUSTIN GYRATORY TO 1½"
PLUNGER FEEDER TO
BUCKET ELEVATOR 14"x7" STYLE "A"
1-24"x10'-TROMMEL SCREENS ½" AND 1½"
2-DOUBLE-2 COMPT HARTZ JIGS
2-SINGLE-2 COMPT HARTZ JIGS
1-WILFLEY TABLE
1-DRAG CLASSIFIER
1-24"x10'0 3RD" TROMMEL
1-BUCKET ELEVATOR-REMACHERING BUCKETS 12"x6"-PERFORATED-⅛" ø HOLES
1-SORTING BELT 18"-" TO
1 PORTABLE CONVEYOR 12"-" TO
STAMP STORAGE BINS = 800 TONS.
10-NELSON FEEDERS
2-CHALLENGE FEEDERS.
60-1250 LB STAMPS. FRASER AND CHALMERS.
CRUSHING TO 16 MESH.
TONCAP SCREEN.
6-3' PULP THICKENING TANKS CALLON'S TYPE
1-SLOUGHING OFF TANK.
18-No 2-DEISTER TABLES.
1-WILFLEY TABLE
9-8' CALLON'S TANKS.
2-MIDDLINGS ELEVATORS-BUCKETS 6"x4".
1-DRAG CLASSIFIER.
6-No 3 DEISTER SLIMERS.
1-TAILINGS ELEVATOR-BUCKETS 10"x6"
1-AUTOMATIC TAILINGS SAMPLER.
1-3" CENTRIFUGAL SLIME PUMP.
2-9 TON-1-18 TON SLIME TANKS. STEAM COILS IN BOTTOM.
CANVAS TABLES-96'x20'
TRAM WAY FOR CONCENTRATES
DRIER
ORIGINAL FEED 30 TO 40 OUNCES AG.
TAILINGS FROM PRELIMINARY TREATMENT 14 TO 20 OUNCES AG.
CANVAS TABLES UNDER CONSTRUCTION-TO TREAT ALL OVERFLOWS FROM CALLON'S TANKS AND TAILINGS FROM No 3 DEISTERS.
SLIME TANKS TO SETTLE AND PAY ORIGINAL SLIMES FROM MINE ASSAY 100 TO 150 OZ. AG.
AVERAGE VALUE OF TAILINGS SINCE COMPLETION OF FLOW SHEET.
SAND TAILINGS 3.9 OZ. AG. CONTAINING 4 TO 8% SLIME.
SLIME TAILS. 85% 200 MESH AND FINER 5.84 OUNCES AG.-TO BE RETREATED
GENERAL TAILINGS = 4.48 OUNCES AG.

MOTOR LIST.

FOR	No	HP.	AVER. OPERATING HP
COARSE CRUSHING AND PRELIMINARY TREATMENT	1	100	32 = 64 · 12 · HRS.
PORTABLE CONVEYOR	1	3	1 = 2 · 12 · HRS.
STAMPS	2	100	160
No 2 DEISTER TABLES	2	10	14
SLIMER FLOOR-INCLUD.	1	10	10
'ING ELEVATORS AND PUMP	1	5	3
TAILINGS ELEVATOR	1	3	3
		TOTAL 345	223

LINE NOTATION.

ORIGINAL MILL FEED.-SLIMES FROM LOWER DRAG CLASSIFIER AND SLIMER MIDDLINGS
TAILINGS FROM PRELIMINARY TREATMENT AND STAMP DISCHARGE.
No 2 DEISTER MIDDLINGS.
No 2 DEISTER TAILINGS.
TAILINGS FROM DRAG CLASSIFIER.
CONCENTRATES ARE SKIMMED FROM JIGS AND SACKED-FROM TABLES GO TO SETTLING TANKS. HUTCH PRODUCT FROM JIGS RETURNED TO No 2 ELEVATOR-RETREATED ON FINE JIGS AND WILFLEY.

THE CONIAGAS MINES LTD.
COBALT ONTARIO
CONCENTRATOR FLOW SHEET.
CAPACITY 170 TONS PER 24 HOURS
DATE NOV. 14 1910.
F.D. REID.
MILL SUPT.

specific gravities being regulated by the combinations of native silver, calcite, smaltite and niccolite.

The veins vary in physical properties from the solid well-defined and more or less easily recoverable, to the decomposed, in which the smaltite or niccolite has suffered oxidation, the native silver being unaltered and in forms similar to that in the solid veins, i.e., from the finely disseminated and invisible to the dendritic and massive.

Values occur in the wall rock in the form of stringers, leaf silver and finely disseminated mineral. The finely disseminated mineral, along with the fine leaf and ruby silver in the wall rocks, makes hand sorting of waste impracticable.

The flow sheet accompanying this gives details of treatment. The principal features of the mill are:—

1. The hand sorting of oversize of one and one-quarter inch rings, the tailings from sorting belt going di-

rect to stamp bins. By this method the process is simplified, hand sorting in the mine is greatly reduced, and flake silver and silver in gangues of low specific gravity are sorted out, whereas in jigging, values in this form are liable to go over with the tailings. Attritional losses are also greatly reduced.

2. The original slime from the mine is cut out in the initial stage and piped direct to settling tanks, the product running from 115 to 175 ounces of silver to the ton. This process takes care of the decomposed vein matter.

3. The stamp discharge is thickened in 3-foot cones, the unclassified product going direct to No. 2 Deisters. The tailings from the No. 2 Deisters go to a Drag Classifier, the clean sand going to waste and the slimes pumped back and retreated on No. 3 Deister Slimers. By this method the slimes are reduced in value from about 20 to 12 ounces of silver before treatment on slimers, the sands on panning show very little, if any, free mineral, and the concentrates from No. 2 Deisters range from 1,800 to 2,200 ounces silver.

The sand tailings vary from 2 1-2 to 5 1-2 ounces silver, and vary directly as the nature of the wall rock treated. Ore from some of the workings crushed to 16-mesh and treated on tables, will give a 2 1-2 ounce sand, whereas ore from other workings would require to be crushed to 60-mesh to produce tailings of the same low value.

The slime tailings vary from 6 to 8 ounces silver, depending on the value of the feed to final treatment tables—the slimers making an extraction of from 40 to 50 per cent.

Recommendations as to Mining Legislation

(Submitted by the Special Committee of the Canadian Mining Institute.)

A committee of the Canadian Mining Institute consisting of G. G. S. Lindsey (Chairman), T. B. Caldwell, Lanark; Colonel A. M. Hay, Haileybury, Clifford E. Smith, Brockville, and J. L. Retallic, Kaslo, was appointed on the 1st of March to visit Ottawa and urge upon the Government that the recommendation of the Select Standing Committee of the House of Commons, on Mines and Minerals, dated Tuesday, the 18th day of May, 1909, be carried by the Government into effect.

The recommendation of the Select Standing Committee was as follows:—

"Your committee is of the opinion:—

"(1) That there should be assigned to the Mines Department the administration of mines, including the issue of title thereto, and of all mining laws.

"(2) That an Act should be passed consolidating all the laws relating to mines under Federal control.

"(3) That consideration should be given to a policy which will have for its object the re-acquisition by the Crown of mining rights heretofore granted in patents of land."

The Prime Minister appointed Monday, the 21st day of March, 1910, at eleven o'clock, to hear the committee, at which time all the members were present, except Mr. J. L. Ratallic, who had not sufficient length of notice to enable him to be present.

Mr. James Conmee, Chairman of the Select Standing Committee, introduced the committee, with Mr. H. Mortimer Lamb, at whose request Professor Willmott, F. T. Congdon, M.P., and Ralph Smith, M.P., were also present. Besides the Prime Minister, the Hon. Wm. Templeman and the Hon. Chas. Murphy received the committee. After the matter had been presented by Mr. Lindsey, Chairman of the committee, and spoken to by other members, the Minister of Mines gave his hearty endorsation to the proposal, and Sir Wilfrid Laurier promised that the first and second recommendation of the Select Standing Committee would be put into effect, and urged the Institute to prepare a statute consolidating all the laws relating to mines under Federal control, on the promise that the Government would introduce it at the next session of the Dominion Parliament.

At half-past three o'clock the same afternoon, at the request of the Minister of Mines, the committee waited upon him, when it was agreed that the Select Committee of the House would be called together immediately, a sub-committee appointed to draft the Act consolidating the mining laws, and an appropriation obtained so that the sub-committee might have the opportunity of dis-

G. G. Lindsey, K.C.

cussing with representative mining men from every province of the Dominion, the principles and details of the statute, so as to enlist their co-operation and support, and in this way secure a statute which would commend itself to as many provinces as possible, and possibly be followed by them in legislation for their own provinces.

On the 12th of April the report of the committee to the Institute was adopted, the committee was asked to continue to serve, given power to add to its number and full authority to act on behalf of the Institute, and was also empowered to take such steps as they might deem expedient in the premises.

The House of Commons did not appoint a sub-committee or take any further steps in the matter before rising. This having been brought to the attention of the Council of the Institute on the 7th of October, the committee was enlarged by the addition of the gentlemen who served on the previous committee appointed in 1909—Dr. A. E.

Barlow, Messrs. J. B. Tyrrell, B. A. C. Craig, J. M. Clark and A. B. Willmott, and this enlarged committee was empowered to draft certain recommendations to constitute the basis of a mining law for submission to the Council at its next meeting in December.

The enlarged committee met and prepared the following recommendations, and asked that a special meeting of the Council consider the same, which was done on the 11th of November, when the report was adopted, with the exception of Paragraph 5, which was changed.

The Secretary then submitted the committee's report, as follows:—

Report of Committee on Mining Legislation.

The committee of the Canadian Mining Institute, appointed to recommend a basis of a mining law for the Dominion for the purpose of submission to the Council of the Institute at its next meeting in December, respectfully submits:—

1. That the title to be required should be lease for 99 years for all purposes.

2. That the rental should be based upon the acreage and paid in advance at the rate of $1.00 per acre per annum.

Work done on any claim to the extent of the rental, but only where the work done amounts to at least $200 in any one year, is to be received in lieu of rental for that year.

3. That, in addition, royalties at the rates at present provided be paid, (it to be made clear what the general clause in regard to royalties in the existing statute means).

In the case of coal the present royalty, 5c. per ton (2,000 lbs.) should prevail up to the year 1930 (this date is given because the existing 21-year leases based on a 5-cent royalty expire at that time), and after 1930, and up to the end of the present century the royalty should be 10c. per ton.

Note:—Existing lessees should be permitted to exchange for lease under the new statute.

4. The prospector is not to be obliged to make discovery of mineral in place to the satisfaction of anyone, but having made what, by him, is believed to be a discovery of mineral in place, he is to be permitted to stake out a claim of 52 acres on the ground, and then record it in the Government Recording Office at a nominal fee, on doing which a lease is to be issued to him, which lease is to be perfectly free from any conditions dependent on the opinion or reports of officials.

5. There shall be no license fee or permit required for prospecting on the domain of the Crown.

6. Conformably with the promise of the Prime Minister there should be assigned to the Mining Department the Administration of Mines, including the issue of title thereto, and the making of all mining laws.

On motion of Mr. Donnelly, seconded by Mr. Penhale, it was also decided to delete paragraph 5, and substitute therefor the following:—

5. "A license fee shall be required of persons applying for the lease of mining lands from the Crown, and a prospector must either obtain a license to prospect before going into the field, or qualify before recording a claim."

The following resolution was passed:—

In addition, the Council requests the committee to submit the report to the Minister of Mines and to request him to provide a grant of money to cover the cost of drafting the Act in accordance with the suggestion made to the committee by the Prime Minister.

At the luncheon held by the Toronto branch on Friday, the 2nd, the usual discussion at such meetings was upon the recommendations of the committee as approved by the Council, and these were unanimously adopted and the committee was requested to press through legislation during the present session of the House.

The committee have an appointment with the Minister of Mines and with the Select Standing Committee of the House at Ottawa on Wednesday, the 14th December.

The Committee of Council (Messrs. Lindsey, Caldwell and Lamb), met in Ottawa on the 14th of December, to urge before the Select Committee of the House on Mines, the necessity for urgent action; each member present addressed the committee.

The committee of the House reaffirmed unanimously its anxiety to have a mining law passed at once, and to have the disposition of mining lands transferred to the Department of Mines, but as that involved a transfer of power from the Department of the Interior, at the suggestion of the Minister of Mines, a sub-committee of the House was appointed to wait upon the Prime Minister, the Minister of the Interior and the Minister of Mines, and discuss these questions with them, and the Committee of Council were asked to accompany the sub-committee.

On the same day these deputations did wait upon the three Ministers mentioned, when the Prime Minister stated that if the Minister of Mines would prepare a Mining Act it would be introduced into Council, and if any objections should be presented to it, they would be threshed out there, and he was quite prepared that an appropriation should be made to meet the expenses of preparing such an Act.

The Minister of Mines next day arranged an appropriation and has placed in the hands of Mr. J. M. Clark, K.C., the preparing of the Statute, which is to be drawn up, on the basis, that the disposition of mining lands will be vested in the Department of Mines.

Personal and General

Col. A. M. Hay is in Haileybury.

Mr. Robert Bryce is in Porcupine.

Mr. Martin Nordigg sails for Europe on January 9.

Mr. R. E. Hore was in Toronto during Christmas week.

Capt. John Hampson, formerly manager of the Alice mine, near Creston, B.C., has gone to England.

Mr. F. M. Young, secretary of the Crow's Nest Pass Coal Company, has returned to Fernie, B.C., from a visit to the coast.

Mr. S. S. Fowler has returned to Nelson from a visit to mining properties on Princess Royal Island, in the Coast district of British Columbia.

Mr. J. W. Evans, Belleville, is recovering from the effects of an operation for appendicitis. He will not be able to move around for some time.

Mr. H. McI. Weir passed through Toronto on his way to Brantford, there to spend Christmas. Mr. Weir represents Toronto interests in Porcupine.

Mr. A. J. Becker, superintendent of the Lucky Jim zinc mine, Bear Lake, Slocan District, B.C., was in Winnipeg lately, in connection with the prospective provision of transportation facilities, to allow of a resumption of shipment of ore from the Lucky Jim.

SPECIAL CORRESPONDENCE

QUEBEC.

The report of Mr. J. B. Tyrrell on a large feldspar deposit on the north shore of the Gulf of St. Lawrence, 40 miles from the north shore of Anticosti Island, has come to hand. More exactly, the deposit is situate on a peninsula two miles long on Quatichoo-Manicuagan Bay, 37 miles east of Esquimeaux Point. The shore is generally low, although there are rounded hills of rock that rise to an elevation of 100 fect or more. The bay has not been charted, but Mr. Tyrrell believes that it is navigable for ocean-going vessels of ordinary draughts. Communication with the outside world is provided for by a telegraph line two miles from the point.

The greater portion of the coast appears to be underlain by dark, coarse-grained hornblende schist, striking towards the

northeast and dipping vertically. With the hornblende is associated a finer grained quartzitic rock. Parallel with the schistosity, great dykes of orthoclase pegmatite have been intruded into the schist. Whilst the walls are well defined in most places, in spots large masses of schist have been broken off and included in the pegmatite. The dykes vary in width from 100 to 200 feet, and extend from the extreme point of the peninsula northeastward for a mile or more on the property. Two of these dykes were examined.

The pegmatite of the dyke is composed chiefly of orthoclase (or microcline) feldspar and of quartz. Small quantities of

biotite, muscovite, and black tourmaline are associated. [Note —Orthoclase and microcline feldspars are of identical chemical composition. They both contain 16.9 per cent. potash theoretically. In nature, the potash may be replaced by varying amounts of soda.]

The feldspar is generally pink or light grey in colour. In places it occurs in large, very pure crystals, twelve inches or more in diameter; but, for the most part, even when the definite crystalline form is retained, the feldspar is mixed with small prisms and bands of quartz. In such cases the feldspar constitutes about 80 per cent. or more of the whole. This combination makes up the greater part of the dykes.

In some places the rock consists almost entirely of feldspar; in others it consists almost entirely of quartz, with a few large crystals of feldspar scattered irregularly through it. Most of the quartz is white, or light grey, in colour; but in some places it is of a beautiful pink colour, with an opalescent appearance. This would make a good ornamental stone. Generally, the more quartzose perlions of pegmatite are near the sides of the dykes, whilst the feldspar predominates near the middle.

The enormous pegmatite dykes are very coarsely crystalline. Large and very pure masses of feldspar crystals are often segregated together in quantities that may yield hundreds, or even thousands, of tons. From these segregations a pure high-grade potash feldspar could be obtained. But the great portion of the feldspar in the dykes is closely associated with a small amount of quartz, and forms with it a typical graphic granite, usually free from biotite or other deleterious material. Vast quantities

of feldspar in this form, corresponding to the "Standard" feldspar of commerce, could be mined above the level of tidewater, and, doubtless, much more could be obtained below this leve.

ONTARIO.

Cobalt.—It is predicted that 2,000 companies with Porcupine as their base of operations, will be formed this year. It is easy to sell any kind of property, no matter where it be, for a thousand dollars, as long as it is reasonably near good claims. They are being bought for acreage in companies forming.

There is a very general feeling among mining men that the Government should see to it that the wildcatting in the early days of Cobalt should not be repeated at Porcupine, as it will do harm to legitimate operators.

The bullion shipments so far this month of December have not been very high. But the total at the middle of the month had reached the 418,684 mark, so that it is certain that over half a million ounces will be accounted for.

The Jacobs interests have purchased the Bruce Brymer claim situated in the south of Tisdale and adjoining the Foster. Camps will be built and work commenced at once.

While there is no slackening of interest in Porcupine the real estate boom has for the moment eclipsed mining speculation. Since the announcement of the building of the railway the lots

have trebled in value and there is now much competition for lots on the townsites at Golden City, Porcupine City and South Porcupine. All three have claims on the purchaser. In the last month the building activity at the south end where Col. Carson is now interested, is intense.

Two new smelters are in the market for ore. One will be ready to treat ore by the end of next month as the building at Orillia is completed, and most of the machinery has arrived. It is known as the Canadian Refining & Smelting Co. and will treat 20 tons of high-grade a day for the present. The other has a small plant on Dufferin Street, Toronto, and is bidding especially for high-grade cobalt ores. They will give ten cents a pound for 7 per cent. cobalt, and 8 cents for 6 per cent. In silver ores they will only take the very high grade. They are also bidding for high-grade nickel.

The Porcupine Power Company is making every preparation to rush the work on the power plant at Sandy Falls on the Mattagami. They will have storehouses of their own at Kelso, their own teams on the road, and they are confident that they will have all the machinery at Kelso by the end of February and can deliver power.

A syndicate of New Liskeard, Hamilton, Toronto and Cobalt men has purchased the O'Kelly claim at Miller Lake for $40,000. Mr. V. E. Taplin is the secretary-treasurer of the company. Work will be commenced as soon as possible.

The Temiskaming mining company, which resumed regular dividend payments on Nov. 10, has declared a 5 per cent. bonus for the new year, in addition to the regular 3 per cent. They will on Dec. 31 have paid 32 per cent., or altogether $784,156.25.

With the payment of the dividend on Jan. 12, the Nipissing will have practically redeemed its capitalization, having disbursed 99 per cent, or $5,940,000. The La Rose at the same time will have paid 29 per cent., or $2,079,185. While there was no increase in the La Rose dividend rate this quarter there is every hope for a rise at the next declaration.

The Floyd Mining Company has gone into liquidation. The company's main claims were in an unproductive portion of Coleman.

The Hon. Frank Cochrane, Minister of Lands, Forests and Mines, has returned to Toronto after his trip to Porcupine. He states that no expense will be spared to push the Porcupine Railway to completion with all despatch. If necessary, a thousand men will be employed in the work. He expressed himself as highly pleased with the Porcupine country. At Porcupine a contractor named Morrison cross-examined the Cabinet Minister rather severely and very plainly told him the views of a portion of the mining men in the North.

The eight Armstrong-Booth claims adjoining the Rea mines have been optioned to Mr. E. P. Earle, president of the Nipissing, for a sum between $150,000 and $200,000. Three of the Armstrong-Booth properties were under option to the Timmins, but they did not take them up.

With the declaration of their Jan. 16 dividend the Crown Reserve will have paid 150 per cent. on its capitalization in less than three years. For eight quarters it has now paid 15 per cent.

Last November La Rose produced 408,000 ounces. The operating profits amounted to $153,000 as compared with $138,000 in October.

The Princess and Lawson alone earned the La Rose dividend for the month.

To broaden investments in Northern Ontario, the Trethewey-Cobalt intends to increase the capitalization to two million dollars. There is some opposition to the suggestion among stockholders.

After a considerable period of development, during which there was no attempt to take out ore, the Beaver is now preparing to ship a high-grade car, which will leave before the end of the year. In the meantime on all three levels good ore bodies are being opened up. On the 200-foot level a crosscut has now opened up a five to six-inch vein of 4,000 to 5,000-ounce ore.

The Right of Way will pay the regular dividend of 2 per cent. on Jan. 1. It has now paid 73 per cent. of the original capitalization of $500,000. Since the capitalization has been raised to a million and a half, 8 per cent. has been disbursed.

East of the Fourth of July alone the Meyer vein at the 175-foot level now shows ore for 225 feet. For twenty feet there was a barren patch in the vein, but with this exception the lead has averaged from six to eight inches wide of 4,000 to 5,000-ounce ore. Two hundred feet from the shaft a winze will be sunk on high-grade ore to ascertain the depth of the conglomerate. The dip of the conglomerate is much more pronounced here, so that in all probability 300 feet of that formation will be obtained in the drift farther east.

The month of November was notable with the Nipissing, both in regard to production and also the discovery of new ore bodies. During the month $200,851 net was produced, and $398,410 was shipped, all net. Of this total $84,000 came up the Fourth of July Shaft. The discoveries included the new vein at the Kendall, the ore at 140 feet at the new shaft 122, and further ore bodies at the Meyer and 164.

Seven tons of high-grade ore left the camp early in December from the Waldman mine. This was taken out from the old shaft some time ago, but was not shipped immediately.

In a very interesting paper at the Cobalt Board of Trade banquet, Mr. T. R. Jones, of the Buffalo, stated that the gold area represented in Porcupine is supposed to include 180 townships, or 6,480 square miles, of which only 84 square miles had been in the least prospected. In the possible silver area there were 9,072 square miles, of which 222 square miles, or 2 1-2 per cent., had been prospected. Of the area so far prospected, 5 per cent. had proven more or less producing areas.

Col. Carson, president of the Crown Reserve, confirmed the report that his company is contemplating the erection of a big mill if no customs concentrator is to be commenced at once in the Kerr Lake district. He stated that when the high-grade had been exhausted at the Crown Reserve it would still be a great low-grade proposition. He understood on good authority that there was five years of milling ore right in sight in the Kerr Lake district already.

In a few weeks there will be the best possible accommodation at Porcupine for travellers. Big well-equipped hotels are building at Porcupine City and South Porcupine.

The telephone line from Matheson to Porcupine is now in good working order, and is doing considerable business. A large number of messages have already been sent over it.

Campbell and Deyell, the two Cobalt chemists, will establish a branch of their business at South Porcupine, where a building has already been commenced and the machinery sent up. Dogherty and Dixon, two more Cobalt mining men, will also establish an assaying business in the camp.

There is now a rush into Denton Township, or what is better known as Cripple Creek. It is 45 miles from Porcupine. The assays from that district, while not spectacular, are uniform and fairly high.

BRITISH COLUMBIA.

The Granby Consolidated M. S. and P. Company has declared a dividend of one per cent., total amount $148,500. This is the twelfth dividend the company has paid, and it brings the aggregate of profits distributed among the shareholders up to approximately $3,900,000.

The Hastings (British Columbia) Exploration Syndicate, Ltd., operating the Arlington gold mine at Erie, in Nelson mining division, lately declared a dividend of sixpence per share on its 60,375 issued shares. The company's head office is in London, England. Mr. Leslie Hill, M.E., of Nelson, is resident consulting engineer and manager. This is the third dividend this company has paid during Mr. Hill's management,

but the first and second were each at the rate of one shilling per share.

Cariboo.—Now that the placer gold mining season is over for the year it is realized that there will probably prove to be a decrease in the quantity of gold recovered in 1910, as compared with that in 1909. The chief cause of the expected decrease was that the washing season closed early and there was not sufficient water to admit of the sluice boxes being cleaned up on several of the larger mines, consequently much of the gold washed out of the gravel must remain in the sluice boxes until after next year's season shall have opened. Good progress has been made with construction work on the Quesnelle Hydraulic Gold Mining Company's 17-mile ditch and pipe-line from Swift River to the company's gold-bearing leases on and near Quesnel River about 20 miles below Quesnel Forks.

Atlin.—The season is believed to have been the best placer mining operators on Atlin creeks have experienced since 1907. This is reported to be largely due to the greater yardage of gravel the North Columbia Gold Mining Company washed during the 1910 season and the consequent increase in the quantity of gold recovered. In addition there was some lode gold obtained from quartz crushed in a small stamp mill on Taku Arm of Tagish Lake.

East Kootenay.—While the tonnage of lead ore from the St. Eugene mine is less now than for years production at the Sullivan mine, also operated by the Consolidated Mining and Smelting Company of Canada, has been large enough lately to make good that deficiency. An ore-testing plant, designed to treat ores on a commercial basis, has been put in at the St. Eugene mill. Shipment of ore from the Society Girl mine, near Moyie, was in progress about the middle of December, but the tonnage then available was not large—probably between 150 and 200 tons of hand-sorted ore. Coal mining has been active at four collieries, namely, those of the Crow's Nest Pass Coal Mining Company at Coal Creek and Michel, and of other companies at Hosmer and Corbin, respectively, also in the Crow's Nest Pass district.

West Kootenay.—It is proposed to develop the Highland mine, Ainsworth camp, at a deeper level than has yet been worked on the property, if satisfactory financial arrangements can be made by the Kootenay Silver Lead Mines, Ltd., which company holds the property under option of purchase. Work is being done on both the No. 1 and Gallagher mines, and both will send down some ore when the sleighing shall be good enough for heavy hauling. The 1910 season has not been a generally good one at mines on the south fork of Kaslo Creek, from which the output of ore was comparatively small. The machinery for the Joker stamp mill has not yet been hauled to the property, but lies where unloaded from the K. & S. Railway, near the junction of the south fork with the main stream. Efforts will be made to do the necessary heavy hauling as soon as there shall be sufficient snow on the ground to make a good road. The late lessees of the Whitewater mine have abandoned their lease of the property as a result of the destruction of the concentrating mill by fire last summer. With neither concentrating nor transportation facilities, both having been destroyed by fire, there was no inducement to re-open the upper mine. Development work is, however, still being done in the "deep" of the Whitewater vein, by the company known as the Deep Mine, Limited.

In the eastern part of Slocan district, the Rambler-Cariboo and Lucky Jim mines are preparing for producing ore on a larger scale than for years. Already some 4,000 sacks of ore—about 300 tons— from the Rambler-Cariboo have been hauled part of the way to Three Forks, as far on the way as there has been snow for good sleighing. The snow is unusually late in coming this year, there having been little fall as yet low down the mountains. It is intended to regularly maintain an output from the Rambler-Cariboo of about 200 tons of silver-load ore per month, there being plenty of ore available for stoping on several levels down to the 1050-ft. Driving the low-level adit at the Lucky Jim zinc mine is being done faster now that there is compressed air for machine drills. A new compressor has been put in to replace that destroyed in last summer's forest fire. Development work is being continued throughout the winter at the Washington mine, above McGuigan Basin, and at the Surprise and Noble Five, on the Cody side of the divide. Near Sandon, mining progress is much as during several recent months, with the Ruth-Hope and Richmond-Eureka both shipping ore in quantity and the Slocan Star doing similarly, though on a smaller scale for the present. Practically all the smaller mines have been closed for the winter, work not being practicable to advantage when the winter snows are deep, and sometimes dangerous by reason of the risk of snow slides. There have been reports published in effect that the Standard mine has been sold, but as yet these are premature, for no sale has been effected. There is such an unusually large showing of shipping ore in the mine, with good reason to look for its continuance, much development work warranting this expectation, that its purchase from the present owners by Spokane capitalists is regarded as probable.

About Nelson, there is also activity in several directions. The Consolidated Mining & Smelting Company has been constructing a four-mile aerial tramway from the Molly Gibson concentrator towards the landing on the west arm of Kootenay Lake preparatory to resuming shipment of silver-lead ore from this mine. The organization of a company named the Kootenay Gold Mines, Ltd., has been in hand and it is understood has been accomplished. The authorized capital of this company is $250,000, and the chief object the acquirement of the Granite-Poorman gold mines and 20-stamp mill, situated within a few miles of Nelson. The property is owned by the Duncan United Mines, Ltd., and is being worked under lease by Messrs. Gough, Guille and Swedborg, fo Nelson. Copper ore is being shipped from the Eureka mine to Trail. The assets of the Hall Mining & Smelting Company, including the Silver King mine and a large group of adjacent mineral claims, smelter at Nelson, aerial tramway connecting mine and smelter, water rights, electric power transmission line, etc., have been sold, together with several other groups of claims also situated on Toad Mountain. The sale is an absolute one, and 60 per cent. of the purchase money has been paid, the remainder being payable in two instalments, the final one falling due next summer. It is reported a strong company is being organized in England to acquire this big consolidated group and other property included, and that it is proposed to drain the Silver King mine by a deep-level tunnel; also to work the North Star group, which is one of those being acquired. The question of operating the smelting works will be considered later, but it is regarded as a possibility.

At Sheep Creek developments continue to be satisfactory. The Queen is mining ore from a big shoot found in the deeper part of the mine. The Nugget keeps its 4-stamp mill going, and, at the same time the work of further exploring the mine is being steadily proceeded with. The Kootenay Belle is reported to have quite lately cut one of the known veins at a depth of more than 200 ft. below where it had previously been opened. The crosscut adit entered the vein at 325 ft. from its portal. Where explored in No. 1 adit at 90 ft. from the surface this vein ranged in width from 30 in. to 5 ft. A larger vein occurs within 100 ft., and the lower adit is to be extended so as to cut that at greater depth, as well. Little information is obtainable concerning the Mother Lode, which Mr. John McMartin, formerly of Cobalt, has been prospecting all the year. It is known, though, that developments are regarded as quite satisfactory, and tests of ore are being made with a view of determining the style of mill best suited for treating the ore.

Coast.—It is stated that the Tyee Copper Company has taken over from the Northern Texada Mines, Ltd., the lease of the Cornell mine, on Texada Island. This mine is one of the Van

Anda group, which in past years produced a considerable quantity of gold-copper ore, much of it of high grade. The output of the Cornell, however, during 1909 and 1910, was of ore which though of fairly good grade, was not as high as in earlier years. During 1909 and part of 1910 there was produced from the Cornell 14,600 tons of ore running from 3.7 to 4.5 per cent. copper, and about 1.4 to 1.7 oz. silver and 0.3 to 0.4 oz. gold per ton. Princess Royal Island is again having attention. Some years ago a company having its headquarters in one of the Maritime Provinces, did some mining on this island, but no work had since been done there until lately. An adjacent island, Gribbell Island, also had mining done on it, but this part also has been neglected for years.

Much interest is being taken in the official bulletin on Portland Canal, by Mr. W. Fleet Robertson, provincial mineralogist, shortly to be issued. There is this satisfaction derivable from Mr. Robertson's reports—he is thoroughly conscientious and reliable, and may always be depended upon to unequivocally state the facts as he finds them.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—Reports from Scheelite, the Moose River tungsten mining camp, indicate that progress is being made. Several new and rich veins have been cut. Mr. Victor Hills, of Denver, has recently concluded an examination of the property.

Springhill.—M. J. Butler, general manager of the Dominion Steel Company, accompanied by Mr. McDougall, assistant general manager of the Dominion Coal Company, and Hector McInnis, the newly elected vice-president of the Cumberland Coal & Railway Company, who are now inspecting the Springhill properties, went to Parrsboro to-day to view the terminal facilities of the company at that point. They returned to Springhill this afternoon.

The strikers anticipated that Mr. Butler would ask for a conference with the men, but so far he has given no indication of a desire to meet them. A cheque for $21,000 arrived in Springhill this week from the headquarters of the U.M.W., in Indianapolis, and as rather a peculiar coincidence a double indemnity order was issued on the same day this week as the polling took place for the election of executive officers.

For over a week past picketings have been going on in a most active and demonstrative fashion. Hundreds of men and many women will line the sides of the streets and jeer and hoot at the strike-breakers. Arrests are being made daily. Some of the parties have been tried before the Magistrate in Springhill, while others are taken to Amherst. The feeling in town is growing more bitter and more intense, and it is difficult to understand how the present conditions can continue longer without more serious trouble arising.

NEW BRUNSWICK.

Hillsboro.—Buried beneath three or four hundred tons of rock was the terrible fate that befell three workmen in the Albert Manufacturing Company's quarries at Hillsboro on Dec. 16th. Several others had miraculous escapes. The dead are: Fred Nelson, aged 40; Edward Collect, aged 45; Theophilus Allain, aged 21. Octave Duplessis was severely injured.

The men were working on the face and at the bottom of the 40-foot embankment. Two of the men were drilling into the face of the quarry with a view to blasting the top off when suddenly the rock gave way and fell, burying the three men.

ONTARIO.

Ottawa, Dec. 14.—A deputation representing the Canadian Mining Institute, and a sub-committee representative of the Commons Standing Committee on Mines, conferred this afternoon with Sir Wilfrid Laurier and Hon. Messrs. Oliver and Templeman with regard to the recommendation passed by the Mines Committee this morning, that steps be taken by the Federal Government to pass a general Mining Act, and to secure as far as possible, from the provinces, uniformity of legislation and regulations governing mining operations.

It was agreed that an Act should be drafted and presented by the Government to the House this session, codifying the existing Federal regulations with respect to mines, and whatever further action possible to carry out the wishes of the mining men with regard to the uniformity of legislation throughout Canada.

Ottawa, Dec. 13.—Mr. Hudson, Government expert on explosives, has been sent out to investigate the cause of the disaster in the coal mine at Bellevue, Alberta. It is expected that the Government measure to be brought down this session with reference to the manufacture and use of explosives may also contain provisions tending to improved methods of mining and reduction in the number of fatalities.

ALBERTA.

Edmonton, December 12.—Thirty lives are known to have been lost, as a result of the disastrous mine explosion which occurred Friday night at 7 o'clock in the Bellevue coal mine, three miles east of Frank, Alberta.

There were forty-six men on the shift, and thirty-three of them were killed. Fifteen were rescued, some of them having narrow escapes. A rescue party was imprisoned, and two or more of the members of it have lost their lives it is feared.

The known dead include Fred Alderson, fire boss at Hosmer Mines, one of the rescue party, who first entered the mine, and the only man not an employee of the West Canada Coal Company.

News of the disaster did not reach Fernie until late Friday night and a caboose and engine bearing a party of rescuers from the Coal Creek mines, including Mr. Evans, Superintendent Shanks, and others, started for the scene of the disaster, picking up a life-saving apparatus at Hosmer.

A. Michael, General Manager Ashworth, of the Crow's Nest Pass Coal Company, and others, boarded the special which, after transferring at Coleman and changing crews at Frank, arrived at Bellevue at 3 o'clock Saturday morning.

A rescue party was at once formed, and the men, under the direction of J. W. Powell, superintendent of the mines, equipped with Draeger helmets and oxygen apparatus, entered the mine. The oxygen apparatus, though not thoroughly understood by the users, proved of much value, but owing to the fact the charges lasted only thirty minutes, and also through the lack of men to form sufficient relays, the apparatus was not as effective as expected.

The rescuers worked until 5 o'clock Saturday morning, when a cave-in occurred, imprisoning the entire party. Two of the men were experts in the use of the oxygen helmets, but one man, Mr. Fred. Alderson, was brought out dead.

Mr. McKenzie, of Blackmore, a member of the rescue party, was brought out barely alive, and is in a very serious condition. Many others are still in a precarious condition.

The thirty-three bodies recovered, in addition to those of the Hosmer miners, were all bodies of the original forty-five of forty-six imprisoned in the mine. Many have been identified, but in the case of foreigners especially, identification is difficult. Many bodies are badly mutilated.

Coroner E. M. Pinkney, of Lille, arrived soon after noon Saturday, and had a jury empanelled at once. An adjournment to the 19th instant was taken.

Relief trains, equipped with blankets, food, etc., and bringing physicians have arrived from all directions on the Crow's Nest line between Cranbrook and Lethbridge, and there is no lack of willing, sympathetic aid.

Every coal mine in the district is closed down and the miners are working in shifts in the work of rescue.

Many stories of the wonderful heroism will be told when the work of rescue is complete, but while there remains a single chance to save a life, the men refuse to talk of their experiences in the mine.

One incident, however, stands out clearly. Jack Hutton, miner at Frank mine, was one of the volunteers for the first relief party. After entering the portal he heard that his brother, Ike, was among the imprisoned. He worked until three in the morning, and finally located his brother in one of the side galleries. Ike, with others, had started for the surface, when they were caught in the second fall, and retreated to the gallery where the air was comparatively pure. When the second relief party arrived, and removed the debris, Jack Hutton staggered out carrying the insensible form of his brother. Both were overcome.

There are several stories at present as to the cause of the explosion. The one most generally accepted is that a fire supposed to have been put out in October, broke out again and ignited the gases. No shots were fired after the shift had left the mine.

Alderson, the mine boss from Hosmer, who lost his life trying to save others, leaves a wife and four children in England.

Six English miners were on the imprisoned shift and of these three have been identified as Joseph Maguff, Homan Tippo, pit boss, and Isaac Hutton, fire boss.

Edmonton, December 13.—Premier Sifton announced in the Legislature that the fullest possible investigation was being made into conditions of the mines in the south of the province, and particularly the one at Bellevue, owing to the recent disaster there. A provincial mine inspector has been sent there, and a local inspector has been on the scene since Saturday. Following the investigation, he stated that a commission would probably be appointed.

BRITISH COLUMBIA.

Fernie, December 13.—Six of the Slav victims of the Bellevue disaster were buried here in one grave, and the body of Fred Alderson will be interred at Hosmer to-morrow.

It is a significant fact in connection with the disaster that a Government mine inspector viewed the mine for escaping gas three days before the fatality, and posted a notice to the effect that the timbering and ventilation were good, and that there was no gas.

The Miners' Union had asked that an inspection of the mine be made and told Inspector Sterling, it is stated, that there were volumes of gas in the mine. It is thought that there is yet one unrecovered body.

Nelson, December 15.—The bonding of the C.P.R. group of claims at Ymir to a Vancouver syndicate, represented by Charles Jennings, with whom negotiations have been proceeding for some weeks, has been consummated.

The C.P.R. group, owned by Edward Peters, of Ymir, and George Colwell and G. G. Peters, of Nelson, and a number of associates, is located in close proximity to the Sterling group, which was recently bonded to Phil White, of Vancouver, and to the Blackcock, upon which a deal with Mr. White is now pending.

All papers in connection with the bond have been executed, and are now in escrow in the Royal Bank of Canada. The final payments are to be made within two years, and one of the conditions of the deal is that the development work at present being carried on shall continue throughout the winter. There are ten claims in the group, and a large number of surface cuts, a shaft, and several tunnels have been already driven on the property.

Vancouver.—It is announced that the Tyee Smelting Company, of Ladysmith, has bought the interests of the Cornell mine at Van Anda, Texada Island, originally worked by a British syndicate.

The latter syndicate abandoned operations and sold out to the Northern Texada Mines, Limited, who struck a rich formation of Cornite copper, yielding high values in silver and gold. They expended $300,000, and within two years this was all recovered from the mine and a handsome dividend was paid the shareholders, so that the sale price of the lease left them very much to the good.

The Tyee Company intends to put in a large amount of additional machinery, and development work will be started on a big scale. Others interested in the selling company in addition to Dr. Tanzer, are Messrs. S. G. Faulkner, A. A. Jones, Dr. W. R. Spencer and J. Y. Griffin, of this city; J. B. Suess, of Seattle; R. J. A. McGuiness, of Van Anda, and others. On his retirement as president and manager, Dr. Tanzer was the recipient of a presentation from the men.

The mine property itself is owned by Mr. H. W. Treat, of Seattle, and is situate one mile from Van Anda. Since January 1, 1909, 20,000 tons of high-grade ore are claimed to have been taken from the mine to the Tyee smelter at Ladysmith. Since that date $225,000 is also said to have been paid in wages and supplies, ninety-four per cent. of which remained in this province, and a further sum of $40,000 went to Mr. Treat in royalties. The machinery which the company installed upon taking possession cost another $25,000.

MINING NEWS OF THE WORLD.

..Bolton, Eng., December 21.—Three hundred and thirty-seven coal miners were entombed to-day in the Hutton colliery by a terrific explosion.

Eight hours after the disaster occurred only fifteen of those entombed had escaped. A pit boy who was the first rescued, declared that the disaster would cost the life of every man working in the shaft. The mine caught fire from the explosion and great gusts of black smoke rolled from the mouth of the shaft, driving back the rescue parties.

The shock of the explosion was felt for miles around and the families of the imprisoned men crowded about the shaft screaming and trying to enter.

As the body of one dead man was brought out there was a rush to try to identify the blackened remains.

Gusts of the deadly fire damp which filled the pit drove back the rescuing parties. The clothing of the rescuers was burned off and some of them emerged minus hair and eyebrows.

Great throngs crowded about the shaft begging to be allowed to take part in the rescue work. They were mostly relatives of entombed men and the officers who were strung about the pit were compelled to fight them back.

Eight hours after the disaster the rescuers took seven of the miners to the surface of the shaft. Although life was still in them they were badly hurt and the physicians who made a hasty examination before they were taken to the hospitals declared that they were probably fatally wounded.

A shift had just finished work in the shaft, but the men rushed from their homes, grimy from their night's work, clamoring to enter the shaft and rescue their comrades.

Special relief trains were rushed from surrounding towns bearing doctors, nurses and medical supplies. Experienced miners, long used to the disasters of the coal mining district,

were hurried to the scene. Especially constructed devices to guard against the fatal gases in the mine were brought there.

A temporary hospital and morgue were established. As the blackened and wounded men were brought to the surface they were taken with all possible despatch to the hospital. The dead were hastily embalmed and placed in the morgue for identification.

There were 337 men in the colliery at the time the explosion occurred and eight hours later only fifteen survivors had been taken out. At that time ten of the dead had also been removed.

Fire broke out in the mine following the explosion and prevented rescue work. Vast volumes of smoke mingled with the fatal fire damp. Great billows of fire spurted from the pit thousands of feet in the air and pockets of gas exploded from time to time with tremendous detonations.

Within a few minutes after the first blast occurred, the mouth of the mine was surrounded with relatives and friends of the miners. When these learned that the mine officials were considering sealing the mouth of the pit rioting broke out. The mine officials were attacked by the infuriated mobs and a detachment of soldiers was summoned to protect the representatives of the owners and prevent the men in the crowds from rushing to their doom in the shaft in the hope of attempting a rescue of their imprisoned comrades.

The local authorities were powerless to restore order. The municipal authorities deputized armed guards to patrol the mine company's property.

Members of the early rescue party, which was able to penetrate a short distance into the shaft before the fire passed beyond control, declared that more than 250 miners were undoubtedly dead, as they were working in a section of the mine completely cut off by falls of slate and a seething furnace of rescuers declared that the poisonous fumes and lack of fresh flames. Even if they escaped death in the raging holocaust, the air would kill them.

The mine owners declared that the explosion had been caused by an ignition of accumulated fire damp from an open lamp worn on a miner's cap.

The plight of the miners was rendered more desperate by a mishap to the machinery of the shafts where the cages refused to move for a time, preventing a quick escape and interfering with the ventilation. The rising gases were checked by obstructions and driven back upon the entombed men.

SOUTH AFRICA.

Johannesburg.—The Johannesburg Star reports the discovery of a gold formation—said to be similar to the Glynn's Lydenburg deposit—traced for a distance of 4,000 yards and situated 11 miles southwest of Pretoria.

Three of the finance houses are interested and prospecting is proceeding.

A prominent group of engineers who inspected during the week-end the Cyferfontein discovery on the Klerksdorp goldfield, express themselves impressed by the showing.

INDIA.

The gold production of the mines of the Kolar Goldfield (Mysore) and two outside mines (the Hutti Nizam's and the North Anantapur) for November was 47,272 ozs., an increase of 43 ozs. compared with the return of the previous month.

UNITED STATES.

Bakersfield, Cal.—At the recent meeting of the directors of the Independent Producers' Agency, in this city, several plans for the improvement of the oil markets were considered and it is probable that in the near future action will be taken to carry out the plans that met with general favour. One of the projects is for the Agency to rent all the storage it may need for a period of 10 years on a certain fixed amount, and not for month to month as prevails at this time. It is likely that steps will soon be taken towards this end.

San Francisco, Cal., December 20.—More than $78,000, $18,232 in gold bullion, and $60,000 in express bullion, has been stolen by Alaska treasure thieves, and the Canadian Government and the United States Post Office Department are working to-day to solve the crime, which was committed under mysterious circumstances.

The robbery of the $78,000 worth of bullion took place while the treasure was enroute from Fairbanks, Alaska, to this city. The authorities have been working upon the supposition that $60,000 was stolen from a United States mail bag on board the steamer Humboldt between Skagway and this city. Inspector Durand to-day declared, however, that he had discovered evidence that the treasure was stolen between Dawson and White Horse Rapids in Canadian territory.

Four persons giving the names of E. L. Smith, Margaret Henry and T .J. and G. M. Woodson, are under arrest in San Francisco. The quartette had $12,500 worth of gold bullion and currency in their possession when arrested. The authorities have not revealed the part they claim the woman played in the robbery.

Redding, Cal.—The Farmers' Protective Association has unanimously adopted a resolution demanding that the Balaklala Copper Company cease from operating its smelter at Coram, except in strict conformity to the decree of Judge Morrow, of the United States Circuit Court at San Francisco. The farmers charge that the fumes are still causing great damage to crops and that the smelter must close until such time as the Cottrell or other devices effectively control the objectionable smoke.

Colorado Springs, Colo., December 17.—Dividends aggregating more than $550,000 have already been declared or will be declared this month by mining companies operating at Cripple Creek, with headquarters in this city. Among the companies that have already announced these so-called "Christmas" dividends are: El Paso, $24,000; Golden Cycle, $30,000; Elkton, $37,500; Gold King, $19,737; Vindicator, $45,000; Acacia, $7,194; Granite, $16,500; Portland, $60,000.

Leadville, Colo.—When the year 1910 shall have been completed and figures are made up on zinc production in Lake County for the year, it is expected that the figures representing the output of carbonate of zinc will represent a surprisingly large percentage of the total. Close to 4,000 tons a month of carbonate of zinc are being produced, and the returns thus far indicate an average value of about $20 a ton net to the shipper.

MEXICO.

Durango, Mex.—Forty-seven miles northeast of Telehuanes, the Inde Gold Mining Company at the camp of Inde, is treating an average of 3,000 tons of ore a month, employing an all slime cyanide process and grinding with high-speed rolls and tube mills. The reduction equipment will be enlarged by the addition of a half-dozen Pachuca tanks to care for the ore from the company's recently acquired Potrillo mine.

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" 10	54½	25⅛
" 12	54⅜	25⅛
" 14	54½	25⅛
" 15	54⅜	25⅛
" 16	54⅝	25⅛
" 17	54⅝	25⅛
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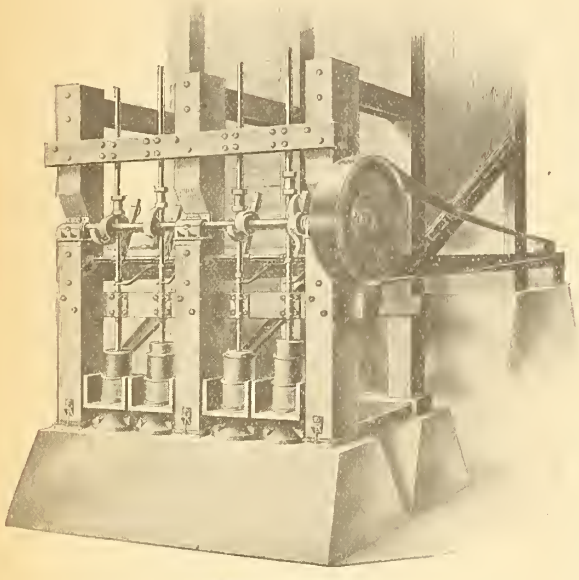

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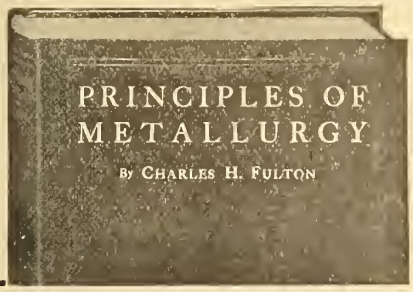

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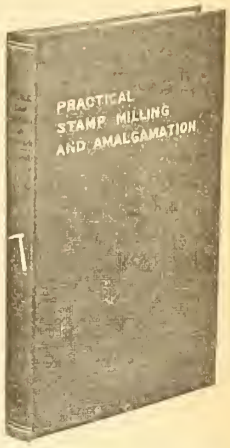

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Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Government of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unsurveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10 00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minimum being 40 acres in unsurveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

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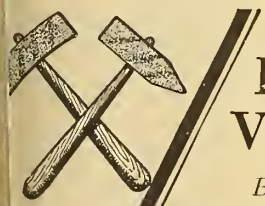

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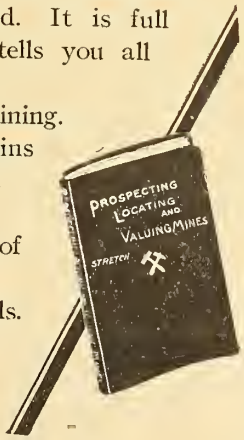

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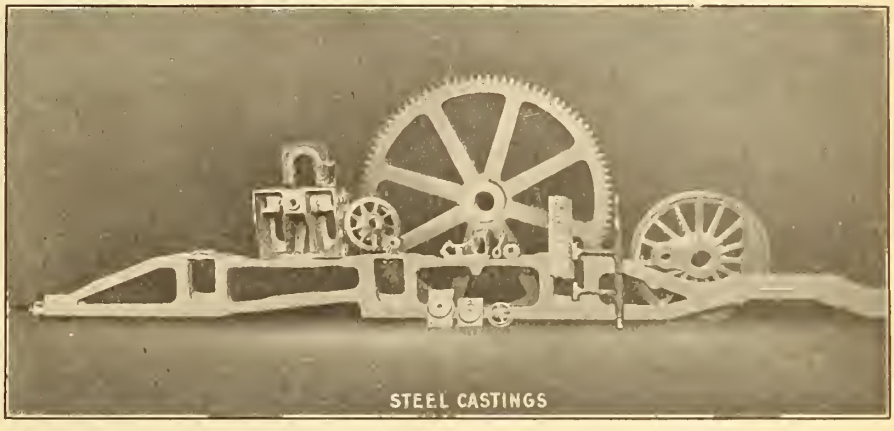
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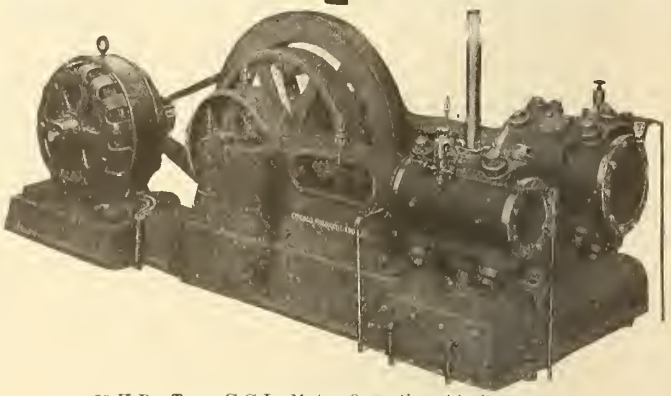

50-H.P. Type C C.L. Motor Operating Air Compressor
Silent Chain Drive

Induction Motors are described in Circular 1118, Direct-Current in Circular 1068

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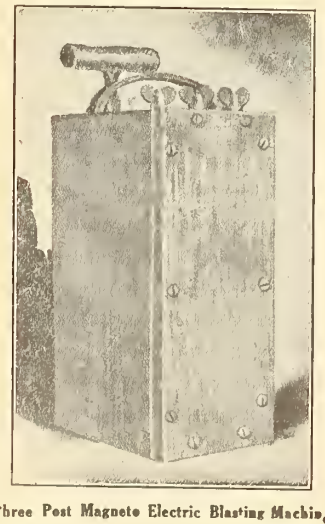

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Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

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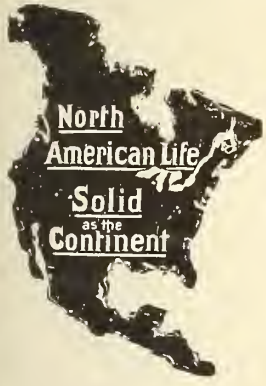

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THE CANADIAN MINING JOURNAL

L. 32 TORONTO No.

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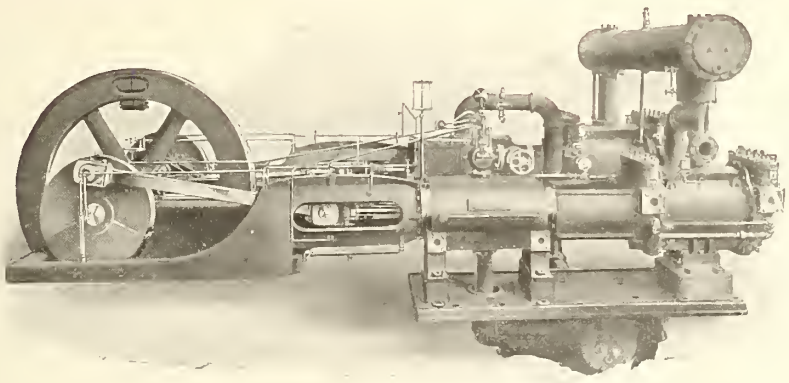
Fitted with the well-known Cincinnati Air Valves and Corliss Steam Valves



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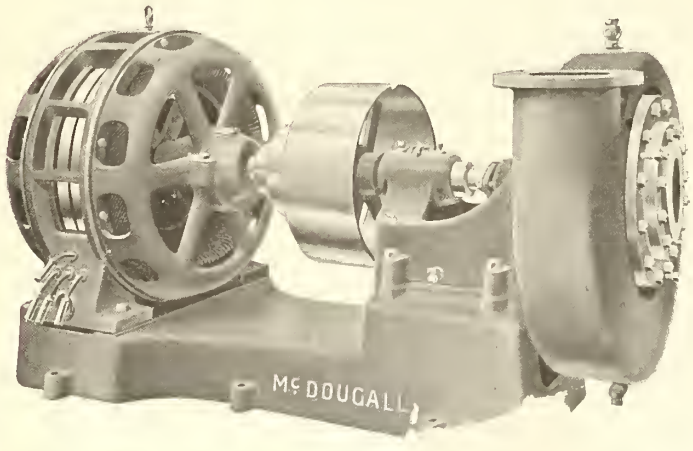

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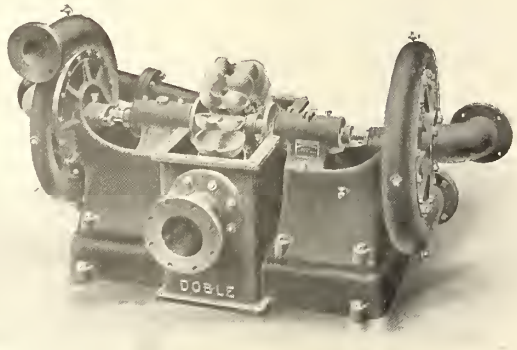

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and not give it a trial when we can guarantee that it will relieve you of this part of your troubles.

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These machines are simple and plain in design, but in proportion to size, they are stronger and more durable than large "heavy-duty" compressors.

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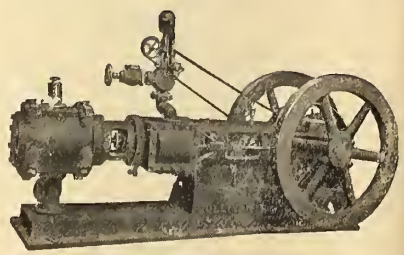
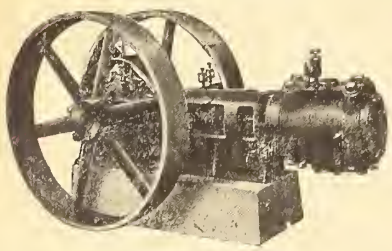


Single Stage, Steam

BULLETINS { Steam 658H / Belt 658F

COAL CUTTERS HAMMER DRILLS ROCK DRILLS DIAMOND DRILLS



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Amatite has a genuine mineral surface.
This means th· t it requires no painting.
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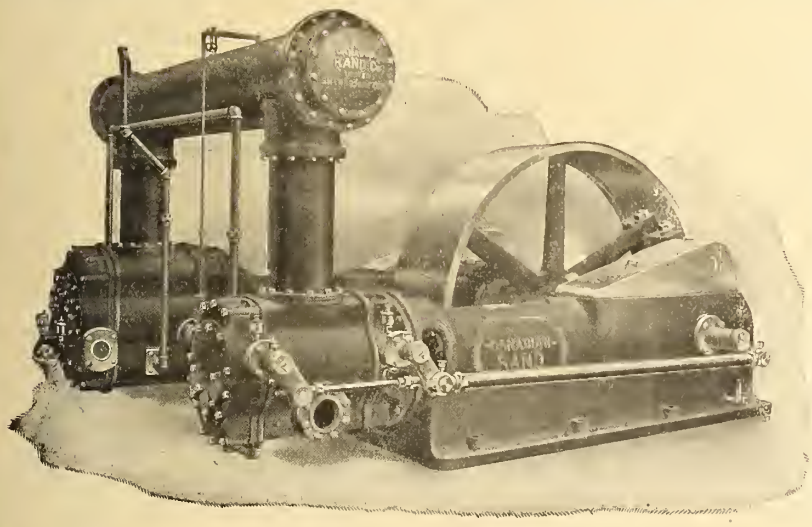
CLASS "RP-2" AIR COMPRESSORS



The Rand Class "RP-2." Duplex Power Driven Air Compressor combines the good principles of modern engine design with the best pneumatic practice.

The unusual capacity of Class "RP-2" Compressors is of course evolved through their high speed and high efficiency, but their massive enclosed dust-proof construction permits of high-speed without impairing the "Rand" reliability.

The superior quality of workmanship, rigid enclosed construction, exceptionally large bearing areas and efficient lubricating system which literally "floods" all important bearings, combine to give the high mechanical efficiency which characterizes this type.

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ROCK DRILLS
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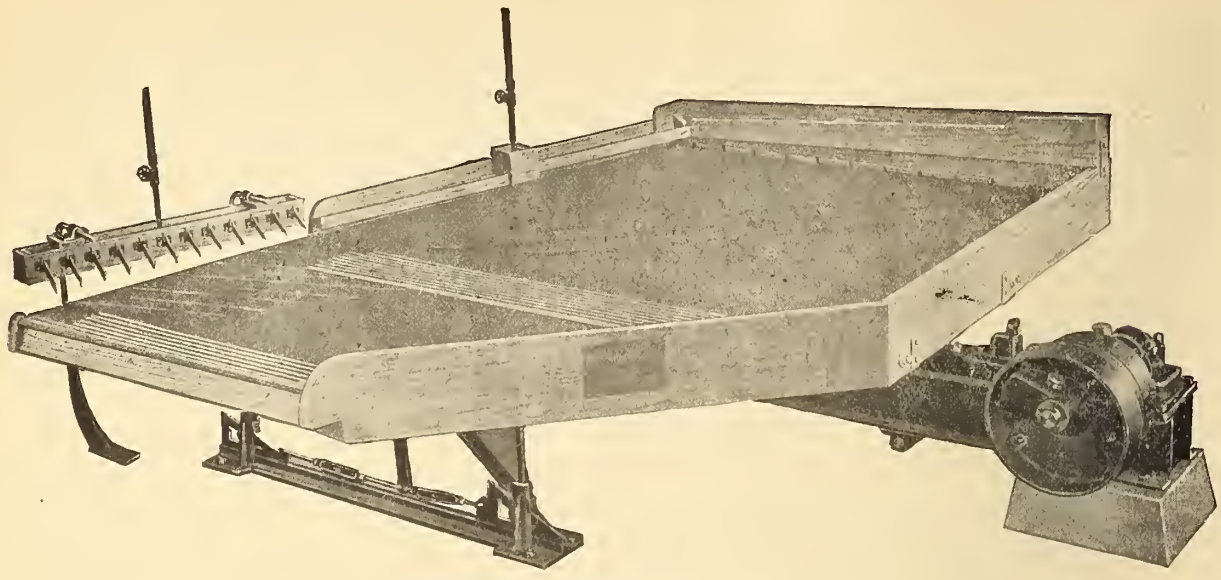

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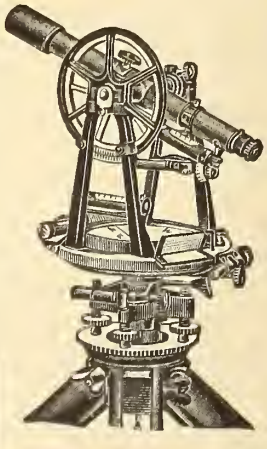

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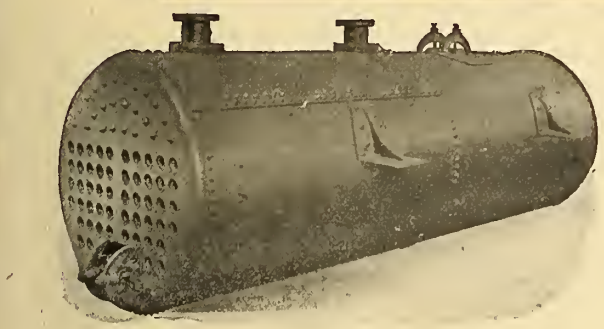

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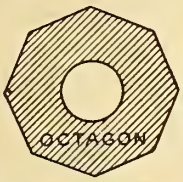
Specify Distinctly "STAG" BRAND Allen's Stag Brand



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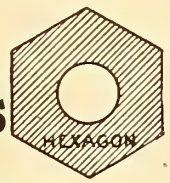

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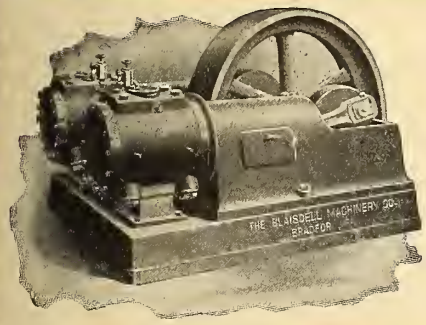

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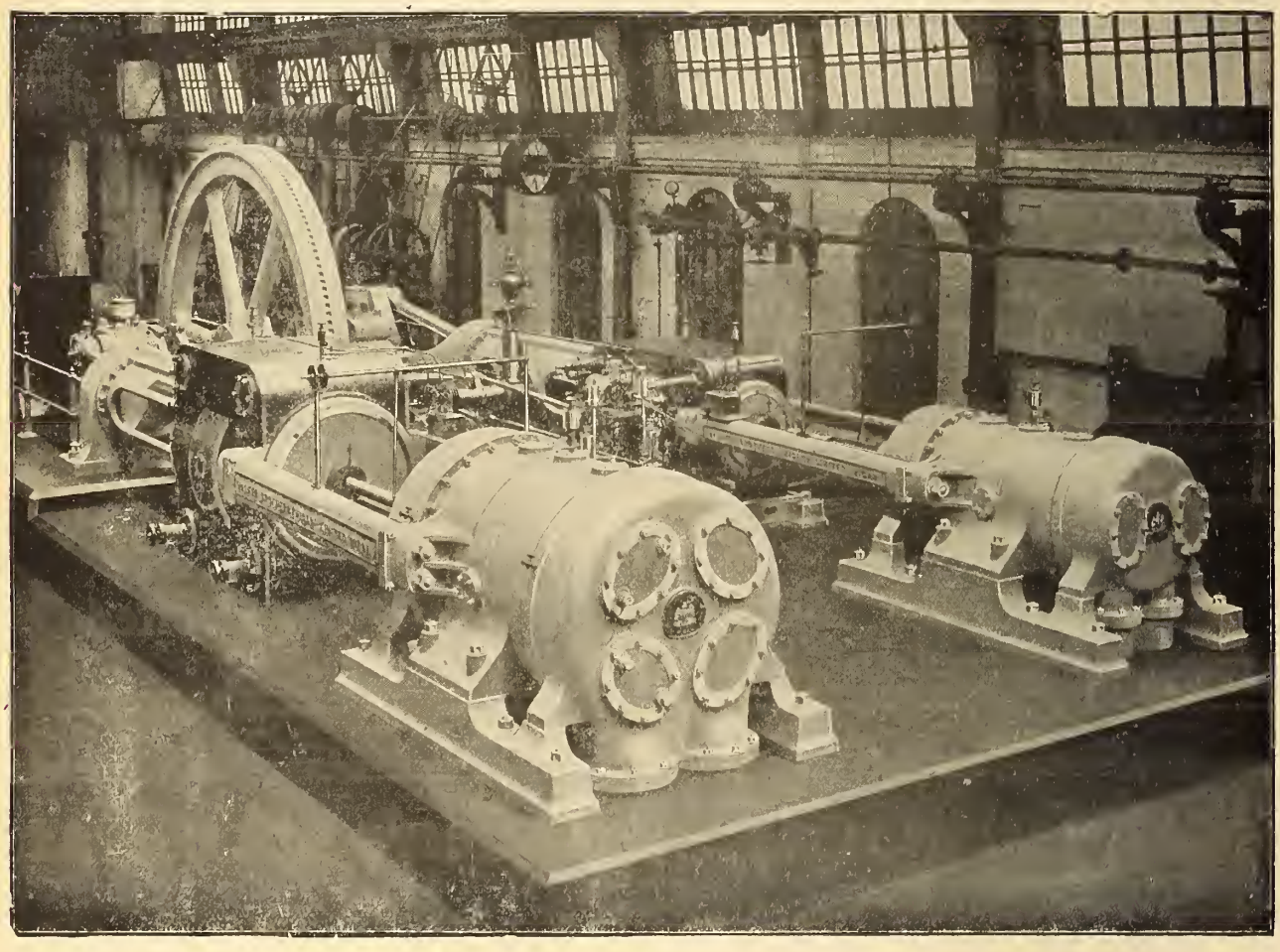

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Air Valves to New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. **(Applicable also to Existing Engines.)**

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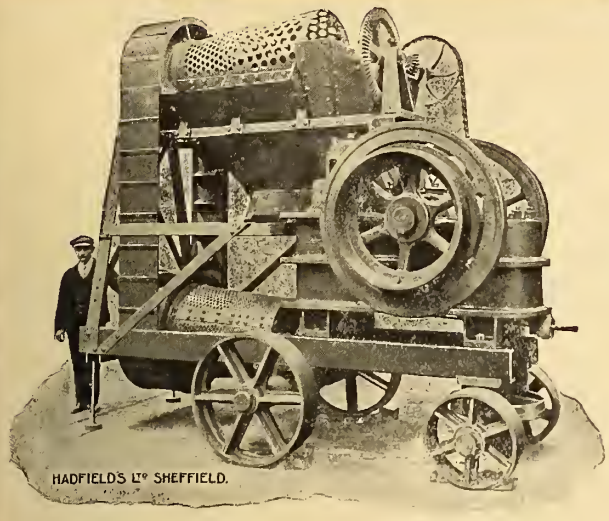
SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



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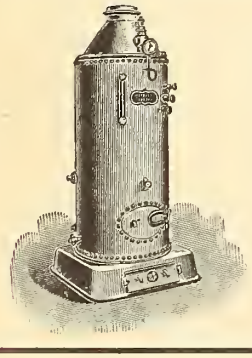

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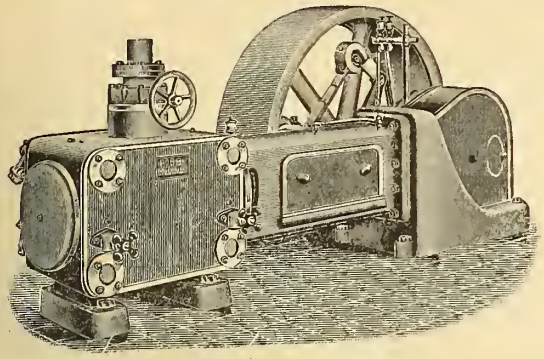

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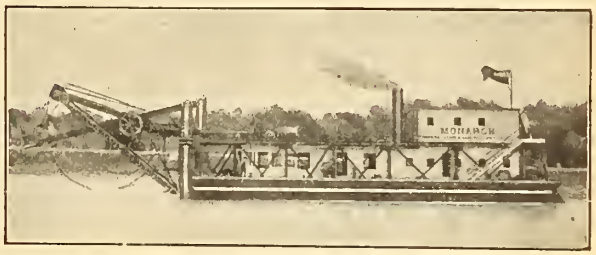

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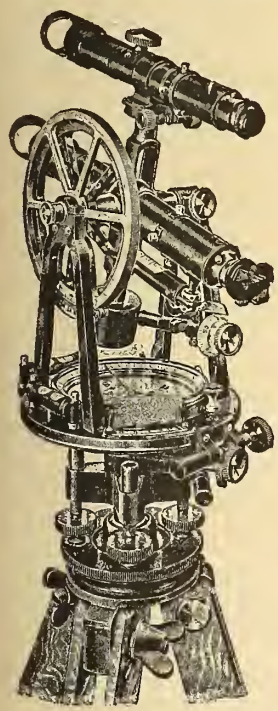

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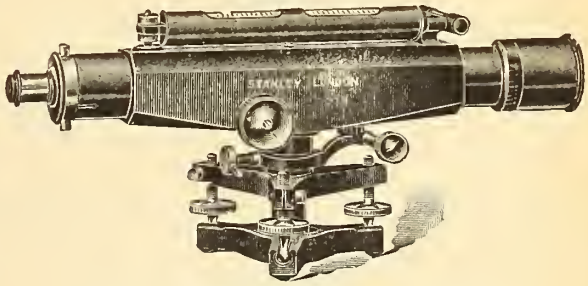

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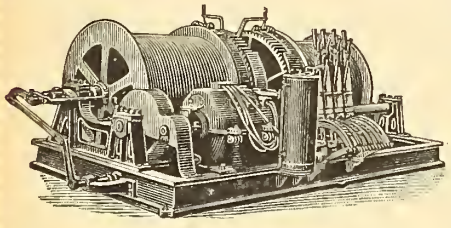

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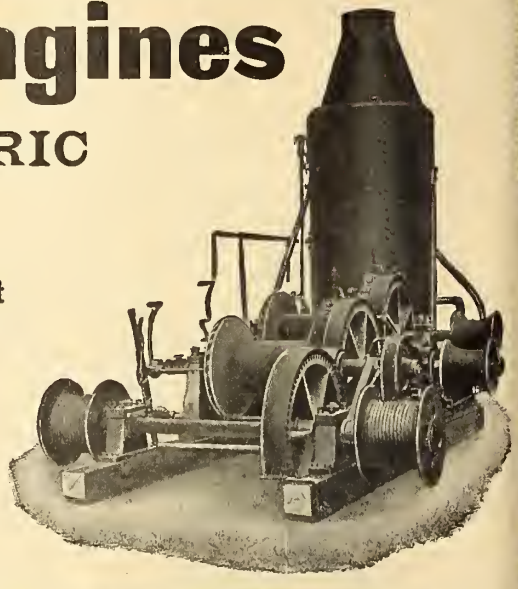

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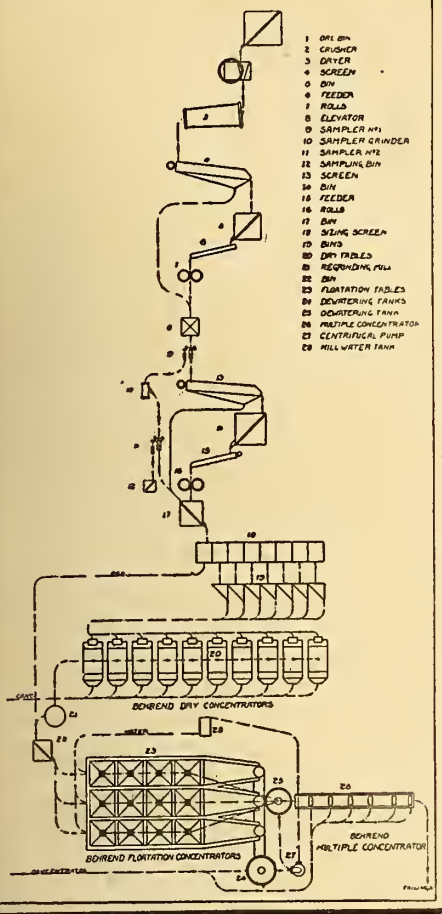

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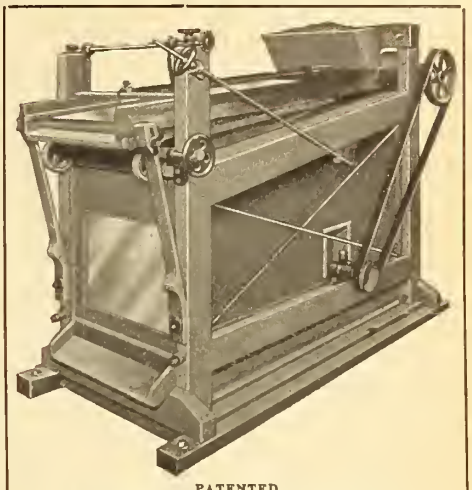

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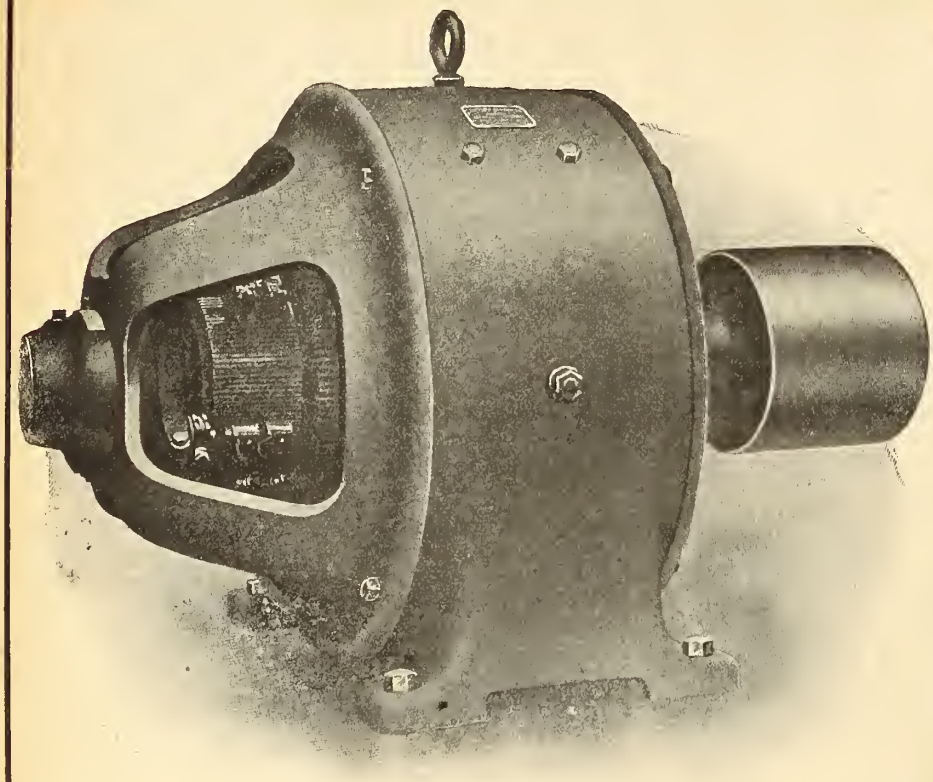

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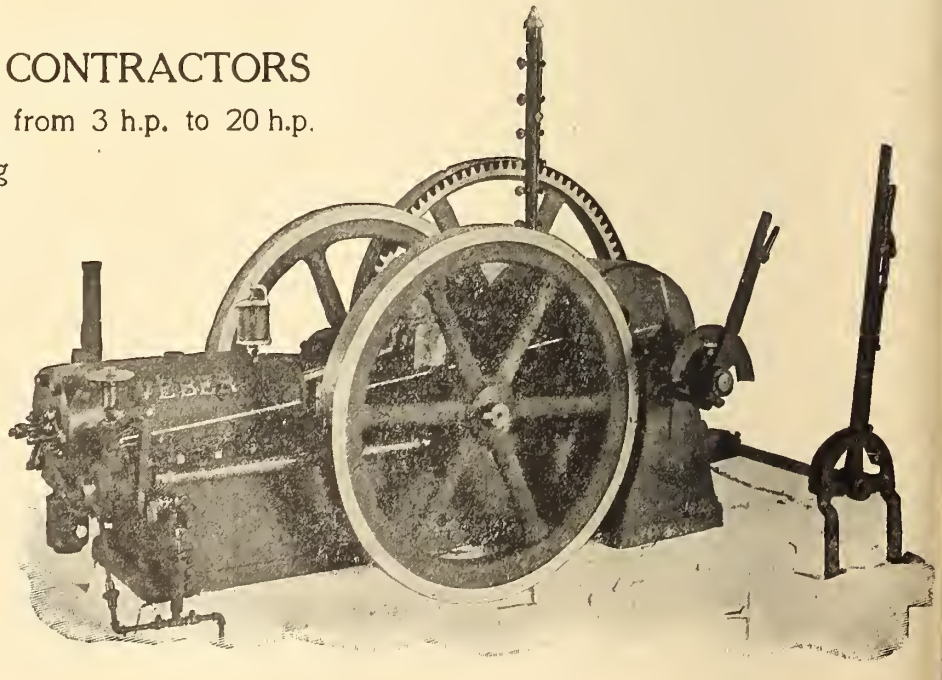

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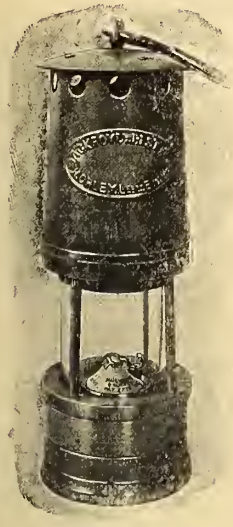

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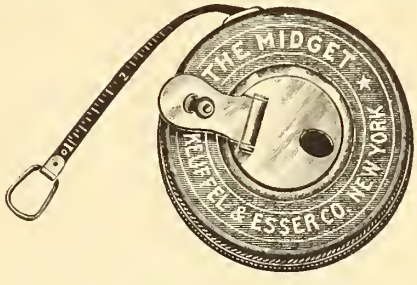

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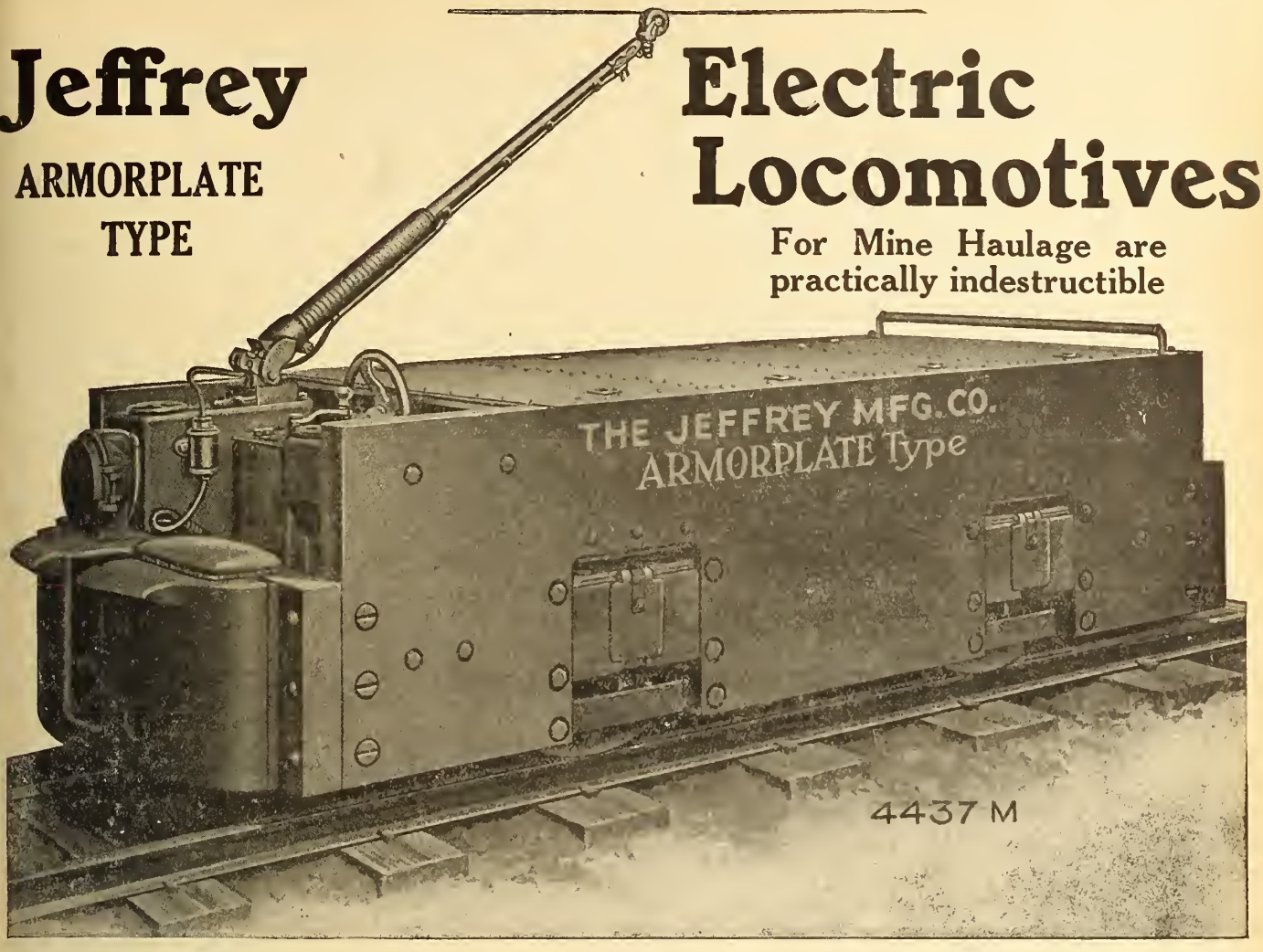

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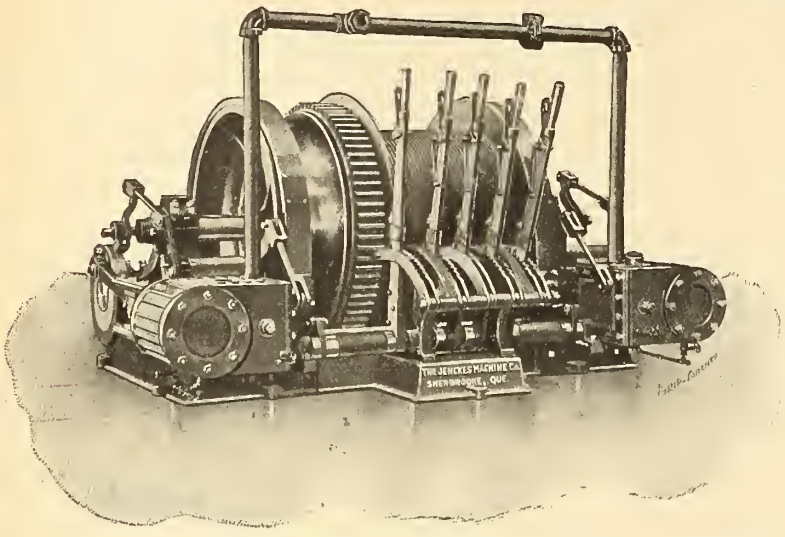

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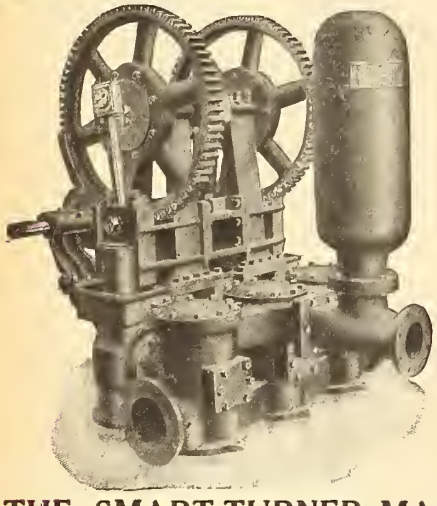

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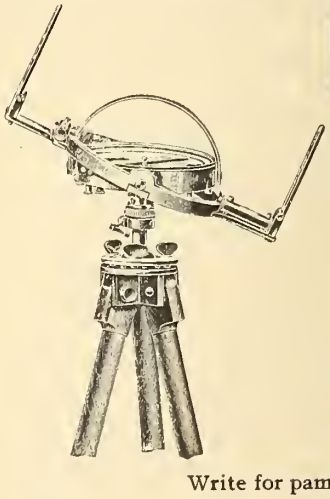

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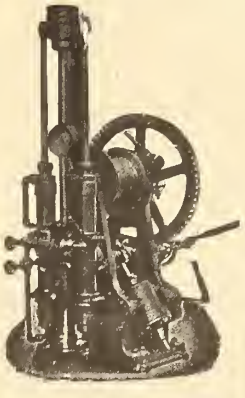

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VOL. XXXII. TORONTO, Jan. 15, 1911 No. 2

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

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CIRCULATION.

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TAXING MINERAL RIGHTS.

The Toronto Globe vigorously insists that the present Government of Ontario should impose a tax upon mining rights as distinguished from surface rights, alleging, and with reason, that it is inimical to the public good that speculators should be privileged to hold such mining rights without attempting to utilize them, and without paying a cent in taxation. The Globe is right. But the Globe goes too far in blaming the present administration for this state of things. Present conditions were inherited from the late Government which was in power for over thirty years, and which did nothing to remedy the evil complained of. On the other hand, the Whitney Government has made a beginning in endeavouring to eliminate an insidious, because hidden, evil that is seriously injuring the progress of the mining industry of Ontario. By substituting for the old Algoma tax of one cent an acre, a levy of two cents per acre on all mining lands or mining rights in the unorganized territory a certain stimulant, though perhaps not a very energetic one, has been supplied to the exploitation of such properties. That a tax of even two cents an acre is sufficient to cause many owners of undeveloped lands to lay down their burden is apparent from the long list of lands recently published in the Ontario Gazette as having been forfeited for taxes in arrears.

The Government, of course, must go a step further and extend the tax to mining lands and mining rights in organized municipalities. In the mining regions of Eastern Ontario there are many cases where the mineral rights have been severed from the surface rights when the owners have parted with the latter. Nothing is done by the proprietor of the mineral rights to ascertain whether valuable minerals are or are not there; the surface owner has no incentive to prospect for them; the mineral rights are not taxed; and in the course of years the owner dies or moves away. Thus, no matter how promising a deposit may be brought to light, no one can obtain the legal right to work it.

Again, in the Southwestern peninsula the oil and gas rights reserved or claimed by the Canada Company in farmers' lands have been a fruitful source of trouble and controversy. Not being assessable by the municipal or provincial authorities, they cost the company nothing to carry; but when strikes were made in the vicinity the company was at once benefitted by the enterprise of other people. Roads and other improvements are required when discoveries are made on mining rights, as well as when made on mining lands; and the owners of mining rights should be obliged to contribute to the cost as well as to pay the same taxes as

mining lands that include the surface as well. Then when default is made in payment of the latter, the mineral rights would revert to the Crown and a clear title could be obtained.

THE CHIBOUGAMOU REPORT.

The preliminary report of the commission appointed to investigate the Chibougamou (Quebec) region is distinctly disappointing, but cannot be considered finally discouraging.

For some years wild rumours of rich mineral deposits have been circulated, and much pressure was brought to bear upon the Quebec Government to construct 120 miles of railway from Lake St. John to tap the Chibougamou country. This the Government wisely refused to do. Too few facts were known. But the Government did consent to send an independent commission of specialists to examine the land of promise.

The personnel of that commission was carefully selected. With Dr. A. E. Barlow as chairman, and Prof. J. C. Gwillim and Mr. E. R. Faribault as his associates, the Government had every reason to place implicit confidence in the commission's singleness of purpose and in the correctness of its findings. The appointments were made with absolutely no reference to politics or to any other consideration than fitness. Ample appropriations were placed at the commission's disposal.

Throughout the summer's campaign nothing was heard of the work being done. Nor had any information been officially divulged until the tabling of the preliminary report on January 11. This is creditable to all parties concerned.

As regards the reported rich discoveries of gold, copper and asbestos, the commission found little corroborative evidence. No evidence at all was obtainable to confirm the reputed occurrence of ores of silver and cobalt. Iron ore and iron pyrites are spoken of more hopefully. But in general the commission's statement directly refutes the wonder-talk of the prospector. Fuller details in the final report may tend to qualify this disappointing pronouncement. Meanwhile, it is only possible for us to accept the fact that Chibougamou is not what we had hoped.

It must not be forgotten that the members of the Chibougamou commission would be the last persons in the world to damn the region altogether. Their duty was to determine the general geological character of the country, and to discover how true were current tales of spectacular wealth. Their finding must be accepted as it is offered—as an appraisal of the present results of prospecting in one section of Northern Quebec. It must not be misconstrued into a sweeping condemnation of a region that may yet prove entirely worth while.

RISE, SIR MINER!

Is the mining man without honor in this sorry scheme of things? We look for him in vain in our Houses of Parliament. He is not conspicuously visible in that Palace of Sleep, the Senate. Nor does the coveted flower of Knighthood decorate him. And still our wonder grows that this is so!

Not numerous are those of us who are eligible for the Senate. This perhaps, is as it should be, Dr. Osler notwithstanding. Some few of us should aspire to the House of Commons. We are needed there. A full score of us we can name who have claims upon the accolade —claims sounder, larger, and more dignified than those of many a living Knight. We are producers. Humanly speaking, we create wealth. Our work adds to the health, also, of the nation. We blaze the path for the farmer and for the railway. Towns spring into being at our bidding. Indeed and in sooth we are the people!

But, withal, we are not dreamers dreaming greatly. Nay, we are highly practical persons with large desires. Weary are we of being ignored by the Powers, and played with by the politician. The time has come when we yearn for several well-nourished statesmen of our own to whom we shall say "Go." and observe them going.

Nor would we resent a trifling lot of senatorial seats. But this way lies trouble. We can but call for volunteers. Not ours the job of nominating. And if, perchance, a desultory geologist or two accept the honour we shall speak no word of blame.

As for Knighthoods—well, that's another matter. Most of us have rolled that succulent, sibilant, prefix over our tongues conjoined with the names our parents gave us. For our immediate selves we shall not, cannot, speak. Kind friends will remember to do that for us. But it has often struck us that a discreet distribution of royal favours amongst, say, the Council of the Canadian Mining Institute would be soothing and grateful. In fact this thought fires our imagination.

Ottawa papers please copy.

FRENCH COAL DUST EXPERIMENTS.

An abstract of reports of the French coal dust experiments, conducted at Lievin Experimental Station during 1907-10, has just been published by the Colliery Guardian. Some general conclusions embodied in the pamphlet we shall outline herewith.

The practice of watering in front of shot-holes in dusty mine galleries, is commended. When the amount of water is equal to that of the dust, explosions can be checked, if not prevented, before extending seven to eight yards. A further good precaution is to water the gallery for about 10 yards previous to shot-firing.

General watering of the galleries, and, as an alternative, the dissemination of incombustible dust in sufficient quantity to form at least 40 per cent. of the mixed dust, are also urged. Other precautions, such as washing the tubs, lime washing the walls and floor, are suggested.

The difficulties and drawbacks of systematic watering are pointed out, and schistification (the dissemina-

tion of incombustible dust) is dwelt upon as being often advantageous. But stress is laid upon the fact that local watering and schistification are powerless to arrest an explosion that has been well started.

The question of arresting an explosion that has already become serious was, therefore, looked into. It was found that an explosion that had developed over a length of 75 metres could be stopped by establishing an arresting zone 100 metres in length. But a high degree of watering or schistification was required in that zone. Four times more water (by weight) than there is dust was found necessary to establish the zone; and at least 75 per cent. of slate dust when schistification was resorted to. Both methods have their drawbacks.

Far more efficacious were the experiments with two new methods—concentrated schistification and concentrated watering. Briefly, in these methods the flame arrives at the moment when the water or combustible dust has just been overturned. The arresting barriers are thus extinguishers rather than gradual suppressing agents. Whilst these results are tentative, they are extremely encouraging.

Other conclusions reached are that no explosion can be produced by the ordinary initial causes in a dust deposit where the content of volatile matter does not exceed 18 per cent.; though it may be propagated there as the result of a violent initial explosion occurring over a portion of dust deposit richer in volatile matter, or started by firedamp or by explosives. It is also stated that, other conditions being equal, coal dust rich in volatile matter is more dangerous than if the content of the latter were smaller.

The practicability of applying these experimental results to working mines has not been fully demonstrated. But that, we believe. is only a matter of time.

MR. W. H. ALDRIDGE.

The announcement of the retirement of Mr. W. H. Aldridge from the active management of the Consolidated Mining and Smelting Company of Canada came as a surprise to his large circle of friends. Since 1897, Mr. Aldridge has been the controlling spirit in the C. P.R. mining interests in British Columbia. In that year he arranged the purchase of the Trail smelter from F. Augustus Heinze. The history of the enterprise has been a record of expansion. Operated until 1906, under the name of the Canadian Smelting Works, the plant was then taken over by the present company, which had also acquired large mining areas near Rossland.

Mr. Aldridge still retains his place on the board of directors, and will continue to act in an advisory capacity for the Consolidated. His position as general manager is to be filled by Mr. R. H. Stewart, a thoroughly competent and experienced official, who has long been connected with the company. Mr. S. G. Blaylock becomes assistant general manager. Both of these gentlemen have excellent records.

IMMUTABLE MAN.

Human nature in all ages remains startlingly unchanged. Here is a quotation from an old volume, printed first in German and translated into English in 1730. The reference is to mining in the Hartz Forest:—

"This Mountain is hollow'd out underground into such large Caverns, that they in some places are too high to be propp'd; wherefore 'tis very dangerous to workfl in some of the Mines; upon which account the Miners at Goslar are two Mornings in the Week exhorted by a Sermon to live in the Fear of God, to be prepar'd in case of any Accident; but they are such a fool-hardy audacious Crew, that when the Parson preaches a little longer than ordinary, and the City-Gates are open, they run out of the Church, leaving him to preach to him-self."

Our sympathy goes out to that poor preacher. His life-insurance policy was not popular.

THE TUNGSTEN MARKET IN 1910.

Canada is not yet a producer of tungsten ores, although within a few months shipments will be made from the rich deposits at Moose River, Nova Scotia. The condition of the tungsten mining industry in the United States is, therefore, of interest.

Ten years ago the production of concentrated tungsten ores in the United States was only 46 tons, valued at $11,040. Last year's output was 1,824 tons,valued at $832,992. This is probably the largest annual output on record in any country.

Prices during 1910 were fairly high, ranging from $6.50 to $9 per unit, for concentrates carrying at least 60 per cent. tungsten trioxide. California and Colorado are the principal producing States.

The Nova Scotian ores are more easily concentratable than those mentioned above and it is probable that higher prices will be obtained for them.

THE SILVER MARKET DURING 1910.

A happy augury for one of Canada's greatest mining camps is the continued strength of the silver market. After maintaining an average price throughout 1909, of 51.502 cents, the metal more than held its own during 1910, the average price for the past year being 53.486 cents. For the latter half of 1910 the average was 54.318 cents, a decided improvement over the preceding six months. The highest monthly average in 1909 was that for May, 52.905 cents. The highest during 1910 was November's average, 55.635 cents. The corresponding low figures were 50.468 cents for March, 1909, and 51.454 for the same month in 1910.

Arguing from analogy, we may expect a drop in price through one or two winter months. But there are plain indications that the Chinese and Indian demands will be large during 1911, and that, therefore, there will be no significant falling off in prices. Much will depend upon the success of the Chinese Government's

effort to negotiate its loan of £10,000,000 on easy terms and to standardize its currency. Much also will depend upon climatic conditions in India during the autumn of 1911. At present there are few reasons to doubt that the forthcoming year will develop a larger market for silver in the Orient. As Cobalt's output may be increased considerably, this fact is stimulating. One has only to multiply the output of Cobalt by a digit to arrive at a very comfortable sum.

"GOLD MINING IN NOVA SCOTIA."

In The Mining Magazine for December, an article that appeared in the CANADIAN MINING JOURNAL on gold mining in Nova Scotia, is commented upon. The Mining Magazine agrees fully with the conclusions there indicated. It takes exception, however, to the use of the word "venturer" as an equivalent of "adventurer." Our choice of the former word was deliberate. Either is correct. But "adventurer" smacks of high or shady finance. "Venturer" is shorter, crisper, and more apposite. Objection also is made to the use of the word "profits." Our contemporary in this case is right. That word is loosely employed. Unless we were justified in sacrificing literary finish for the sake of emphasis, we should not have employed the phrase.

However, we submit that in discussing a topic so important it would have been better for our acute trans-Atlantic contemporary to have omitted these meticulous refinements. There is such a thing as painting the lily. Moreover, such prods induce an irritating desire to search the columns of our captious sister for like lapses.

EDITORIAL NOTES.

The provisional programme of papers to be read at the thirteenth annual general meeting of the Canadian Mining Institute is most attractive. In the list we notice two papers on mining law, one on the markets for Canadian ores, and one on photography. Many other topics are to be treated. The meetings are to be held at the Chateau Frontenac, Quebec, on March 1st, 2nd, and 3rd.

The ventilation of collieries will be the subject of a series of articles soon to appear in these columns. Along with the work of salvage, this is a topic of immediate moment.

A motor car to run on the winter route between Matheson and Porcupine is the last word in northern transportation.

The payroll of the Nova Scotia Steel and Coal Company totalled $2,825,000 in 1910, as against $2,480,226.91 during the previous year. The average number of employees was 5,276, as compared with 4,450 during 1909. In every department there was a large increase in outputs. Most marked was the enlargement of iron ore and coal production.

REVIEW OF MINING IN COBALT DURING 1910.

(Written for the CANADIAN MINING JOURNAL by its Special Correspondent.)

It was estimated three months ago by an engineer intimately acquainted with the camp, that if no new ore bodies were found there were reserves sufficient to maintain the present output from the Cobalt area for two years. That was at the rate of a million dollars a month, so that at a conservative estimate there were then $24,000,000 unmined, but in sight.

Since Mr. A. A. Cole made his careful estimate the most important discoveries of the year have been uncovered. These comprise not so much new ore bodies as the continuation of pay ore where it was scarcely hoped it would occur.

WHERE AND HOW HAS THE COBALT CAMP MADE PROGRESS IN THE YEAR OF GRACE 1910?

Silver Area Not Widened.

No new discoveries of importance have been made during 1910 outside the known silver-bearing area. In no instance has any of the pioneering prospects in the new territory made good. Some gallant attempts have been made to widen the field; but in every instance they have failed. The real accretions to the wealth of the camp have occurred in the development of hitherto but partly explored territory within the silver circle, and through the tapping of the new veins on the old producing properties. Instances of the first are the Savage and the Cobalt Provincial, of the second, the La Rose and the Temiskaming. It would seem that, while it is as yet too early to be able to state definitely that outside the arbitary lines there is no silver in payable quantity, yet the prospects of properties without the Pale are rapidly diminishing with the progress of time.

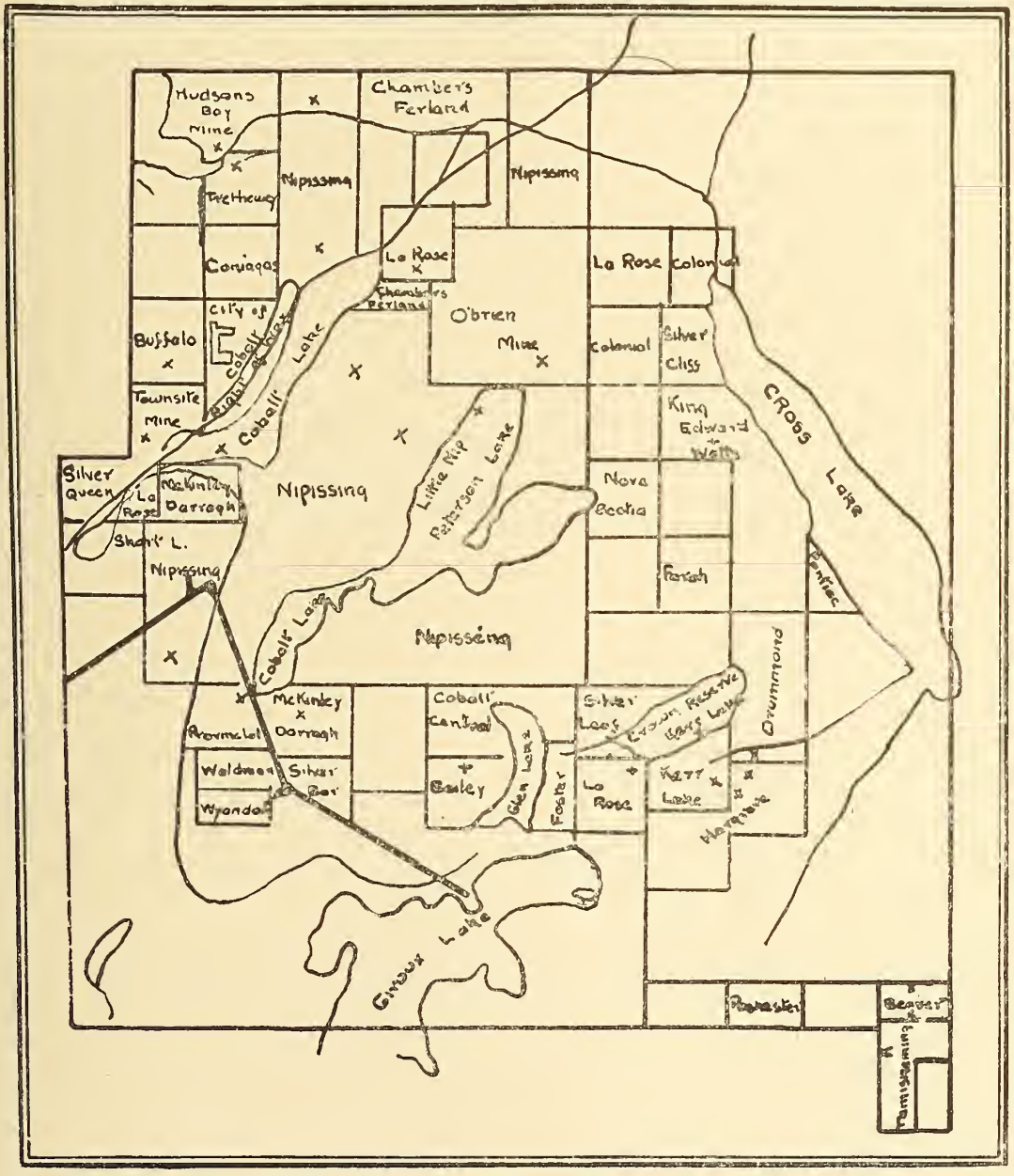
Upon the small map that accompanies this article will be found a number of crosses indicating where new ore bodies or unexpected extensions of producing veins have been found during the year just past. In the extreme northwest corner of the map will be seen the Hudson Bay mines. In the extreme southeastern are the Beaver and the Temiskaming. While the Ophir Cobalt has had small bunches of silver ore and the John Black a strong cobalt vein, neither of these companies has made any material advance this year. The South Coleman district is now the section of the Cobalt camp of speculative value, excepting the Beaver and the Temiskaming, which have shown marked improvements as mines during the year. Several properties have gone to the 400-foot level and are exploring at that depth; but beyond the ore bodies which the Beaver and the Temiskaming share nothing that promises to be of permanent value has been discovered. To the rich have been vouchsafed fat millions more in divi-

dends and ore reserves; from the poor has been taken away even that which they had, namely hope.

The Famous West Ridge.

In the extreme northwest corner of the producing area of small capitalization and huge dividends, the Hudson Bay has obtained a new lease of life and built a mill. Last year Hudson Bay had decided to increase its capital and venture into the open stock market. There was some difficulty experienced in completing the deal and, while Hudson Bay now operates the rich mine on the Buck line, it is but another name for the T. & H. B. It has remained satisfied to run a big producing mine on an $8,000 capitalization and pay its shareholders 300 per cent. per annum every two months or oftener. There was something like resignation in the attitude of the management with regard to the physical condition of the mine last year, but the main lesson of 1910 has repeated itself here. Where there is one strong high-grade vein there is a similarly strong probability that there will be several more. The Hudson Bay Company has found several bonanzas this year, not comparable with the big vein, but enough to insure 300 per cent. dividends for some time to come.

The satisfactory development of the hitherto unexplored area near the Hudson Bay mine line has amply justified the erection of the big mill on the property. With characteristic caution, little was spent on development in the northern section until the existence of several veins had been proven from the Hudson Bay's property. Now the No. 3 shaft promises to be the surface manifestation of a second mine. The mill has more than justified expectations. It is daily running its scheduled capacity of a hundred tons, and the heads are high in the mill ore.



Like almost every enterprise associated with the mining industry in Northern Ontario, the Trethewey intends to enter the Porcupine field, and with this aim in view the directors have approved of the doubling of the capitalization. The Trethewey still prefers not to go on a quarterly payment basis, but has paid and declared this year 20 per cent. in dividends.

With the debt of the Thorold smelter and the enlargement of the stamp mill wiped off the production of the Coniagas is now more likely to keep pace with its development. In the last two months of the calendar year 1910 a million ounces were produced. The last

quarter of the fiscal year of the Coniagas showed the very considerable advance that had been made in production, and the whole twelve months showed a few ounces short of the two million mark. As Mr. Leonard explained in the annual statement, the smelter and the mill are now able to handle a very much increased tonnage and, as the mine shows a gain of three and one-half million ounces in ore reserves, it can answer readily enough to the augmented drain on its resources.

The property cornering on the Coniagas to the southwest, and on the same famous ridge, produced in the first six months of the fiscal year ending November about 850,000 ounces, or very considerably more than for the same period of last year. The Buffalo has now joined the ranks of the Cobalt properties that have repaid the whole of their capitalization, and as fresh ground has been opened up at the 300-foot level and to the west, the ore reserves, when the annual report comes to be framed at the end of April, will certainly show no diminution.

South of Cobalt Lake.

Directly west of the Buffalo, a company controlled from England, the Cobalt Townsite has, under the skilful guidance of two of the best mining men in the camp, J. Reddington and C. E. Watson, been placed upon a shipping basis. So far this year attention has been confined to the shaft on the Buffalo line where some good ore bodies have been discovered underground and promising veins located on the surface. A contract for a considerable amount of ore has been let to the Northern Customs plant at Cobalt, indicating that even with the discovery of no new ore bodies it will be a regular shipper for at least some months of next year.

Under new management, and resigned to rank as a low-grade mine, the City of Cobalt has been steadily making small profits during the year. Its contract with the Northern Customs has been adhered to and all the ore has been trammed direct to the mill without hand-picking. Towards the close of the year a narrow, but rich streak of high-grade was cut at the bottom level, evidently a continuation of one of the recently discovered Townsite leads. Only a few acres of the City of Cobalt adjacent to the Buffalo and the Townsite have as yet been explored below the surface. At the annual meeting a considerable balance was shown and there was a disposition among some of the directors to declare a 3 per cent. dividend, but more conservative counsels prevailed and it was set aside for the further development of the property. The quarterly statement ended December 31st, shows that the mine had a balance of $28,000.

It is to the southern strip of property lying between the Townsite and the McKinley-Darragh that the Right-of-Way mine owes its further lease of life. For the better part of the year a steady shipment of three cars per month has been maintained, one of high and two of low grade. Increased acreage obtained when the capital was raised, has so far proved a profitless investment, but nothing further than the sinking of test pits and trenching on the old Cobalt Merger property has been carried out. The Right-of-Way has each quarter paid 2 per cent., which entails a slightly higher expenditure than six per cent under the original capitalization of $50,000.

If Cobalt Lake be represented as a clumsily drawn leg with the toe to the southeast, it may be said without fear of contradiction that the companies owning properties adjoining the toe have had a very prosperous and lucrative year.

Advance of McKinley

In the space of two and a half years Mr. Robbins has raised the McKinley-Darragh, with a dubious past and a hazy future, from the ranks of the intermittent shippers to the pedestal of a quarterly dividend payer and the producer of a million ounces every six months. Towards the end of 1910, the stock aroused interest in the market for the first time for the year, the 12 per cent. bonus being sufficient justification for a steep rise. At the very height of its productivity Mr. Robbins leaves the oldest mine in Cobalt for the Hollinger in Porcupine.

Sandwiched between the defunct Silver Queen and the McKinley-Darragh the Princess became early last year the rising hope of the La Rose Consolidated, long before the Lawson had shown any indication of living up to its wonderful surface showings. From a weak member of the La Rose tribe, barely paying her own way, the Princess has developed into one of the important feeders of the Montreal company; and now adds her regular quota to the total tonnage leaving Cobalt yards under the joint title of the La Rose Consolidated.

Leaving the west and southwest edge of the Cobalt field, Cobalt Lake bounds the great stretch of the Nipissing. The New Year hope that Sir Henry Pellatt's company was at last coming into its own has not been confirmed. Several excellent ore bodies were discovered near the McKinley-Darragh boundary. But the richness diminished in precise ratio as the drift progressed north. With the most rigid regard to economy it is stated that the financial statement at the annual meeting will show a surplus of $100,000. The physical condition of the mine is scarcely as good as it was a year ago.

The Nipissing occupies the centre of the stage, while the score or more of other properties camp on the edges of the productive area, with the Temiskaming and Beaver as an oasis of productivity in the southeast. To the east of Cart Lake and Peterson Lake the Nipissing has only prospected in the old haphazard, pre-Watsonian way. The season of surface exploration just passed, while rewarded with some discoveries of value, did not yield another 122. The main extension of the field lay in the southwest, where a most unenticing crack opened out into eight or nine inches of bonanza ore. It is in the Keewatin area previously regarded lightly. Underground work is being carried on this winter at this point.

Below, the surface finds have been most gratifying. The ore shoots of 64 have occurred with the exactness and precision of the decimal point. To the east the Meyer has developed into a 250-foot long ore body, definition and grade not to be surpassed in the camp. As it is reckoned that the conglomerate will carry down for another 70 feet, it would appear that the Meyer may be the legitimate successor of the Kendall as the premier producer of the Nipissing. On the east side of Cobalt Lake the cutting of the expected ore body fifty feet below the first level at shaft 122, is probably of more importance than the duplicating of veins at the Kendall. While recognized as a first rate prospect this new ore body was modestly credited with but a few hundred ounces in the last annual report. Length the vein had, but not depth before the discovery in November; but it now definitely enters the list of Nipissing producers. Two interesting departures will mark the career of the Nip in 1911. Despairing of finding all the valuable leads by trenching, Mr. Watson is now going to hydraulic all his acreage, commenc-

ing when the snow leaves Nipissing Hill this spring. The other departure is the treating of their own low grade ore in a mill to be erected on the property as soon as the exhaustive experiments have determined the best methods of extraction. One shaft alone at the present time is keeping a customs mill operating at full capacity so it is apparent that the Nipissing concentrator will mark a period in the treatment of low grade ore in large quantities.

Within the embrace of the Nipissing the string of leases on Peterson Lake belonging to the mining company of that name have not made any marked progress during the year.

The Little Nipissing has continued to find ore and to ship it. Despite some excellent and praiseworthy essays it alone on the lake figures in the shipping list.

On the northern edge of the Nipissing the Chambers-Ferland has fallen far short of expectations. Beyond the regular shipment of low-grade ore this neighbour of the main La Rose has shown a quiescence distinctly disquieting to its stockholders.

Justification of Lawson.

After a period of depression and anxiety the La Rose has now settled down to a production that will infallibly raise the dividend rates, when it is considered that sufficient cash reserves have been accumulated. Last quarter the Lawson and Princess earned the two per cent. dividend alone. The disappointment of the early part of the year was the leanness of the spectacular Lawson vein, a few feet below the surface. Nor today has the Silver Sidewalk proved aught but silver plated. No. 2, in the Keewatin, showed unexpected values, and No. 11, on the Foster boundary, also helped to retrieve the position. Both of these discoveries have been overshadowed by the opening up of a wonderful shoot of ore on No. 8 vein on the 200-foot level. As there was practically no high-grade on the upper level of this lead, the duplication of the surface indications was as gratifying as it was surprising. There is now a drift a hundred feet long on No. 8 vein and fifty feet of it is probably almost as rich, if not as spectacular, as the Silver Sidewalk which made the Lawson famous. In width and values it can only be compared with the Meyer vein of the Nipissing. At the main La Rose, cross-cuts from the main vein at four different points have tapped an ore body parallel and as rich as the great producer. Though the developments on No. 3 far surpassed expectations, this parallel vein is easily the best ore body in the mine now.

La Rose has now ceased to ship low grade; it has cut down tonnage and increased production. The Princess has already been referred to. When La Rose prospects were gloomy, drifts on this little slice of conglomerate at the south end of Cobalt Lake gave the first promise of improvement.

The O'Brien completed its big mill during the year and is now the heaviest bullion producer in the camp. The centre of production has shifted to the southeast, and fine ore has been encountered in the diabase. The favourable developments in this formation on the O'Brien are the more interesting in view of the ill-success that has attended the majority of other properties that have relied upon diabase veins for their reserves. The various workings are all now connected underground and when Mr. Culbert's plans are complete, the whole tonnage will be raised up the one central shaft and sent over a tramway to the mill. The mill is making a good extraction on about 30 ounce ore. In spite of the heavy charges incident on a large amount of dead work and surface improvements, the O'Brien will make a profit of between $400,000 and half a million.

No Luck in Diabase.

Properties mining in the diabase on Cross Lake and to the east of the great square of the Nipissing have not lived up to expectations. After the cessation of operations for over a year the Colonial has operated its mill and has shipped just short of 200 tons of concentrates this year. It is reported that, as the shaft has been sunk, better values have been obtained, but ounces per ton run low and profits are tenuous. The property is being mined and worked conservatively and given a fair trial. The two producers on Cross Lake are now hunting for new ore bodies. With but a few months' ore reserves for their small mill in sight, the King Edward has accomplished some fine pioneer work in sinking a shaft 500 feet from the top of the cliff above its plant, and has cut one of the veins. It is not too promising. Mr. Glen Anderson will cross-cut to the No. 5, which showed good ore in the winze below the tunnel level. He expects to win fresh ore here, if it is to be discovered at all.

The Silver Cliff, bought by rich Pittsburg capitalists, and equipped expensively, will also have to open up more ore if it is to run the mill on its own ore for many months in the new year.

Expensive litigation and the nonfulfilment of the promise of surface veins underground has been balanced on the Nova Scotia by the excellent record of Mr. Kirby with his big cyanide mill. Once the dispute with the Peterson Lake in relation to the Nova Scotia lease has been settled, as it should soon with the more friendly board of directors, it is anticipated that more ore will be available for the mill. The Nova Scotia has shipped nothing but bullion this year.

The area between the Nova Scotia and the Kerr Lake district has been barren of results.

Prospects at Giroux Lake.

The discoveries on properties in the immediate vicinity of Kerr Lake will swell the ore reserves for the camp. With the single exception of the Silver Leaf, which still deserves the title of the most luckless forty acres in Cobalt, all the properties have done well. While the Drummond has not been successful in delving for new ore bodies on Kerr Lake, the Hargrave has found a new lead for it in the southwest corner of the property.

The Crown Reserve, with a record of 150 per cent. paid on capitalization in less than three years, has still considerable high grade ore in sight, and is developing a large tonnage of low-grade ore in preparation for the time when the mill is completed. It has opened new territory in the north with reassuring results, and the rich section near the Carson has furnished many delightful surprises in narrow, but rich, veins on the upper levels. The Victoria was the premier discovery of the year.

Possibly less is known of the Kerr Lake Mining Company than of any other in camp. It was feared that depleted ore reserves would induce a lowering of the dividend rate in the last quarter of the year, but the pessimists were not justified. In the last few months fine new ore bodies have been cut under Kerr Lake where previously no work had been done, and also near the Hargrave boundary, driving from the old Jacobs shaft. There is little doubt now that the Hargrave has the continuation of the Kerr Lake No. 3 right in its own territory. The vein is well defined, but is fickle in values. The ore bodies found so far are short. Close to the boundary line of the Drummond

the No. 1 vein has yielded practically all the shipments made this year. While this vein has produced some beautiful ore, it only occurs in lenses and no very considerable portion of it is in the Hargrave territory.

To the west of Kerr Lake the Diabase Mountain group have not had a profitable year. Sunk in the abyss of litigation and debt during nearly all 1910, the Cobalt Central in 1911 may have the opportunity of proving a profit-making mine again, as it is reported that all liabilities will be paid off by the new control, and that minerlike methods will be adopted.

The Bailey Cobalt has installed a good plant and opened up new ore bodies. Under skilful management it presents one of the possibilities of the coming year. The Foster has not shown any tendency to "come back."

Gillies Limit Unproductive.

The two Gillies Limit properties with any ore in sight each produced one car of ore from the Waldman vein, but their researches below the fault plane have not been encouraging. Alone of the purchasers from the Ontario Government in all their Gillies Limit sales the Provincial bears the earmarks of a producer. After developing a hundred-foot ore body near the Savage line and mining a high grade car, Mr. Reddington felt justified in erecting camps and preparing to open up his territory on a considerable scale. Adjoining it the Savage now forms a very valuable reserve to the McKinley-Darragh-Savage group. It is now producing steadily at the rate of thirty or forty thousand ounces per month, with excellent possibilities of increasing that rate in the coming year very materially.

South of the Hargrave and north of the Temiskaming and Beaver, there have been no new developments during the year, though there has been very considerable activity. The Rochester stands in a little better position than it occupied at the beginning of 1909, but the very promising indications of permanency shown during the year have not been maintained.

The Beaver has shown the most marked gain among South Coleman properties. The management has evinced disposition to pay less heed to the market and more to the mining of silver. One ore shoot of about 80 feet in length has been practically stoped out between the 200 and the 250-foot levels, but the same vein has been cut and opened up at two places on the 300-foot. Two other veins, discovering nothing but cobalt on the surface, have made beautiful high grade below. It is now reported that a mill will be built, results at the end of the year may prove that with the present ore bodies the step was not entirely a wise one.

The South Coleman Producers.

On the Temiskaming the good profits from the mill and the persistence of high-grade ore on the lower levels have permitted the directorate to resume regular quarterly dividends and pay a bonus. On the 500-foot level a few bunches only of high-grade ore have appeared, but it is thought that one of the principal veins has faulted and will be picked up on a lower level. There is much high-grade on the 400-foot level yet, and the low-grade reserves have only been stoped out as the mining of the richer ore progressed.

The year 1910 was disastrous to companies of purely speculative value, but has witnessed the building up of the district as a centre of industry and production to a degree not imagined twelve months ago by the most sanguine.

THE MINES BRANCH DURING 1910

Written for the CANADIAN MINING JOURNAL.

The following is a brief account of the field work and other investigations carried on by the Mines Branch of the Federal Department of Mines, during the past year:

The investigation of the handling, storage and use of explosives, instituted in 1909, was continued. Capt. A. P. H. Desborough, one of His Majesty's inspectors of explosives, was invited to visit Canada to consult with the Government with regard to proposed regulations to govern the manufacture and storage of explosives, and with respect to the establishment of an explosives testing station. Captain Desborough, accompanied by Mr. Joseph G. S. Hudson, visited nearly all of the Canadian explosive factories and distribution depots, where high explosives are stored, in order to study the existing conditions in this country. Captain Desborough's report and recommendations will appear in the summary report of the Mines Branch.

The number of casualties which have occurred in using high explosives and the great loss of life and property resulting from explosions in magazines, in which high explosives are stored, have recently emphasized the pressing necessity for a thorough investigation of the matter to be followed by legislation regulating the manufacture, handling, storage and use of high explosives.

The gathering of information for a special bulletin on the copper resources of Canada was continued by Dr. Alfred W. G. Wilson. During the past season he visited numerous localities in Ontario and the Maritime Provinces.

The commercial processes for using pyrites as a source of sulphur, are also under investigation by Dr. Wilson. Pyrite burning is of special importance at the present time with respect, both, to the sulphite pulp industry and in the preparation of mineral fertilizers. Sulphur is now imported for use in these industries, while the bulk of the pyrites ore mines in Canada is exported. The introduction of a satisfactory process for recovering the sulphur content of these ores for such purposes as above mentioned would open a home market for our undeveloped pyrite resources and for pyritic ores of low copper content.

Magnetometric surveys were carried on in Ontario, New Brunswick and Nova Scotia during 1910.

Mr. Einer Lindeman extended the surveys already made at Bathurst, N.B., and at Bessemer, Ontario, and also made topographical surveys of these localities.

Mr. Howells Frechette made a magnetometric and topographic survey of a part of the Torbrook iron range, Nova Scotia.

Mr. L. Heber Cole, recently appointed to the department, spent the latter part of the summer in the Cobalt and Porcupine districts obtaining information regarding the mining operations there.

During the past summer Dr. T. L. Walker, of Toronto, continued the work he has been doing for the Mines Branch in investigating the molybdenite resources of Canada. He examined numerous properties

in Ontario, British Columbia, Quebec and New Brunswick.

The ore testing plant for experimental investigation into methods of concentrating magnetic iron ores is now in operation under the supervision of Mr. George C. Mackenzie. The equipment consists of one complete unit of the Grondal concentrating apparatus, including one Blake crusher, one Harding ball mill and two Grondal separators arranged in tandem. Experiments are being made on various Canadian magnetites in lots of from 5 to 50 tons. The problem of economical concentration is of great importance on account of the very large number of deposits of magnetite in Canada, too low in iron content for the direct use of the iron masters. The ever increasing demand for iron ore and the limited amount of high grade ore in sight emphasizes the importance of converting these low grade magnetites into stock suitable for iron making.

The problems of developing a commercial process or processes for the production of zinc and zinc products from the complex Canadian zinc ores have been under investigation by Dr. Haanel, Mr. W. R. Ingalls, of New York, and Dr. Alfred Stansfield, of McGill University, Montreal.

Mr. F. W. Harbord, of London, England, has been engaged to investigate electro-thermic processes invented recently in Europe for the production of spelter and zinc oxide.

Mr. Hugh de Schmid visited most of the mica properties of Ontario and Quebec, gathering data for a on mica.

Dr. Wm. A. Parks, of Toronto University, has been collecting data for a special report on the building and ornamental stones of Ontario. This will be the first of a series of monographs on Canadian building stone, to be issued by the Mines Branch.

The installation of a peat gas producer, gas engine, dynamo and other apparatus was completed during the summer at the Fuel Testing Plant in Ottawa. Several tests have already been made by Mr. B. F. Haanel, on peat from the Victoria Roads peat bog and the Government bog at Alfred, Ont. At present a second gas producer is being installed in order to extend the scope of this plant to the testing of lignite and bituminous coal.

The Government peat plant on the bog at Alfred, Ont., was in operation under the supervision of Mr. Aleph Anrep, Jr., for about two and a half months, during which time 1,600 tons of peat were produced. More than 600 tons were sold at Alfred and Ottawa for domestic use, the remaining quantity being required for the operation of the fuel testing plant. The bog at Alfred was visited by the members of the American Peat Society in July, a special excursion being made from Ottawa, where the society was then in annual session.

In addition to the work at Alfred, Mr. Anrep made a thorough examination of the Holland peat bog at Bradford, Ontario, a bog 16 miles long and up to two miles in width.

Statistics of mineral production during the calendar year 1909 were collected by the Division of Mineral Resources and Statistics under the direction of Mr. John McLeish and a preliminary report thereon was issued on March 1st. Mr. C. T. Cartwright spent some time visiting clay manufacturers and quarry operators in Ontario collecting statistics of production, etc. A complete and revised report on the mineral production in Canada during the calendar year 1909 has been prepared and special bulletins on the production of iron and steel, coal and coke, and on cement, lime, clays, stone, and other structural materials have been separately issued. This division is now engaged in the collection of statisties of mineral production during the calendar year 1910, and the active and prompt co-operation of all mining operators, brickmakers, quarry owners, etc., is urgently desired to ensure an early compilation and publication of results.

The usual routine work has been carried on in the Chemical Division under Mr. F. G. Wait.

The following reports were issued during the year 1910:—

47. Iron ore deposits of Vancouver and Texada Islands. By Einer Lindeman, M.E.

55. Report on the bituminous or oil shales of New Brunswick and Nova Scotia; also on the oil shale industry of Scotland. By Dr. R. W. Ells.

58. Annual report of Division of Mineral Resources and Statistics on the mineral production of Canada during the calendar years 1907 and 1908. By John McLeish, B.A.

59. Report on the chemical analyses made in the Mines Branch Laboratories, during the years 1906, 1907 and 1908. (Appendix—Commercial Methods and Apparatus for the Analyses of Oil Shales, by H. A. Leverin, Ch.E.) By F. G. Wait, M.A.

62. Preliminary report on the mineral production of Canada during the calendar year 1909. By John McLeish, B.A.

63. Summary report, 1909.

67. Bulletin No. 2, iron ore deposits of the Bristol mines, Pontiac County, Que. By Einer Lindeman, M.E., and magnetic concentration of ores, by George C. Mackenzie, B.Sc.

68. Bulletin No. 3, recent advances in the construction of electric furnaces for the production of pig iron, steel and zinc. By Eugene Haanel, Ph.D.

71. Bulletin No. 4, investigation of the peat bogs and peat industry of Canada, 1909-10. By Aleph Anrep, Jr.

79. Production of iron and steel in Canada during the calendar year 1909. By John McLeish, B.A.

80. Production of coal and coke in Canada during the calendar year 1909. By John McLeish, B.A.

85. Production of cement, clay products, stone and other structural materials, in Canada during the calendar year 1909. By John McLeish, B.A.

The following reports are at present in press:—

69. Chrysotile-Asbestos: Its Occurrence, Exploitation, Milling and Uses. (Second edition, enlarged.) By Fritz Cirkel, M.E.

82. Magnetic concentration experiments. Bulletin No. 5. By George C. Mackenzie, B.Sc.

84. Gypsum deposits of the Maritime Provinces of Canada—including the Magdaline Islands. By W. F. Jennison, M.E.

Nova Scotia's coal output was larger during 1910 than in 1909.

Crude No. 1 Canadian feldspar fetches a high price in the United States. It sells for $5 per long ton at Trenton, N.J. The ground brings $10.50 per short ton. No. 2 Canadian crude, on "standard," brings from $5 to $5.25 per long ton; the same grade, when ground, sells for from $9 to $9.50 per short ton. The various grades of United States feldspar range from $2.50 to $4.50 for crude, and from $5.50 to $9 for ground. The Canadian feldspar, as shipped to the United States, contains 71 per cent. of potash feldspar (orthoclase).

THE MARITIME OILFIELDS, NEW BRUNSWICK

[EDITOR'S NOTE.—We have made frequent reference in these columns to the new gas and oil fields near Moncton, New Brunswick. In our editorial review, January 1st, there occurs a misprint. The discoveries are referred to as being near Bathurst. This, of course, was one of those inadvertences that it appears impossible to avoid once in a while. They grieve the editor, who, in turn, tries to grieve the printer.

The following facts concerning the wells are of much interest:

The work of the Maritime Oilfields Company, in the Stony Creek field, Albert County, New Brunswick, has brought excellent results. The field exploited is small, being only a mile wide from north to south, and two miles long from east to west. The oil wells shot have a total daily capacity of 50 barrels. The total flow of gas from all the wells is estimated at about 40,000,000 cubic feet per day.

This announcement will come as a surprise to most of our readers. The exploitation of this field was undertaken by Dr. J. A. L. Henderson, of London, England. From the first, the task of opening up this extremely productive field was beset with difficulties. But nothing has daunted the enthusiasm of Dr. Henderson. He is blessed with a level head, and clear business perception. And he and his company have been rewarded beyond their most sanguine expectations.

Contracts have been entered into with the city of Moncton to supply power for the lighting of the city, for fuel gas, and for the proposed new tramway. The laying of pipes will be commenced early in the spring. The distance to Moncton is only ten miles.

Moncton, a city of about 15,000 population, is a growing manufacturing centre. The large shops of the Intercolonial Railway are situated there. Other considerable industrial plants also have Moncton for their home. The country surrounding is rich agriculturally. The bringing in of a plentiful supply of cheap fuel will, without doubt, give a tremendous impetus to the city and to the surrounding district.

Only a minimum quantity of oil is being pumped—enough merely to prevent flooding of the gas sands. A few notes on each well are here appended:

No. 1 well was started about two years ago. It was abandoned at 1,220 feet.

No 2 well, 11 miles from Moncton, was abandoned in October, 1909, at 2,400 feet.

No. 3, at Stony Creek, 10 miles south of Moncton, was the first producer, yielding 300,000 cubic feet of gas per day, and two barrels of oil.

Well No. 4 was drilled on the Westmoreland side, but no productive sands were found to a depth of 1,675 feet. All further operations have been confined to Albert County.

Well No. 5 at Stony Creek, was the first big gas producer, its capacity being now placed at 2,000,000 cubic feet per day with a pressure of 105 pounds per square inch. It also yields two barrels oil daily. (This is the well from which the company gets its gas for power and after using for over a year, the production is greater than when first shut in.

Well No. 6. north of No. 5, proved to be a "crooked" hole and was abandoned at 1,320 feet.

Well No. 7, drilled to a depth of 1,990 feet, has an oil capacity of 8 barrels per day and 125,000 feet of natural gas.

Well No. 8, at a depth of 1,680 feet, has a natural gas capacity of 1,600,000 feet per day and shows good indications of oil, but owing to the strong flow of gas, the pressure being 200 lbs. to the square inch, it is impossible to torpedo the sands.

Well No. 9 is a small gas producer, and shows a yield of 5 barrels of oil per day. Salt water interfered with drilling at a depth of 2,060 feet.

Well No. 10 has a natural gas capacity of about 380,000 feet per day and yields about 4 barrels of oil per day.

Well No. 11 was abandoned at 1,250 feet, owing to the breaking of the drilling cable which could not be recovered.

Well No. 12 has a gas capacity of 3,695,000 cubic feet daily and a pressure of 610 lbs. per square inch with a good show of oil, not torpedoed.

Well No. 13, gas capacity 786,000 feet, pressure 200 lbs. Good showing of oil. Capped at 1,595 feet.

Well No. 14 is the king of the gas producers, the test showing 10,000,000 feet daily, with a pressure of 475 lbs. At a depth of 1,480 feet the flow of gas was so strong that it was impossible to continue drilling and the well was capped.

In wells Nos. 15 and 16 there was the same experience, the gas pressure being too great between 1,400 and 1,500 feet to admit of drilling.

The capacity of these wells is as follows: (15) 6,500,000 feet, pressure 285 pounds; (16) 9,500,000 feet, pressure 350 pounds.

Work is now proceeding on wells 17 and 18. In No. 17 drilling was commenced in October and the hole is now 1,950 feet deep with a good showing of oil and a strong flow of gas. No. 18 is down 2,175 feet, operations being commenced November 14th. It is understood the company will continue operations all winter.

SUMMARY OF WORK DONE AT NIPISSING AND LA ROSE FOR 1910

(Written for the CANADIAN MINING JOURNAL by R. B. WATSON.)

The year 1910 has been a prosperous one for Nipissing and La Rose as well as for the Cobalt district in general.

The camp's tonnage and ounces of silver shipped will both show an increase over 1909.

The tonnage shipped does not reflect accurately the prosperity of the camp, as the mills are now treating a considerable part of the low grade ore which formerly went to the smelters; much progress has been made in this direction during the year and the time is approaching when very little except high grade ore and concentrate will be shipped to outside reduction works. Bullion is being produced by several cyanide plants, with

or without amalgamation, and the next step to look forward to is the production of bullion from the high grade ores.

This is the history of most mining camps but the complex nature of the Cobalt ores has retarded this logical development.

There has been a further slump in the price of cobalt oxide which resulted in a prompt change of schedule by the principal Canadian smelters cutting off all payments for cobalt. The mines are now receiving no revenue from the cobalt contents of the ores except on the small tonnage shipped to Europe.

Working conditions have improved since the arrival of power in the late spring.

There are now two power companies supplying compressed air and two supplying electric power.

The latter service has been quite satisfactory; and while the air power has been subject to more frequent irregularities, due to the starting up of a new plant, these initial difficulties will doubtless soon be overcome and the result is a service of great convenience.

The air supplied by the hydraulic plant is somewhat deficient in oxygen, so that a candle does not burn freely in a face where there is no natural ventilation. No bad effects, however, have been felt by the men working in this air as far as noted. Acetylene lamps are used in place of candles; they give a better and cheaper light and will probably replace candles throughout the mine, even where they are not necessary.

The shipments of the Nipissing Company for the year will be about 6,600 dry tons, containing 5,500,000 ounces of silver. During the month of December alone the shipments will amount to about 850,000 ounces. This is the largest number of ounces ever shipped in one month by the company and the year's results show a substantial increase over 1909.

The principal veins which have yielded this product are the four veins in the Town of Cobalt, namely No. 64, No. 73, No. 80, and No. 100, together with No. 63 (Kendall), No. 26, No. 122, and No. 54 on the east side of the lake.

The deepest working on the property is on Vein 64, where a considerable amount of development has been done on the 270-foot level and above. Several good ore shoots have been found and a winze is now being sunk to the 350-foot level.

This vein is the strongest fissure yet opened up on the property; it has been drifted on for some 800 feet and appears to be as strong in the Keewatin as in the overlying conglomerate—although the ore so far found has been in the latter formation. It will be explored in depth in hopes that the Keewatin here will give as favourable results as have been obtained in this formation at several places in the southern part of the district. The Keewatin is being looked upon with less suspicion than heretofore.

The best new ore body of the year is on the 160-foot level of vein 73, where there is high grade ore for a length of 250 feet, with an average width of six inches. There is also another parallel stringer of good ore 150 feet long and two inches wide. Very little stoping has been done on this level; nor has it been necessary to draw from the big ore shoot on the first level.

Veins 80 and 100 have produced a large tonnage from the stopes above the 70-foot level; both veins have been located on the 190-foot level.

On the Kendall vein (No. 63) a new level has been driven at a depth of 225 feet, where stopes will be started in both the main vein and the cross vein. A new vein which promises well has recently been found in a cross-cut on the 145-foot level.

No stoping has been done on vein 122, which is now being developed on the second level.

Two new shafts have been sunk in the Keewatin; one near the O'Brien line; the other in the southwest corner of the property next to the Gillies Limit. These will explore several veins showing rich ore on the surface.

A small jigging plant is being installed for the treatment of the large tonnage of screenings heretofore shipped to the smelters; the tailing from this will go to the Nipissing Reduction Company's concentrator to be treated with the low grade ore from vein 63.

It is hoped that a complete method of treatment for the large amount of low grade ores now on the dumps and in the mines, will be worked out at the small experimental plant now under construction.

La Rose shipments for the year will approximate 5,040 dry tons, containing 3,400,000 ounces of silver.

A large amount of development and exploration has been done with very satisfactory results. This work has been confined to La Rose, Lawson, and Princess properties, with some surface and underground prospecting on the Fisher-Eplett group in the south end of the district.

At La Rose proper a new vein was discovered lying west of the main vein and on which an ore shoot some 250 feet long has been blocked out.

Several of the cross-veins have been producing well; the best of these is No. 3, now being developed on the 235-foot level. This vein passed from the conglomerate into Keewatin at about 100 feet and represents one of the few instances where the rich ore continued into the lower formation.

The Princess mine has yielded steadily and is turning out to be a valuable bit of territory. A number of new veins have been found and the lot will be systematically prospected for others.

The Lawson mine made a bad beginning but is now redeeming itself, after a period of steady exploration. A very interesting development has taken place recently in No. 8 vein—a wide calcite filled fissure which runs for many hundred feet across the property. The outcrop yielded only a few bags of ore and on the 88-foot level there was practically nothing. The shaft was then sunk 100 feet deeper into the Keewatin, where a beautiful ore shoot of 5,000 ounce ore, eight to ten inches wide, was found. This ore body has yielded $160,000 worth of ore during the last two months in taking out sufficient ground for the stope timbers. The finding of high grade cobalt ore at depth in the Keewatin, under a calcite outcrop, suggests large possibilities not only for this ground but for other veins in the district.

Shipments from La Rose properties have shown a falling off in tonnage due to the fact that practically nothing is now sent to the smelters except first-class ore and concentrate. Jigging plants have been installed which extract the heavy mineral from the screenings produced by the bumping tables, and the jig tailing then goes to the concentrator.

The Northern Customs Concentrator is treating 100 tons per day of La Rose second class ore and is enlarging its mill to take care of the excess which is now going to the dumps.

Cobalt shipped about one hundred thousand ounces of bullion during 1910.

OUR BRITISH LETTER.

The General Election and the Markets—A Modderfontein Surprise and Some Developments—Electrical Hoisting on the Rand—Rhodesia's Rise—A Country with a Big Mining Future—Welsh Miners' Strike—Conditions in Welsh Collieries—Gold Mining in Russia.

(Exclusive correspondence of the Canadian Mining Journal.)

With a general election in progress markets, mining or otherwise, have shown no special activity. The connection between politics and the markets is close—perhaps closer than it need be. The Liberal Government will return to power with practically the same majority that it had in the old Parliament, and as the Liberal Government is not particularly favoured by the investing and monied classes markets have tended towards depreciation following close upon the lead of Consols. In the new House of Commons, however, finance and its mining subsections will be again well represented.

The South African market has of late had one or two adverse circumstances to contend with, chiefly relating to Rhodesian companies, which have affected the market as a whole. The unexpectedly good Modderfontein dividend announced on December 13th was therefore an agreeable surprise. Estimates had been current that only $1.50 per share would be distributed, or the same as for the June half of the year, but the actual announcement is $2 per share, or 10 per cent., making 17 1-2 per cent. for the year to December 31st next, as compared with 12 1-2 per cent. for the corresponding period previously.

Modderfontein shares, on this announcement, improved appreciably, to nearly $60, which is about $5 above the lowest of the year, though fully $11.25 below the highest. The company owns a very large claim area, and a considerable reduction effected in the working costs has made it possible to utilize a large quantity of ore which previously had been discarded as worthless. For instance, in 1906 the chairman roughly estimated that about 25 per cent. of the area contained non-payable ore deposit, which made the total contents equivalent to 18,400,000 milled tons. More recent estimates placed the figure at over 23,000,000 tons, and an unofficial but expert estimate further raised this figure.

On January 1st last it was estimated that by using one million tons per year the mine would have a life of about 21 years. The reduction in the working costs and consequent increase in the profits—that is, treating the same quality of ore—is indicated by the fact that for the year to May 31st, 1906, the profit per ton of ore treated was $1.66, whereas for the year ended 1909 the figure had risen to $3.36. The issued capital is $7,000,000, in shares of $20 each, which, on the basis of the latest dividend yield a purchaser about 5 7-8 per cent. As in mining investments it is reckoned that the return should be at least 5 per cent., plus the amount necessary to write off the investment during the estimated life of the mine, it would seem that the shares are fully valued, except on the inference that the dividend will be further raised.

There are several interesting features in connection with the electrical hoisting equipment of the Rand Collieries, which are now being actively developed as a gold mine, though floated originally as a coal mine. At the Rand Collieries there are two shafts, but work is more advanced at No. 1. For this shaft there are two hoists, one capable of lifting six tons and the other three tons of rock. The drums are of the cylindro-conical type, which are directly coupled to direct current separately excited motors, being supplied with current from variable voltage generators. Special provision is made in the electrical equipment to ensure safe working. In order to obtain the best results there are continuous current machines fitted with auxiliary poles and compensating winding on the main poles.

The power will be supplied from the Victoria Falls at 10,000 volts to a transformer-house, where it is converted into 6,000 volts, to which pressure the induction motors driving the control generators and the pump motors, etc., are connected. The direct current generator from the 6-ton hoist is capable of giving any pressure from zero to 800 volts, positive or negative. The control generator from the 3-ton hoist is wound for a maximum pressure of 400 volts only. The company's engineers are confident that hoisting costs by these hoists, to be installed at the two vertical shafts, will not exceed six cents per ton, as compared with from 25 cents to 30 cents per ton on most deep level mines where steam power is used. It is also confidently believed that milling costs, with a reduction plant of the very latest design to be subsequently erected, will be very considerably below the present level on the Rand by reason of the much higher duty per unit, vastly improved facilities for working, and the lower running and maintenance costs consequent upon the electrical drive.

In the matter of Rhodesian mining there is a gradual increase in public confidence to be noted on the whole, and Rhodesia, once the Cinderella amongst mining companies, is gradually forcing its way towards a consistently increasing output of gold. The Chartered Company, which rules Rhodesia, is slowly learning the lesson of its errors of past control. Already Rhodesia's gold production amounts to about $12,500,000 annually and the colony remains for the time being as it began, a mining country. Geologically speaking, the high veld, as the great stretch of rolling plains and tree-clad ridges are termed, is made up of old metamorphic rocks into which have been intruded great masses of granite. The granites themselves, though affording splendid building stone for future generations, are of little economic importance. In the schist belts, however, and especially along or near their contact with the granites, gold reefs are frequently met with, as well as deposits of other minerals. No particular district seems to be specially favoured; first one and then another may become the centre of attraction to the prospector for the time being. There are, moreover, no long lines of reef, and it cannot be demonstrated that any two important producing mines are situate on the same lode. Whether this want of concentration is an advantage or a disadvantage is open to argument.

Historically considered, Rhodesia's mining is based upon various discoveries with regard to ancient workings and the story of the colony has not been marked by any of the great "finds" of large nuggets or rich outcrops that have marked the early days of great auriferous areas. It is clear that an ancient race carried on extensive gold mining in Rhodesia, old workings and implements being found over large stretches of the country. Rhodesia's reefs were formerly not believed to "go down," but recent returns have dissipated this old idea, some workings now reaching a depth of 1,700 feet. The industry has now got into a good swing and within the next few years a series of new

discoveries is confidently anticipated, especially of ore bodies untouched by the ancients, now that an era of genuine prospecting has set in.

The Welsh coal miners' strike, which has affected more than 30,000 men and has at times been marked by rioting of a kind practically hitherto unknown in this country's labour struggles, is quieting down. The Board of Trade is lending its help with a view to securing a settlement and at last those insurgent miners who were refusing to obey the orders of their own union and the Welsh Miners' Federation, are exhibiting a more conciliatory attitude. Numbers have returned to work by arrangement with their union. The trouble in South Wales is of long standing and is not the straight-out question of wages and hours of labour that most labour disputes are.

About half the men employed in a mine are at work in actually winning coal, being called hewers or colliers; and the rest are employed in haulage, maintenance, and supervision, or about the surface. The colliers are nearly always paid by the piece, the rest by the day. The present dispute concerns the colliers alone directly, the other classes of workers having struck in sympathy.

Each hewer is assigned a certain length of the face of coal—his "stall," as it is called—which he has to work, either with the help of a boy, whom he pays, or in partnership with another man, the two dividing the earnings. The hewer fills his tram, chalks his number on it, and at the surface it is weighed and tipped over a screen into the railway truck. The small coal falls through the screen, is separately weighed, and discharged into another truck. The weight of large coal hewn is thus ascertained, the miner not being paid for small coal in most of the collieries of South Wales.

The percentage of small coal depends partly upon the skill of the workman, and partly upon the condition of the coal, whether it is soft or hard, or has been crushed by earth movement; and it is evident that the piece-rate per ton of large coal won must be adjusted to make fair allowance for the proportion of small coal which a good workman must inevitably produce. When bands of stone occur in the coal, or loose under the roof, the extra work they give is paid for by an additional tonnage rate agreed upon between the fireman (who acts as foreman, besides testing for gas) and the collier. Various other kinds of work, such as setting props to support the roof and packing waste stone into walls, are paid by the piece. As far as possible permanent rates are agreed upon for all these tasks for each seam of coal, but when the conditions are very variable, there is often difficulty in deciding what rate to apply, and the rates in the official price list not infrequently prove too low. Then the question of an extra allowance arises.

Since the men maintain a check-weigher to verify the owner's weighings, no dispute can arise as to the payment for coal hewn; but it is otherwise in regard to extra payments, in regard to which there seems to be no proper system of record and verification. Bargains between the fireman and a collier are sometimes forgotten, or occasionally, perhaps, wilfully suppressed by the former when he finds he has made total allowances beyond the sum permitted him by the manager. But there are other grave abuses connected with these extra payments and with the allocation of men to particular stalls, such as favouritism, propitiating of committee-men with higher allowances, and bullying the weaker or needy men into accepting lower rates.

A most objectionable feature of the present system is the dispute which occurs on fortnightly pay days, a knot of men remaining behind to demand allowances which they believe are due. After many attempts they may get an interview with the manager, or they may have to rely on the men's committee of the pit, who take up numbers of cases every fortnight. In many cases the allowances are ultimately granted, sometimes after several weeks; but so far as I can ascertain the granting of them is very arbitrary, and depends a good deal on importunity. The earnings of Welsh adult miners vary from 50 cents to four dollars per day and it can be understood that disputes are quite likely to occur even with good feeling on both sides.

The importance of the gold mining industry in Russia is one that is well recognized. A correspondent informs me that at a recent meeting of mining engineers, Herr S. A. Gumnitsky gave an address on the position of the dredging industry in Russia, or, rather, ten years of the dredging industry in the Yenissei district. It appears that the winning of gold by dredging has been in operation in the district for just ten years, and in this respect stands out prominently as compared with other gold districts. The lecturer said that the dredges had been in use long enough for a judgment to be passed on the comparative merits of the various types used, and, of course, of their comparative demerits, if any. The question has become a serious one in view of the fact that the gold industry in the Yenissei district is passing through a very serious crisis. One of the causes of this, he said, was the dearness of labour, particularly during the past few years, and then there has been the appreciation in the value of provisions of all kinds, and, finally, the weakening of the richness of the gold content in the sands, and so on.

He went into detail on the respective merits of the various types of dredges in use on the fields, including the New Zealand, American, Neviansky, and Putiloff types. Those used in the district do not differ, he said, essentially from the type of the Neviansky, and criticizing certain defects in the construction of some of them, he thought these were properly referable to the nature of the ground they had to work, and that the fault in no way lay with the makers, for these had in every case scrupulously followed the instructions of the users.

Idleness and necessity have forced the Urals mining workmen to return to their original occupation—the search of gold in their own grounds. They wash gold in the Neviansky factory and find it also in the well-known Nizhne Tagil area, and they have even discovered in their back-yards and orchards deposits of rich iron-stone and in great abundance. In a word, there is no work in the closed Urals factories, so the workmen are after gold and metals where they did not think it worth their while before. Gold is still to be found in many places. "I know in the Northern Urals," says my correspondent, "in one vilage, that of Ivdel, on the bank of the River Ivdel, where not only is gold found in the orchards of the inhabitants, but the very church, although far from the river, is built on auriferous ground, and I have seen, when there, every time that a grave was dug in that northern latitude, without fail, they struck a rich bed of sand where even nuggets were found. An effort to exploit the gold for the benefit of the church fell through."

Coal Mining in Nicola Valley and Smilkameen Districts, B.C

Now that these southern British Columbia districts are accessible by railways, the development of some of their resources is being proceeded with. Prominent among the activities that are taking place is coal mining, which in Nicola Valley is becoming important, while in the Similkameen it is still largely in the prospect stage. However, much development is being energetically undertaken, and in two or three instances surface equipments are being provided, so that shipment of coal from these new properties may be made before the current year shall close.

Nicola Valley.

Nicola Valley Coal & Coke Company, Limited.—This company owns and operates the Middlesboro colliery, in Nicola mining division. During last year work was done in mines Nos. 1, 3, 4 and 5, and a production of about 158,000 short tons of coal was made. In No. 1 the development work in progress in 1909 was continued, and a second slope was opened. In No. 3 the seam, which is small in this mine, was developed; a rock tunnel connects the mine with No. 2. No. 4 mine has been developed to an output capacity of about 200 tons of coal a day. In No. 5 the workings were further extended. A new fan, with a capacity of 150,000 cubic feet, is being put in, and preparations are being made to considerably enlarge the surface by installing next spring a modern equipment of much greater capacity than that now in use.

Transportation.—The construction of the Kettle Valley Railway, now in hand, will add to existing transportation facilities, which are afforded by the C.P.R. Company's line from the mines to Spence's Bridge. When the new railway shall be completed to the Boundary district a large and easily accessible market will be opened to the coal mines of Nicola Valley. The Kettle Valley line runs for four miles within the bounds of this coal company's property. Mr. Charles Graham, formerly with the Western Fuel Company, Nanaimo, was lately appointed superintendent for this company.

There are several other coal properties in this district on which development work has been done, and some of them are stated to give promise of proving producers.

Similkameen.

Princeton Collieries, Limited.—This company controls about 12,300 acres of coal lands near Princeton. Plans for a modern 500-ton tipple are being prepared, and it is stated that development work will shortly be begun on an 8-foot seam which outcrops near the Tulameen River. Railway transportation will be available, and it is intended to energetically develop this property.

Princeton Coal & Land Company.—This is an offshoot of the old Vermilion Forks Mining and Development Company, which has held land, mining, and townsite interests for years. In December, 1909, production was commenced, and the output was 150 tons. Since then railway communication has been established with the Boundary and Spokane. Last year's production was between 11,000 and 12,000 short tons. The main incline on the dip of the seam is down 450 feet and numerous cross-cuts and levels have been driven. A 50 h.p. steam boiler and hoist operate single rope haulage. Other improvements made recently include the erection of several mine buildings.

Osoyoos Coal Company.—The occurrence of an 18-foot seam of coal of excellent quality on this company's property is reported, but it has not yet been extensively developed. Men were employed during recent months opening this coal, and the prospects are stated to be good for permanent and profitable development.

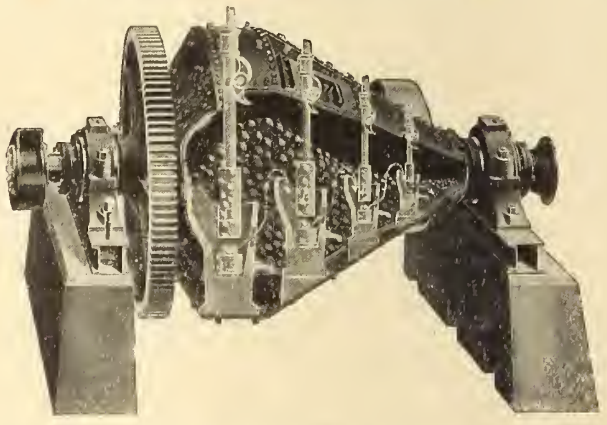
Columbia Coal & Coke Company.—This company holds 10 square miles of coal lands, extending from Granite Creek six miles to the Tulameen (Otter Flat). Last summer 35 to 50 men were employed exposing the various seams, of which it is claimed there are six that are workable. The designing and installation of plant to eventually have a coal-handling capacity of 2,000 tons a day, has been contracted for by a Chicago firm of engineers.

Gravity Stamps Obsolete

By H. W. HARDINGE.

In the rhythmic dropping of the stamps to the old mill man, there is as much harmony as in musical tone to the musician. A discord is produced in the ear of the former when the feed of the battery allows metal to strike on metal. The disquieting note is as detectable above the din to his practiced ear as a false note in an orchestra to the leader.

It is, perhaps, for this reason that the mill man loves his noisy pets and is loath to accept innovations; but they are as sure to come as other advances in metal-



lurgy. It is only a few years since cyanide largely replaced amalgamation in gold milling and the tube mill took the place of grinding pans. We must give way to advancement, and the more experienced metallurgist, who is willing to recognize new features in ways and methods, will keep up with his younger competitor who is not hampered with too much obsolete knowledge. Better be ignorant than learned in methods out of date.

Only within a very short time the South African engineer has broken away from the use of fine screens on his batteries and is now using screens of larger openings than was before thought practicable. He is also modifying weight, height of drop, and drops per minute, to meet the requirement of dealing with the problem of economy necessitated by the lower grades of ores encountered. Less than a year ago the writer in conversation with one of the most successful mine managers and metallurgists in the Cobalt district, suggested that he change his 20-mesh battery screens to 10-mesh; but an objection was made that such a screen would be too coarse. He, however, was alive to possibilities, and we ascertained within the past few days that he has "gone us one better," for his batteries are

now equipped with slotted screens of four times the aperture area of our suggested 10-mesh. The result is that he has doubled his stamp capacity, and his "oversize" is easily taken care of by his pebble mill without any additional increase in power consumption over the same method when the stamps were endeavouring to crush sand by pounding it upon a previously prepared bed of sand on his stamp die. If, then, the stamp is a better coarse than fine grinder or reducer, would it not be well to discard it altogether and employ a machine especially adapted to fine crushing?

A representative of one of the largest manufacturers of mining machinery in the world, writing upon this same subject, and referring to different methods of crushing, appears to give preference to Chile mills and ball mills, even of the older type; and in this connection says, as is true, "there is no work for the gravity stamp which cannot be done better by either of the other coarse crushers."

The writer, in his metallurgical practice, recognized this fact several years ago and in his effort to remedy the defect, through an application of a combination of machines, invented a new type of ball mill embodying the features of automatically adjusting the power to work, i.e., utilizing a large ball to crush the larger pieces in the largest diameter of the mill, and successively smaller balls in the zone of the lesser diameter and lesser weights of balls as well as gradually reducing peripheral speeds, thus relatively taking the place of gradually reduced weights of stamps with lighter and fewer drops per minute. This idea we have endeavoured to illustrate graphically in the accompanying cut of a mill automatically adjusting power to desired work.

The small mill shown has a capacity equal to 15 to 20 stamps and the total cost of mill complete hardly amounts to the cost of foundations for the stamps. It is operated without screens and is as effective as simple. As a further illustration of the unnecessary work put upon the stamp, let us suggest a consideration of this work. For instance, a 2-inch cube of ore beneath the stamp shoe signifies the kind of work that such a machine should do. It will effectively reduce this piece of ore in a single drop so that its resulting particles will average less than a diameter of 1-4 inch, or a reduction of over 500:1. Then the logical sequence of size of the next reducing medium should be in the same ratio to the particle undergoing further division. This would reduce the weight of the stamp in the same proportion, necessitating a "stamp" weight of about 2 pounds. This effect is easily obtained by employing a small 2 1-2 inch or 3 inch ball, and instead of a single stamp we have hundreds of this size of "stamps" for further reduction, acting upon a multiplicity of relative sized particles, a plausible and mechanical result to be attained. Thus, we use a sledge hammer upon a spike and tack hammers upon a tack.

In another short article, we may have something to say in reference to amalgamating gold ores in pebble and ball mills, which idea, at first thought, will not be viewed without considerable questioning by the older millman on account of "flouring" of the quicksilver. It, however, in spite of opinions to the contrary, is being successfully done in the conical pebble mill.

Nova Scotia Steel and Coal Company

The Record of a Prosperous Year.

The year 1910 was one of record outputs and general expansion with the Nova Scotia Steel and Coal Company. Every department of the company's varied works set a new record for production, while the additions and improvements that were made in nearly all the departments will make possible even better production in the future.

At the Wabana iron mines, perhaps greater improvements were made than at any of the other properties. The submarine slopes were further advanced 1,500 feet and are now nearly 7,000 feet from highwater mark. Boreholes sunk to the lower bed from the slopes on the upper seam showed a very marked increase in the richness and thickness of this underlying one. A large amount of equipment was put in here during the year. A Fraser and Chalmers first-motion duplex steam hoisting engine, said to be the most powerful of its kind in British North America, was installed; a new deckhead and a belthouse, with many labour-saving devices were erected; and the hoisting slopes were laid with 80-pound standard section steel rails.

An electrical power plant consisting of Belliss and Morcom triple expansion condensing engines operating Brown Boveri generators was installed adjoining the shipping pier. This plant will supply power for all the operations at the piers and by a transmission line across the island will furnish the electrical power required at the mines. A coal discharging tower was constructed adjoining the electrical plant, work begun on a new ore pocket and sixteen houses were constructed.

R. E. Harris, Pres. N.S.S. & C. Co.

At Sydney Mines the blast furnace and three of the open-hearth furnaces were remodelled and relined during the early summer and the improvements effected then have greatly increased their production. For the past six months their outputs have exceeded those of any other furnace of similar capacity. The usual renewals and replacements were made at the collieries and 76 houses were constructed for employees.

Important additions were made at the New Glasgow works. The new buildings with a combined length of over a quarter of a mile, were erected. One will house the spike, bolt and nut, rivet and polished shafting departments, while the other will replace the shipping building. The combined 16-inch and 9-inch mill installed some fifteen years ago, having become inadequate to the work required, was replaced by separate

18-inch and 9-inch mills. To supply the additional power required an electric power generating set of 2,000 h.p. driven by turbines to be operated by the exhaust steam from the present cogging mill and bar mill engines is now being built in Great Britain, and will shortly be installed, the foundations for which and building to house same being now completed and ready for the erection of this plant.

The progress of the company during the past year is best shown by the following table of outputs, number of employees, etc., in 1909 and 1910:

	1910.	1909.
Iron ore mined	537,000	460,387
Coal mined	845,000	813,453
Limestone and dolomite quarried	75,000	74,407
Coke made	90,000	87,816
Pig iron made	66,000	57,676
Steel ingots cast	75,000	64,240
Steel billets cogged	59,000	52,931
Bars and plate rolled	49,000	45,090
Axles forged	34,000	27,703
Shipments of finished steel and forgings	60,200	58,515
Pay roll	$2,825,000.00	$2,480,226.91
Average number employees	5,276	4,450
Average at collieries	2,656	2,285
Average at I. & S. Dept.	860	685
Average at New Glasgow	900	770
Average at Wabana	860	710
Steamers employed	18 to 20	15 to 20
Tonnage freighted	1,000,000	925,000

The Canada Iron Corporation, Limited

Progress during 1910.

At the request of the CANADIAN MINING JOURNAL, the following brief review of progress has been forwarded by the Canada Iron Corporation, Limited:

The iron ore mine in the County of Gloucester, N.B., was opened and machinery installed for the production of 1,000 tons of crushed ore per day. The surface of the mine was stripped and operations commenced.

A standard gauge railway was built to the junction of the Intercolonial at Black's Cut, and this was equipped with 50-ton steel ore cars and motive power to handle trains carrying 1,000 tons of ore each.

To provide shipping facilities, a dock was completed at Newcastle, N.B., with a storage capacity of 10,000 tons and machinery with a loading capacity of 3,000 tons per hour. This work was all done during the summer and completed in time to get out a first shipment of about 7,000 tons of ore before the close of navigation. This shipment went to the United States.

The mines owned by the corporation in Nova Scotia were also developed during the year, and mining and crushing machinery installed to take care of these at capacity of 800 tons per day.

Shipping docks for this ore were built at Port Wade, N.S., and equipped with loading facilities to handle 2,000 tons per hour. This work was also carried on during the year and completed in time to ship 20,000 tons of ore before the close of navigation, part of which ore was shipped to the United States and part to England and Scotland.

In the furnace department, the corporation completed the construction of a new blast furnace at Midland, Ont., having a capacity of 250 tons per day. This has been placed in successful operation.

In the foundries department, an entirely new and up-to-date plant was constructed at Three Rivers, Que., for the manufacturing of water pipe, this plant having a capacity of 75 tons of pipe per day and 25 tons of castings. This was successfully operated during the latter half of the year.

At Fort William, extensive additions and improvements were made to the plant, which had the effect of increasing the output of water pipe, castings, and car wheels. Here, also, the plant was successfully operated during the whole year.

The foundry plants at St. Thomas and Hamilton, Ont., and at Londonderry, N.S., were also in operation during the full period.

IN AND ABOUT STEWART, B.C.

(Written for the CANADIAN MINING JOURNAL, by W. W. RUSH.)

To those who have been interested in Portland Canal since the early days and have persistently urged its claims to recognition as an important mineral district, the activity of the past season has been particularly gratifying, although it has not equalled the expectations of the most sanguine. The camp now enjoys regular communication with Vancouver by several steamship lines. The mile long tide flat that has hitherto interposed a formidable barrier between Stewart and the outside world has been conquered and two wharves now reach out their long arms to greet the traveller and abate the exorbitant expense of handling ore and supplies that thus far has been a serious obstacle to the camp's development. A telegraph line is building toward Stewart. Prospecting has been more energetic than ever before and several important discoveries have been made, notably the "L. L. H." group on Bitter Creek, and the "Portland" on Salmon River. The transportation problem has been greatly simplified. Many miles have been added to the system of roads and trails, and bridges have been built on the main lines of transportation. The Portland Canal Short Line is well begun. Upwards of ten miles have been graded and rails are being laid. The road work and buildings are all of a substantial character. The familiar "toot" of the locomotive lends a cosmopolitan air to Stewart, and suggests manifold possibilities for the future.

The project of carrying the railway through to Edmonton, thus making Stewart the terminus of a transcontinental line, has been canvassed and appears both feasible and logical. As the most northerly port of British Columbia, Stewart is the natural outlet of a vast interior country stretching away to the Yukon, that in the course of years is certain to be exploited. Land

cruisers have been active all season along the line of the proposed route, and thousands of acres of agricultural land have been taken up in the Upper Naas Valley beyond the head of Bear River.

The money contributed to the various stock companies of the district during the excitement of last winter has been spent perhaps more economically than is usual in such circumstances. At any rate, in looking over the properties of the district one finds little trace of the extravagant or useless or premature equipments that in many camps stand as monuments to the incapacity of managers and the credulity of the investing public. With scarce an exception the new mining companies of the district have confined their operations to actual surface and underground development, and the necessary preliminary work of trails and camps. Office expenses are usually an insignificant item. Considering the amount of "dead work" necessary before actual mining could begin, the scarcity of labour, and the high operating costs incident to boom conditions, very fair progress has been made, and it is the writer's belief that in most instances the purchasers of mining stocks are having a fair run for their money.

Glacier Creek Trail

The pioneer operators of the district, the Portland Canal Mining Co., now under the management of W. J. Elmendorf, has been adding to its ore reserves throughout the year and now has in operation a complete and efficient concentrating plant of 50 tons daily capacity. Concentrates are being sacked for shipment. The Stewart Mining & Development Co. has confined its opera-

tions to underground work. At the Red Cliff some surfaee prospeeting has been done, but the most important work has been the driving of a working tunnel 300 feet below the upper workings. Like many other important eopper deposits, the Red Cliff ore bodies are irregular and have no semblanee to veins. There is nothing disclosed by the workings above the tunnel to prove the piteh of the ore body or to indieate that its vertieal extent is greater than its lateral extent. Therefore, if the lower tunnel has entered an ore body, as eurrent rumor reports, it may signify that the ore continues in a ehimney from the surfaee workings, or it may mean that an entirely distinet ore body has been struek. In view of the extensive mineralization of the vieinity, one eould reasonably expeet to find ore on other levels above and below the first workings.

Looking West from Lordygordy Camp

These older eompanies are still favourites on the stoek exehange, and by the general publie are looked upon as the most important properties of the distriet; but it is probable that some of the properties now in the initial stages of development will eventually dispute their pre-eminence and perhaps outrank them as ore producers. Some of the highest grade silver-lead ore in the distriet is being mined on the "Columbia" and "Evening Sun," situated on the Middle Fork of Glaeier Creek. The Lordygordy Mine, Ltd., operating these claims, reeently made a trial shipment of four tons that sampled $220 per ton, chiefly in silver. The Rush-Portland Mining Co., operating an adjoining property, has a trial shipment of similar grade saeked awaiting the completion of a horse trail for shipment. The "Exeelsior" group lying to the southward of the Lordygordy, has a splendid showing of the same elass of ore. The ore on these claims oeeurs in well-defined veins crossing the formation and dipping vertically or nearly so. Siderite is a eharacteristie gangue mineral. Negotiations are in progress for consolidating all the properties of this section.

Portland Canal Mill

On the South Fork side of the ridge the Paeific Exploration Co. is driving a series of erosseut tunnels on the Jumbo, situated 1½ miles southeast of the upper camp of the Portland Canal Mining Co. in the same vein zone. The lowest tunnel attains a vertieal depth of 750 feet below the surfaee workings. Manager H. E. Knobel reports that 5 feet of ore has been erosscut in the first tunnel and drifting is in progress. The hanging wall

has not been reached, the vein being at least 50 feet in width at this point. The ore is similar to that found on other properties of the same vein zone. On the "Mountain Boy," on American Creek, the same company is developing a series of east-west veins, or shear zones, carrying argentiferous lead, copper and zinc sulphides

bearing matrix on this group is described as a porphyry dike and the mineral an auriferous arsenopyrite. The "Old Chum," a contiguous property, has primary gold values in a well-defined quartz vein, with some copper. Available details regarding these two properties are meagre, but competent mining men are known to have

Red Cliff Camp

Bear River Valley

in a gangue of quartz, calcite and barite. The veins are from 10 to 25 feet wide, not sharply defined and rather limited in linear extent. There is a large amount of ore in sight, chiefly of concentrating grade.

Another new property that has the ear marks of a mine is the "L. L. H." on Bitter Creek. The mineral-

reported favourably on them, and the owners have declined a substantial offer from Henry Hoffman.

On Salmon River interest has centred in the section occupied by the "Big Missouri," "Martha Ellen," "Portland" and other claims of less note. In this vicinity the major part of the development work and

prospecting of the season has been done. H. B. Williams bears a very favourable report of the latter two properties, which he has examined in the interest of clients. On the "Portland No. 1" and "Portland No. 2," under

option to Clothier & Ritchie, a well-defined vein from 10 to 18 feet wide has been traced 1,800 feet along a contact between slate and granite. The strike is southeast, and the dip southwest about 70 degrees. The gangue is quartz and the mineralization consists of lead, zinc, copper and iron sulphides, carrying fair gold and silver values, elevation 2,200 feet. On the "Martha Ellen," one of the Salmon Glacier Mining Company's holdings, similar ore is found across widths of 5 to 30 feet, but the vein is not so well defined as the "Portland," elevation 3,500 feet.

The boom period has had its obvious advantages to the camp. Conservative interests would not have accomplished in a decade the amount of prospecting and dead work that has been done during the past season. The more conservative basis now attained also has its advantages, particularly in offering more favourable conditions to bona fide mining men, many of whom have doubtless held aloof hitherto on account of the high prices demanded for prospects and high operating costs. This problem of costs is as always a vital one. The excessive costs that characterized the beginning of the season have been abated considerably, but further progress in this direction is to be desired. The condition is to be met by the co-operation of the mine operators of the district and by consolidation of neighbouring properties into companies strong enough to conduct operations on an economical scale. With the natural advantages of the district in timber, water power, and proximity to tide water, costs of operating should be reduced to a very reasonable standard.

THE CONIAGAS MINES, LIMITED

(Abstract of Directors' Report.)

During the past year your mine has operated continuously, excepting holidays, with an average force of 133 men.

The capacity of the concentrating mill has been doubled by the addition of thirty stamps making a total of sixty stamps of 1,250 pounds each, crushing 160 to 170 tons of ore per day. The entire plant is now operated by electric power, purchased from the producing companies, as is also the compressed air for the mine. These extensions and improvements have resulted in a material saving in the cost of mining and concentrating per ton.

After extended tests in cyaniding of your ores, your Directors are satisfied that the method of concentration by water, followed in your mill, is more economical for your ore both in cost of treatment and in results, and that the tailings from your mill do not carry sufficient value to warrant further treatment at present.

The following was the quarterly output of the mine for the fiscal year:

	Concentrates.	Mine Ore.
1st Quarter	77,093.06 ozs.	155,660.47 ozs.
2nd Quarter	137,065.64 ozs.	184,680.74 ozs.
3rd Quarter	262,396.67 ozs.	184,284.72 ozs.
4th Quarter	473,345.98 ozs.	455,003.72 ozs.
Totals	949,901.35 ozs.	979,629.65 ozs.

Total concentrates and mined ore, 1,929,531.00 ozs.

From the financial statements, it will be seen that your company, after having paid out $240,000 in dividends during the past year, has a cash balance to its credit of $242,900.23, to which may be added ore in transit and at smelter, to a value estimated at $374,087.58.

During the year, the 225-foot level has been developed by winze sunk on Vein 6 D from the 150-foot level, and an upraise to connect up to Shaft No. 2.

The development on this 225-foot level is shown on accompanying plans. The character and value of the veins show no change.

No. 2 Vein has been followed on the 150-foot level and on the 225-foot level eastward, nearly to the boundary, carrying its usual size and value.

No. 6E Vein on the 225-foot level is about 2 1-2 inches in width of good ore (about 4,000 ounces) at the face, and the drift following it is extending the workings well towards the southeast unexplored portion of your area.

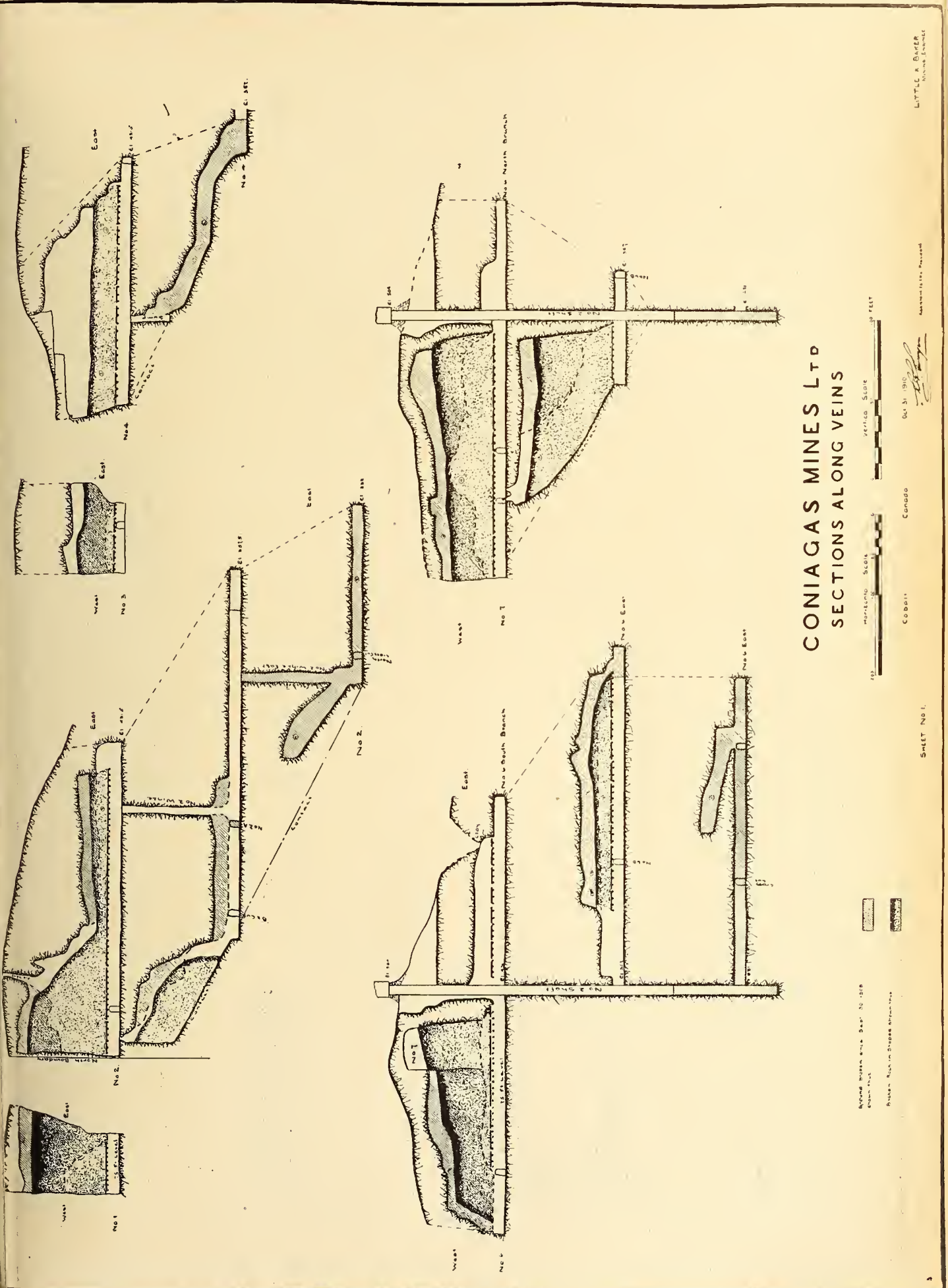
To the south of Veins Nos. 9 and 10, two valuable outcrops of good ore have been uncovered (marked Nos. 15 and 16 on Key of Veins) with an east and west strike, giving great promise of the value of this portion of your property, which will probably be reached during the coming year in the underground workings.

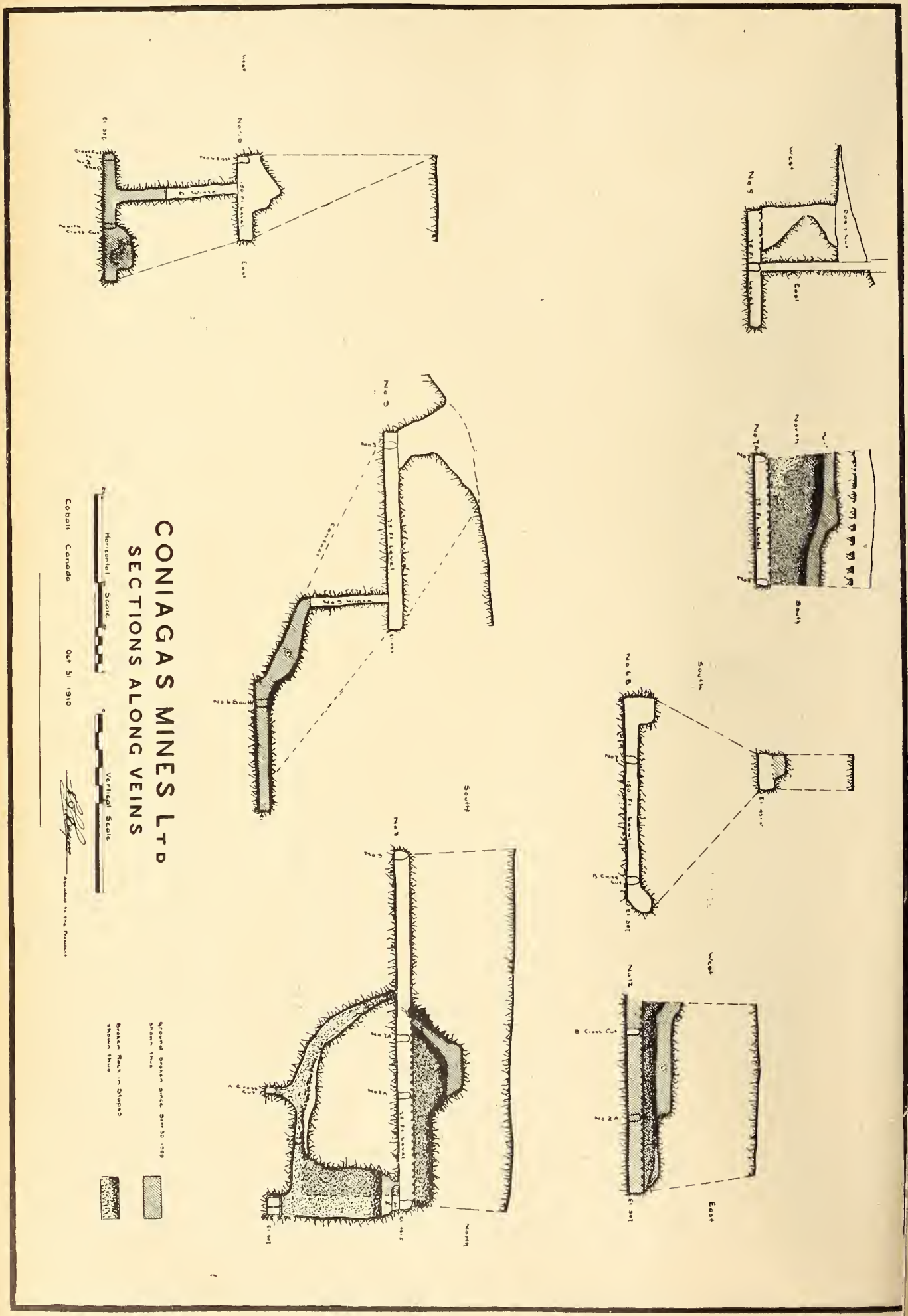
The progress of development and stoping during the year on the various veins is clearly shown on accompanying plans, from which it will be seen that the development has more than kept pace with the stoping, and shows an increase of over 2,500,000 ounces in the quantity of ore estimated as in sight, based on careful surveys and measurements made by Little & Baker, mining engineers, and certified by Mr. R. P. Rogers, C.E., assistant to the president.

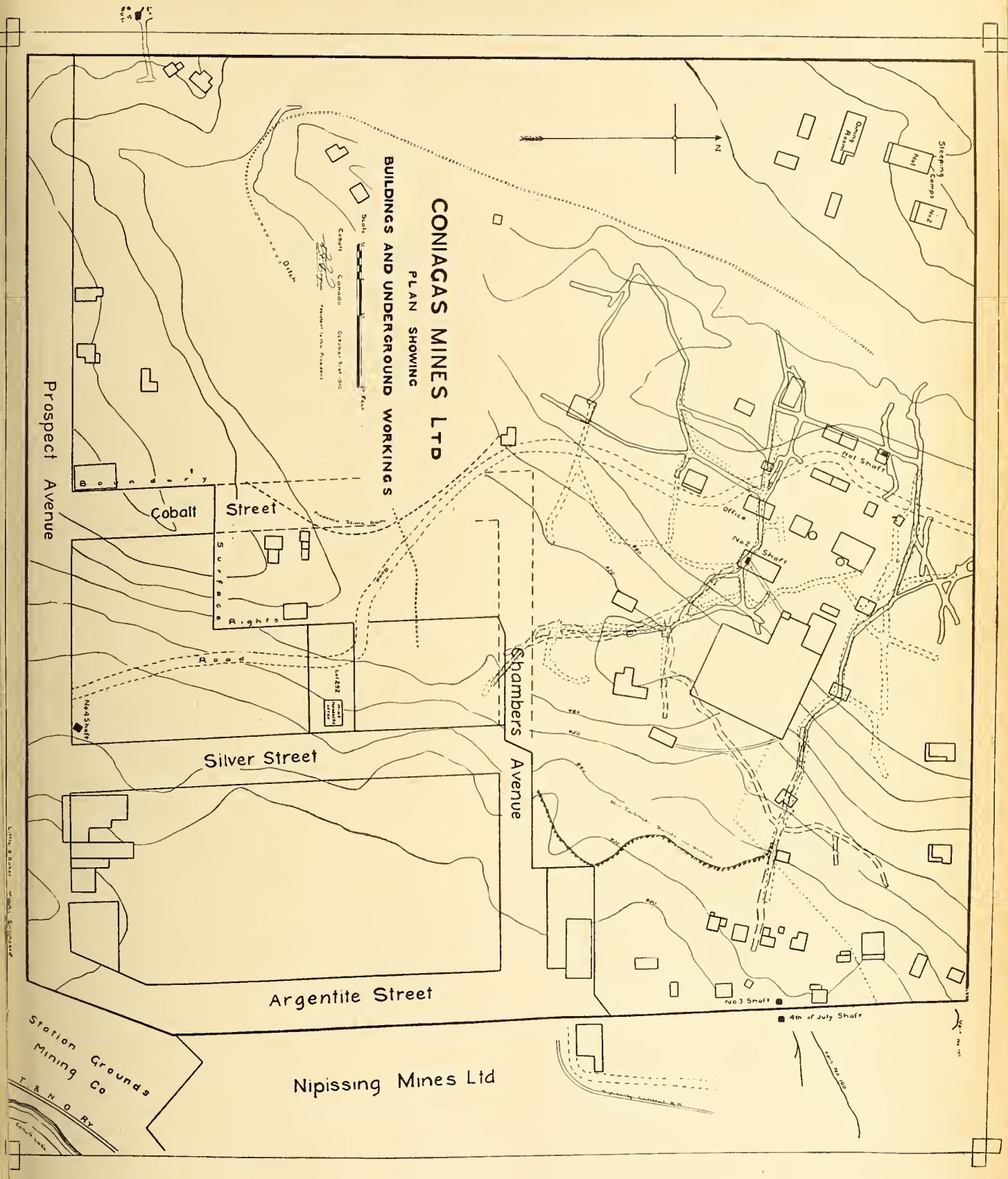
Ore reserves in sight on October 31st, 1910, are estimated at 15,368,400 ounces of silver, contained in 127,167 tons of high grade ore and milling rock, as against 12,500,000 ounces estimated in sight on October 31st, 1909, contained in 106,000 tons of ore and milling rock.

These estimates are shown in more detail in the following table:

The average price received for silver for the past year was 53.55 cents, as compared with 50.18 cents for our last fiscal year, and with 52.3 cents for the previous year.


CONIAGAS MINES LTD
SECTIONS ALONG VEINS
Vertical Scale
Oct 31 1910
Little & Baker
Mining Engineers
Sheet No 1.
No 1
No 2
No 3
No 4
No 7
No 8
North Branch
South Branch
North Boundary
Contact
East
West
Cobalt
Canada


CONIAGAS MINES LTD
SECTIONS ALONG VEINS
Cobalt Canada
Oct 31 1910
Horizontal Scale
Vertical Scale
Ground broken since Dec 30 1909 shown thus
Broken Rock in Stope shown thus
No 10
No 5
No 9
No 6
No 8
No 12
No 2A
150 ft Level
100 ft Level
Contact
North
South
East
West



The relations between the management and employees have been, as usual, most satisfactory, and the general health has been excellent.

As in previous years, so last Christmas, your Directors presented each employee with a cheque for 4 per cent. of his wages during the year, amounting to $3,071.13.

During the year, John Redington resigned the position of superintendent, to take up consulting practice after over four years of faithful and satisfactory service in the employ of your company.

His duties as mine captain have been taken over by Arthur Martin, who has been in your company's service nearly five years.

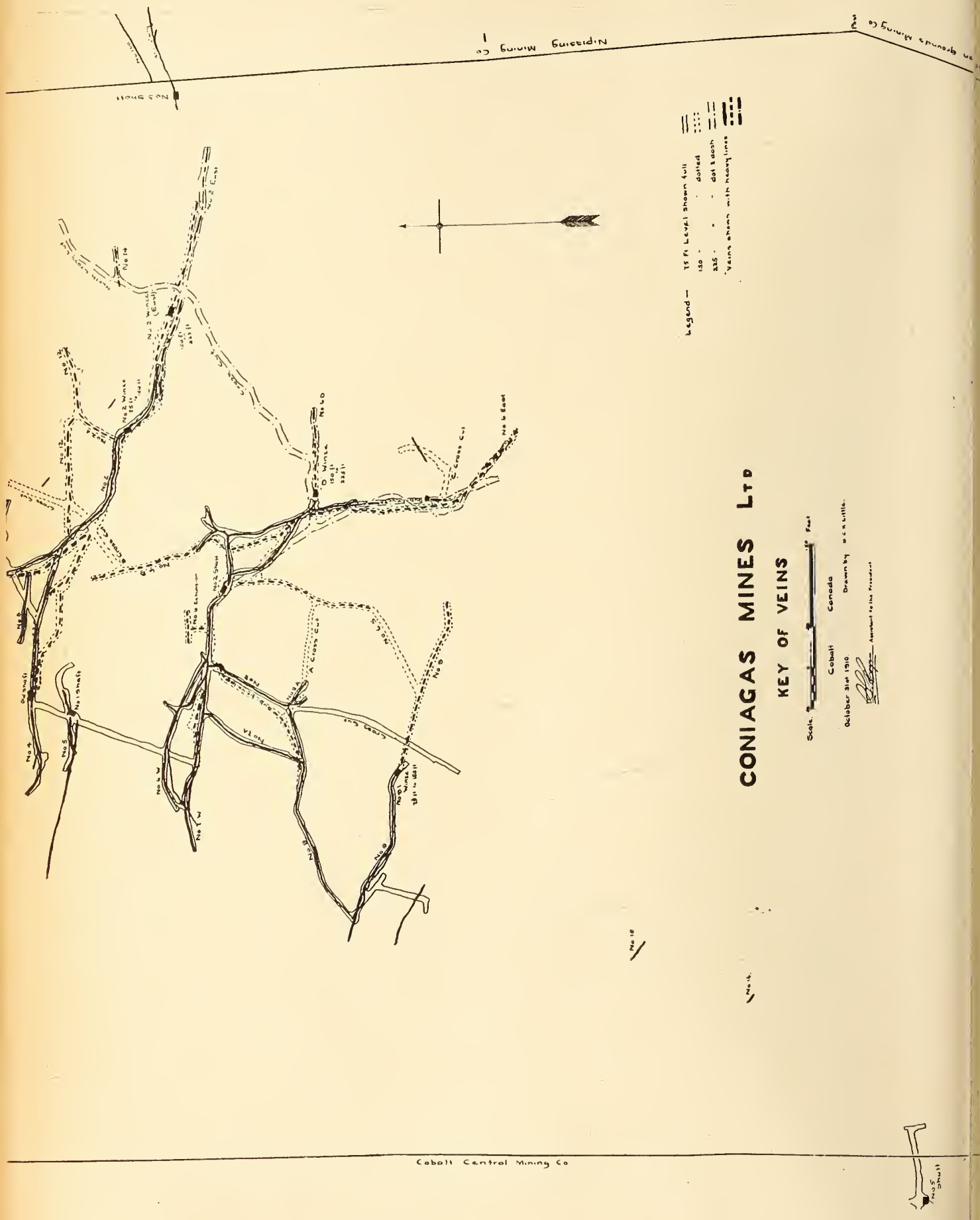

CONIAGAS MINES LTD
KEY OF VEINS
Legend—
Cobalt
Canada
October 31st 1910
Cobalt Central Mining Co

TABLE OF SHIPMENTS FROM THE MINE.

	Nov. 1, 1908, to Oct. 31, 1909.		Nov. 1, 1909, to Oct. 31, 1910.	
	tons.	ounces.	tons.	ounces.
Mine Ore	350	807,253	330.1	979,630
Concentrates	426	599,975	645.5	949,901
	776	1,407,228	975.6	1,929.531

Total tons to date, 5,323.1.
Total ounces to date, 6,792,854.

ORE RESERVES ESTIMATED IN SIGHT OCTOBER 31ST, 1910.

	Est. weight in tons.	Est. Silver contents,, ozs. ag.
Vein Matter, No. 1 Ore	4,027	11,638,000
Wall Rock, Milling Ore	89,590	2,711,900
Broken Rock in Mine (Milling Rock)	19,530	597,900
Broken Ore, on Surface Dump	14,020	420,600
	127,167	15,368,400

The Coniagas Mines, Limited.

Work done to date, and work done during the year ending October 31st, 1910:

	Total to Oct. 31, 1910	Total to Oct. 31, 1909	Work done during 1909-10
Shaft Sinking	539	473	66
Drifting	6,649	5,010	1,639
Cross-cutting	2,032	1,017	1,015
Winzes	232	174	58
Raises	233	110	123

ORE MILLED, TO OCTOBER 31ST, 1910.

Total to Oct. 31, 1910.	Total to Oct. 31, 1909.	Crushed during 1909-1910.
66,768	33,229	33,539

SURFACE DUMP.

Remaining Oct. 31. 1910.	Remaining Oct. 31. 1909.	Removed during 1909-1910.
14,020	14,796*	776

ORE AND ROCK HOISTED.

	To Oct. 31, 1910.	To Oct. 31, 1909.	To Oct. 31, 1909-10.
Milling Ore	66,768	33,229	33,539
Waste Rock	11,686	3,680	8,006
	78,454	36,909	41,545

Your Directors desire your approval of a by-law, No. 19, to permit a Director to act as superintendent or as assistant to the president.

The Coniagas Reduction Company, Limited.

The Coniagas Mines, Limited, owns the issued capital stock of the Coniagas Reduction Company, Limited, except six shares, issued to the Directors to qualify.

It is incorporated with Dominion Government charter.

Capital $250,000
Par value of shares 100

DIRECTORS:

R. W. Leonard, President, St. Catharines, Ont.
Dr. M. L. Hersey, Vice-President, Montreal, Que.
Alex, Longwell, Toronto, Ont.
F. J. Bishop, Brantford, Ont.
Welland D. Woodruff, St. Catharines, Ont.
R. L. Peek, Thorold, Ont.

The extensions and improvements to the plant, mentioned in Report for 1909, were completed during the year, and the plant is now doing excellent work.

Since your company started this plant, the price of white arsenic (of which cobalt ore, treated at its works, contains approximately 25 per cent.) has fallen from 7 cents to below 3 cents, and the price for cobalt (of which the ores, purchased at its works, carry from 2 to 12 per cent.), has fallen from $2.50 per pound for the oxide to almost a nominal price. Owing to these conditions, and the keen competition in the purchase of ore apart from the important advantage of handling the production of your own mine, the profits in this business are not what we anticipated. Under present tariff conditions, it is much more profitable to refine these raw products of the Cobalt mines in the United States.

During the fiscal year, the Coniagas Reduction Company treated 1,788.9 tons of ore, and shipped 2,726,-609.71 troy ounces of fine silver.

Year Ended October 31st, 1909.

WORKING ACCOUNT.

To Head Office and Administration	$14,480.26
" Mines Office and Supervision	11,445.22
" Camp Expense	15,637.93
" Lands and Roads	983.65
" Mining	115,249.65
" Fuel, Oil and Waste	25,095.85
" Milling	40,561.08
" Sale of Ore	8,606.92
" Legal Expenses	2,986.49
" Fire Insurance	3,270.62
" Transportation and Travelling	1,133.60
" Employees' Bonus	3,071.13
" Taxes and Royalties	14,002.31
" Loss and Gain	753,888.98
	$1,010,413.67
By Ore Revenue	$989,070.08
" Camp Revenue	16,882.26
" Rent	2,830.50
" Interest	1,554.49
" Cash Discounts	76.34
	$1,010,413.67

R. FOWLIE,
Auditor.

LOSS AND GAIN.

To Dividend No. 13	$120,000.00
" Dividend No. 14	120,000.00
" Directors' Fund	1,500.00
Balance	952,402.90
	$1,193,902.90
By Balance, October 31st, 1909	$440,013.92
Working Account	753,888.98
	$1,193,902.90

R. FOWLIE,
Auditor.
J. J. MACKAN,
Secretary.

The company has issued to the Coniagas Mines, Limited the 1,494 shares referred to in the last annual report of that company, and has reduced its floating debt by the amount of $64,000.00.

The Redington Rock Drill Company, Limited.

The Coniagas Mines, Limited, owns the controlling interest in the Redington Rock Drill Company, incorporated under a Dominion charter, with a capital of $100,000, in 1,000 shares of $100 each.

Your company is manufacturing these drills in its own shops at Cobalt, and fifteen of them are now working in your mine and giving excellent satisfaction in

every way.

A small force is constantly engaged in manufacturing these drills, and there is a good demand for them.

One drill has been under test for some months in competition with other types in an independent mine, and to date results have been very satisfactory.

R. W. LEONARD,
President and General Manager.

Mining in Coast Districts of British Columbia

The following notes give some information relative to mining in the Coast district of British Columbia last year:

Howe Sound.

Britannia Mining & Smelting Company.—This company continued exploratory work on its big copper property, near Howe Sound, during the greater part of last year. There was little new in connection with operations, though some ore of a different character to that usually found on one or other of the company's group was opened on its Bluff claim, and for several months the mill was run on this ore in an experimental way. A small tonnage of ore of the best grade was mined, and this, together with other ore mined in the course of development, and concentrate from the mill, was shipped to smelters. Altogether the year's output was a little more than 26,000 tons, and of this about 10,500 tons was smelted at the Tyee Copper Company's works at Ladysmith.

Vancouver Island.

Except coal mining, which was more active than ever before, there was no mining on a commercial basis on Vancouver Island in 1910. Some prospecting was done in the Alberni Canal district, also on the west coast of the island around Uchucklesat, and some fairly good showings of mineral were opened. A Victoria syndicate continued prospecting on some cinnabar claims near Sechart.

Tyee Copper Company.—The smelting operations of this company during 1910 resulted in regular increases in the tonnage of custom ore received and smelted. About 47,000 tons of ore and concentrates was received from all sources, British Columbia mines contributing 20,000 tons of that quantity. The marketable metallic contents of the ore smelted were: Copper, 4,500,000 pounds; gold, 5,300 ounces, and silver, 47,000 ounces. The plant at the company's smeltery was added to and further improved, making it thoroughly up-to-date in every respect. The prospects for the ensuing year are considered encouraging.

In view of the recent development of lead ore properties in the Coast district, the question of erecting a lead blast furnace is being considered; it has been decided that as soon as there shall be a sufficient tonnage of ore obtainable to warrant the expenditure, this addition to the company's smelting facilities will be made.

The company lately closed negotiations for a transfer of the leases of the Cornell group of gold-copper mines on Texada Island; it is expected that extensive development work will be done at this property in the near future.

Included in the Tyee Copper Company's activities last year was coal prospecting, in connection with which much exploratory work was done in the coal areas of the Gulf Islands—Galiano, Mayne, Saturna, etc. A diamond drill was kept in operation for several months, and in one instance a hole was bored to a depth of 1,000 feet.

Iron Ore on Vancouver Island.—Some time ago the Dominion Department of Mines published a report, by Mr. Einar Lindeman, on the iron ore deposits of Vancouver Island and vicinity, in which the more important occurrences of this mineral were described. Since then the discovery has been made, near upper Campbell Lake, of what has been described as giving promise of proving an immense deposit of magnetite ore of high-grade and purity. The discoverers are stated to have leased from the Esquimalt & Nanaimo Railway Company 1,290 acres on which this ore occurs. The iron is deposited along the contact of diorite and granite. It is stated that at one point, the soil having been stripped from the sidehill, there is shown a depth of iron deposit ranging to 70 feet. Analyses of the ore have given as high as 75 per cent. iron, but the average is about 65 per cent. It is claimed that the iron is exceptionally pure, an average sample analyzing: Sulphur, 0.04 per cent.; titanium, 0.08 per cent.; phosphorus, 0.0087 per cent. There is abundant water power obtainable from Campbell River Rapids, in the vicinity.

Coal Mining.—The total production of coal from Vancouver Island coal mines in 1910 was 1,616,000 long tons. No coke was made at Union last year. The largest producer of coal was the Canadian Collieries (Dunsmuir), Limited, with an output of about 926,000 tons. Next came the Western Fuel Company, which produced 512,000 tons. The Pacific Coast Coal Mines, Limited, made an output of 168,000 tons. The remainder of the production came from two or three small mines.

The market distribution of the Western Fuel Company's output was as follows: To British Columbia, 55 per cent.; to California, 28 per cent., and to other foreign parts, 17 per cent.

Early in 1910 the Pacific Coast Coal Mines, Limited, completed its railway from its South Wellington mine, to its shipping port, Boat Harbour, prior to which it was dependent on the E. & N. Railway for one mile of haul over its track. The Pacific Coast Company now owns seven and one-half miles of track, thirty 40-ton freight cars, and two locomotives. The company's highest output for a single day was 1,003 tons.

Texada Island.

Mining was fairly active during the greater part of last year on Texada Island; the largest producer was the Marble Bay mine, with the Northern Texada Mines, Limited, next. The latter company worked the Cornell and Copper Queen, under lease. A Seattle syndicate worked the Little Billy. The Northern Texada Company's mine and the Little Billy together shipped to the Tyee Copper Company's smeltery about 7,400 tons of ore of a gross value of $102,000. The Marble Bay's shipments totalled 10,380 tons. A new hoist and an electric light plant were put in, and three buildings—blacksmith, carpenter and machine shop—were erected; also new ore bunkers were completed.

Mining in Other Parts.

Among other parts of the Coast district at which mining was done last year were: Lasqueti, Valdes, Princess Royal, and Queen Charlotte Islands. There was little production made, though.

Mine Valuation and Experimental Metallurgical Demonstration

By R. B. LAMB.*

As mining and its associated art—metallurgy—have progressed under the influence of mechanical invention they have demanded the services of the technical engineer, and he has evolved a plan and advised exactitude.

The scientific training of the mining geologist, the mining engineer, and the metallurgical chemist has been directed towards mine valuation and probable metallurgical results; thereby enabling the valuing engineer to predict, with reasonable certainty, probable profits from the particular enterprise under investigation.

Owners do not yet fully appreciate the importance of the preliminary work of the scientific investigator, and are loth to spend money on an inquiry which to many appears unnecessary and wasteful.

Those who have engaged in the industry of mining for years and who have made it their life business, do not need to be persuaded that money spent intelligently on examination of ore bodies and investigation of mineral areas, is the most profitable expenditure made by the operator in the end—they know it.

The opinion of a farmer on a mine is about as valuable as that held by a Cardinal. The only opinion on a mine worth serious consideration, all others to the contrary notwithstanding, is that of the trained man who has devoted his time to the industry of mining. Primarily the man who has done this is the mining engineer. It matters not whether such a man be a graduate of a technical school or not. The one essential is that he has the experience and training that mark proficiency.

The work of mine valuation should be conducted with care and patience, without undue haste. It should never be the desire to have this work done cheaply—merely for the sake of a report. Work of such important nature takes time and requires checking if it is to mean anything. How often has a mining engineer been been required to report on insufficient data; how frequently has he been called upon to give conclusions on data collected by another; how many times has he rushed and harassed for his report; how often has he been requested to make a preliminary report pending his complete report—all on the plea of haste. This does an injustice to the engineer, to the mine, to the owners, to everybody.

Such reports are usually misleading. They do not represent the true facts, and they are a source of hard feeling and bitter regret.

The opinion of one engineer is usually not enough on any condition that presents mineral possibilities. It requires just as important investigation to turn a mine down as it does to recommend its purchase. Moreover, examinations on developing properties at long intervals are not sufficient; frequent examinations and investigations regularly made are necessary and should be undertaken if the highest results and best economic methods are to be obtained. Those interested in the ownership of properties are entitled to the benefit of such investigations and a moral obligation rests on the management to supply such information as the examinations disclose.

Mining is a quasi-public industry, and as such, the public is justified in demanding some measure of reliable publicity, such as can only be supplied by the engineer after due examination. Mining failures can be fully accounted for by followed advice tendered by the incompetent and the lay-man. The mining engineer—either the specialist or the general practitioner—has not steered the industry on the rocks. Despite so-called miners, experts, and others, whose business is to mine with paper models, the qualified engineer has turned the nose of the mining ship to the open sea and keeps it there. This has been largely attained by the intelligent work of the mine valuer.

Mine valuation has reached a high state of thoroughness in many countries. If we accept the best work carried on in many parts of Mexico, in South Africa, and notably in some of the Western States, such as Arizona, Montana, Colorado and Utah, as a guide—few disappointments will result.

The valuation of gold deposits presents most difficulty and requires the greatest care. The small weight of metal per given quantity of gangue matter and its irregular distribution in the ore-body are the principal factors rendering valuation of gold mines difficult.

Metallurgical inquiry is now the division of the industry enjoying a large share of the interest of the profession and occupying the spare moments of the investor. While the process-quack has enjoyed, and, to some extent continues to enjoy, the confidence of the mine owner, his occupation is passing with the metallurgists' ascendency. It was a slow and painful path over which the early metallurgical engineer plodded before partnership with his mining brother.

However, we now see the consulting engineer advising and demanding the employment of competent metallurgists to assist him and direct treatment problems. What is wanted, however, is more metallurgy. The miner should insist on time for metallurgical investigations as well as for mine examinations. He needs to demonstrate metallurgically—by laboratory and other methods—what can be accomplished with the treatment of the deposit under observation; how well it can be done, and at what probable cost. Metallurgical examinations are usually slower than mine examinations, and require scientific training, practical experience, and experimental demonstration applied to them before opinions of value can be expressed.

Mexico, South Africa, and Australia undoubtedly present the best instances of the progressive metallurgical spirit in gold and silver. They have continuously advanced practice by adopting new ideas—mechanical and chemical—which are themselves closely interwoven. During the past few years the United States has adapted and absorbed the progressive ideas evolved, and bids fair to outdo her rivals in the immediate future. Smelting successes have heretofore held back wet metallurgy north of the Rio Grande.

As the world progresses new demands are made. The coming demand from the prospective mining investor to the seller will be—more time for metallurgical demonstration.

*Mining Engineer, Traders Bank Building, Toronto, Ont.

CORRESPONDENCE.

December 29th, 1910.

The Editor, CANADIAN MINING JOURNAL, Toronto.

Sir,—In your issue of December 15th, you publish a friendly footnote in which you state that my report on the gold mines of Nova Scotia, made in 1905 for the government of that province, "was withheld from pub-

lication for the reason that it contained severe strictures upon certain operating companies."

Permit me to say that this statement is not correct. The fact that such an idea should be in the mind of one so well informed on Canadian affairs as yourself, is only another proof of the blunder made by the government in their failure to publish the report promptly. That delay was excused by reference to the San Francisco earthquake, to the incompleteness of the report, to the expectation of a supplementary report, and, in short, to a variety of reasons, all of which were imaginative, and intended simply to help the government out of an awkward position. I appreciated the humour of that position, but said nothing for three years, when, finally, a garbled version of my report was presented in a speech by the Prime Minister in Parliament; whereupon I wrote to you by way of protest. Since then I have seen references to the subject in the Proceedings of the Mining Society of Nova Scotia, in the course of which further inaccurate explanations and criticisms were offered, all with a view to discounting the opinion expressed by me in the interest of the Province of Nova Scotia, by whom I was paid to express such an opinion.

No more need be said, but I would ask you to use your influence to insist upon the publication of the report, and so end an absurd controversy. Those who read that report will need no further explanation from me.

Yours faithfully,

T. A. RICKARD.

Editor, CANADIAN MINING JOURNAL, Toronto, Ontario:

Sir,—You have several times requested me to write for the Journal, but as I could think of no subject of interest with which I am especially familiar, I have not done so.

In your issue of December 1st, in an editorial, entitled "Good Books," you say:—

"Bridge, auction bridge, poker, and other such devices of Satan, are as wasteful of time and energy in mining camps as elsewhere. Excessive card-playing is a misdirection of time, energy and money. It also softens the moral fibre."

As this is a subject wherein most men engaged in the mining business are interested, and since I have observed, during my long experience in a mining camp, the evils of poker playing, which I loath, it occurs to me that I might write my experiences, and give a few examples of what I have seen of the horrible evils of gambling, which, like the tentacles of an octopus, overcome the unfortunate victim and drag his soul to the depths of perdition. Even as the great Dr. Talmage inspected the gambling hells and dives of Leadville that he might warn Youth and Inexperience, which would naturally prefer his word to personal observation, so can I depict many scenes of ruin caused by the awful and degrading practice of gambling.

I could picture the horror and agony of soul when the uphappy one discovers that a straight flush beats four aces. I could describe the desperation of the unfortunate victim who has attempted to bluff when he held two deuces, and was called. I could describe the physical wrecks who have ruined their health by all night sessions of poker and stud.

With a pen, guided by sympathy and pity for human frailty, I could write volumes describing the human wreeks and derelicts I have seen.

If you care for any of this, I will contract for as many columns as you wish, for as long a time as you desire, at a stipulated price per word; guaranteeing that this price will not exceed that paid the mighty hunter, Roosevelt, for articles, the subjects of which are certainly not of as general interest as those upon which I propose to write.

Hoping to hear from you promptly as to the amount and price at which you are willing to contract. I am,

Youre truly,

FRANK C. LORING,

Home Life Building.

Toronto, Ont., Dec. 8, 1910.

BOOK REVIEWS

ELECTRIC CIRCUIT PROBLEMS—IN MINES AND FACTORIES, BY ELLIS H. CRAPPER, B. Eng., M.I.E.E., 169 PAGES. PRICE $1.00. PUBLISHED BY THE COLLIERY GUARDIAN CO, LIMITED, 30 and 31 FURNIVAL STREET, HOLBORN, LONDON, E.C. 1910.

To provide the mining engineer with an explanation of the principles, laws, and the methods of testing of the electric circuits of collieries, is the aim of this small book. A considerable amount of spaec has been given to the use and testing of cables. The book is written expressly to guide the colliery engineer. Sueh questions as insulation and circuit testing are amply discussed. The explanations are simple and easily understandable. The text is well illustrated with diagrams and half-tone engravings.

COMPRESSED AIR—THEORY AND COMPUTATIONS, BY ELMO G. HARRIS, C.E., 123 PAGES, PRICE, $1.50 NET. McGRAW-HILL BOOK COMPANY, 239 WEST 39TH STREET, NEW YORK, 1910.

This is a purely mathematical and theoretical treatise. The matter is original. It embraces brief expositions of formulae for work, effect of clearance, effect of heating air as it enters cylinders, work in compounding, and so on. Other general headings are: Measurement of Air, Friction in Air Pipes, Hydraulic and Centrifugal Air Compressors, Special Applications of Compressed Air, The Air-Lift Pump. Examples and exercises are appended, as also is a series of mathematical tables and friction diagrams.

Mr. Harris' book will be of use only to the technically trained. To such it will prove suggestive and helpful.

ELEMENTARY CRYSTALLOGRAPHY, BEING PART ONE OF GENERAL MINERALOGY, BY W. S. BAYLEY, PH.D., ASSOCIATE PROFESSOR OF MINERALOGY, UNIVERSITY OF ILLINOIS, 241 PAGES, COPIOUSLY ILLUSTRATED. PRICE —— NET. PUBLISHED BY McGRAW-HILL BOOK COMPANY, 239 WEST 39TH STREET, NEW YORK, 6 BOUVERIE STREET, LONDON, E.C. 1910.

Originally intended as an introduction to a textbook on mineralogy, the material that makes up "Elementary Crystallography" is now offered as an independent volume. The author has presented the subject in a manner that appeals to readers who have only a slight knowledge of mathematics, physics, and chemistry. The elements of crystallography, not the complete science, are outlined.

The Naumann System of parameter symbols is used instead of the more complicated Miller System of indices. This choice is wise. While the Miller system is essential to later study, the Naumann system is unquestionably the better suited to the beginner.

It is hardly necessary to add that the book is well printed and strongly bound. The names of the publishers imply this.

Those of us who struggled in our earlier days through Dana, will appreciate at its full value Dr. Bayley's conscientious effort to grade the road to a knowledge of crystallography.

INDUSTRIAL SECTION

A Western Installation

The Alberta Irrigation & Railway Company in 1908 carried out some large extensions to the plant at their No. 6 colliery, Lethbridge. Included in these was the installation of a twin Leonard Corliss engine to drive the ventilating fan.

During the past fifty years the world has made continued and unprecedented progress and the steam engine has not only kept pace with this advance but has also been one of the largest factors in stimulating it.

The distinguishing feature of the Leonard Corliss engine is its peculiar wrist plate motion and valve gear. By its use is secured such control and distribution of steam to the piston as has never been accomplished so successfully or so simply by any other means. This is best appreciated by those engineers who after trying

other schemes made it a study and learned what can be accomplished and gained by its use. With the wrist plate motion the valves are opened quickly, giving boiler pressure at closest cut off, and are kept in motion up to the point of extreme travel, permitting the cut off to be exactly determined and disengagements affected positively. Both the steam and exhaust valves are given a peculiar dwell movement where most needed.

The reversal of the valves is brought about without shock, the movement being easy from a state of rest to a rapid motion without straining the connections.

The Corliss valve has outlived the criticism of believers in flat siding surfaces who claimed that a boring bar and small engine to operate it were often required to true up Corliss valve seats. Corliss engines can be seen almost anywhere that have been in use for ten or twenty years without having valve seats rebored, and they are right and tight to-day. The Leonard Corliss valves are double parted, practically balanced and designed to take up their own wear. They can be quickly removed for examination and a separate and independent valve controls each part, so placed that a short passage leads, with the least amount of waste room, to the piston. The exhaust valves from their position drain the water from the cylinder and the steam valves are so constructed that they act as relief valves.

The general construction of these engines is shown in the accompanying cut, which also shows the massive pulley which drives the fan. The dash pots are located above the floor line, giving easy access. The plungers have no screws or nuts to work loose and cause trouble and every care is taken to ensure their prompt action. Thus the valves are closed instantly at the proper moment to produce the most economical results.

The governor is of the high speed variety having several revolutions to every one of the engine and thus giving very effective regulation. The speed is readily adjusted and the one governor is connected to the valve gear on both frames. The crosshead moves between bored guides, preserving both vertical and cross alignment. The shoes are adjusted by long solid wedges operated by compensating screws which can be locked in any position. The crosshead, if necessary, can be readily removed.

Some idea of the weight of the engine frames can be obtained from the cut and it will also readily be seen that the metal is so distributed as to give ample strength without undue weight.

The above mentioned engine is built by E. Leonard & Sons, the well-known engineering firm of London, Ont., and drives a large mine ventilating fan built by the American Blower Company, of Detroit. This fan is housed in separate room from the engine and the air is conducted in a concrete conduit from fan to mine. This conduit is entirely separate from the working shaft of the mine. The whole installation is one of much interest and will doubtless open the eyes of a good many as to the vast scale in which coal mining operations are carried on in the Crow's Nest district and vicinity.

Belliss and Morcom

Messrs. Belliss & Morcom, engineers, of Birmingham, who have within the last few years introduced a steam turbine of their own design, report very successful progress with it in every respect. Within the last few weeks they have secured an important order from the Birmingham Corporation electricity supply department for eight 1,000 k.w. Belliss exhaust steam turbines, running at 1,500 r.p.m., to work in conjunction with a similar number of Belliss 1,500 k.w. reciprocating engines in the Summer Lane Station, Birmingham. These exhaust turbines will run in parallel with the alternating current reciprocating sets in the station, making the total capacity of each set 2,500 k.w., and bringing the ultimate total capacity of the station, comprising Belliss engines and turbines exclusively, to over 30,000 k.w. Repeat orders have also been received for Belliss high pressure steam turbines. The first Belliss high pressure turbine built to a customer's order was for

the Aston Manor Corporation, and gave such satisfaction that a repeat order was placed.

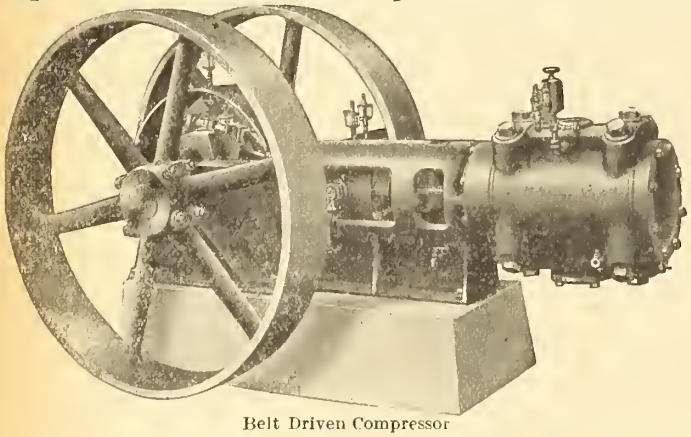
Quite recently the city of Johannesburg in South Africa, placed a repeat order for a Belliss live steam turbine of 3,000 k.w. capacity.

Messrs. Laurie & Lamb, Board of Trade Building, Montreal, are Canadian agents for this firm.

Small Air Compressors for Heavy Duty

The accompanying illustrations show the new single steam and power driven Sullivan air compressors, classes WA-4 and WG-4, which have recently been placed upon the market.

These compressors have been designed especially for the severe service imposed on machinery of this class by mining work. Air power service demands, above all else, continuous and reliable performance. Troubles with the compressor mean idle tools and idle men, causing waste which soon evens up the difference in the



Belt Driven Compressor

purchase price between a good air compressor and a poor one. The air compressors we describe are of small to moderate capacity and are built for various pressures running from 10 to 100 pounds per square inch.

The manufacturers have realized that compressors of this size inevitably receive less careful attention than larger and more costly machines, while the work demanded of them is no less continuous and wearing.

An examination of these machines will further show that the makers have had two objects in view: to produce an air compressor as simple and as durable as possible, and one in which the elements constituting efficiency should be embodied to the greatest possible extent.

These compressors consist of a heavy frame, supporting the bearings and crank shaft at one end and the steam and air cylinders at the other. The machines are of the centre crank type, and a heavy steel guard surrounds the crank and prevents oil from being thrown upon the floor.

In the steam-driven machines, the plain steam slide valve is controlled by an eccentric on the shaft, with which it is connected by a simple but satisfactory arrangement of valve rods. The air cylinder is placed outside the steam cylinder, and is connected to it by a heavy distance piece. The air cylinder is supported on a sub-base which runs the entire length of the compressor, and maintains proper alignment of all the parts.

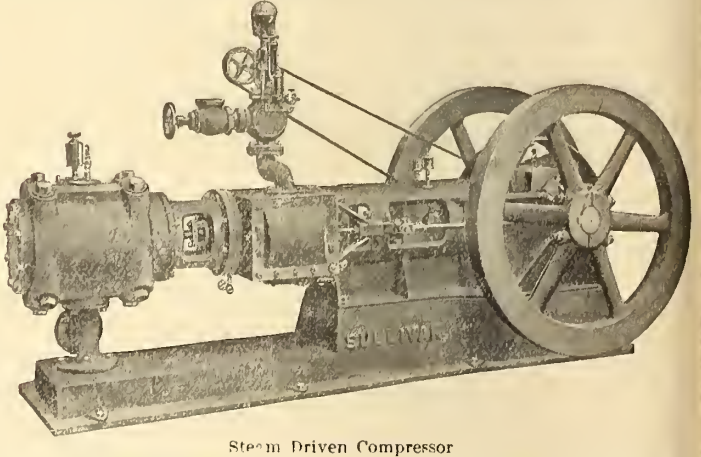
In the belt-driven machines, the air cylinder is attached directly to the rear end of the frame, and all the working parts, such as the crank shaft, cross head, connecting rods and main bearings are of dimensions and contain an amount and quality of material which provide a factor of safety very much higher than is considered necessary in standard compressors of much larger size. The result is that these machines may be depended upon for continuous service year in and year out, and that the danger of breakage from causes within the compressor is reduced to its lowest terms. All parts liable to wear are arranged so that wear may be taken up fully and with the least possible trouble, so that even after these machines have been in service for years, all their working parts remain accurately aligned and in condition to operate with practically their original efficiency.

Particular attention is directed to the design of the cylinder, the inlet valves being at the bottom and the cylinder heads are also jacketed over their whole surface.

This feature keeps the heat generated by compression within safe limits. The air valve mechanism consists of radial automatic poppet valves for both inlet and discharge.

These valves are placed close to the ends of the cylinder, the inlet valves being at the bottom and the discharge valves at the top of the cylinder. The valves act in a true radial direction to the axis of the cylinder, and reduce to a minimum the losses in efficiency made necessary by clearance.

The ports or pockets leading to the valves are very short and direct, so that practically no air is trapped after compression instead of being expelled from the cylinder. The valves and their parts are so made that in case of breakage it is impossible for the broken pieces to enter the bore of the cylinder. The valves are held in place in cages, which seat, by means of taper fits, in the cylinder walls. To remove these valves it is only necessary to unscrew the plug on the outside of the cylinder, when the entire valve and cage may be withdrawn for inspection or regrinding. The main bearings have adjustable caps and are heavily lined with a good grade of Babbitt metal. They are bored



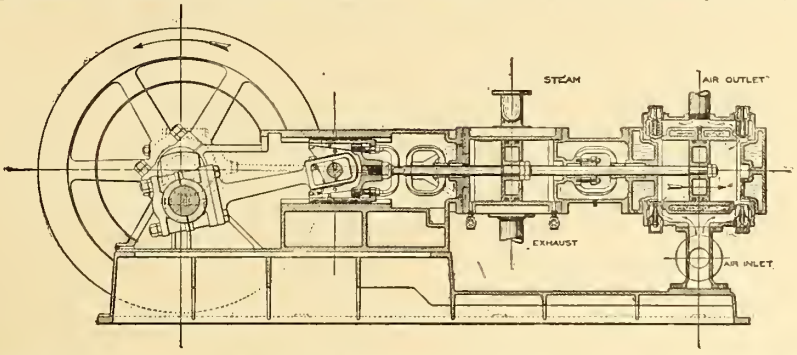
Steam Driven Compressor

out at right angles to the centre line of the piston rod by a special fixture which assures accurate alignment. A box pattern cross-head is used, being the same type as that employed in cross compound machines of the highest grade. It is fitted with adjustable shoes and is regarded as unexcelled in wearing qualities and ease of adjustment.

The steam machines are governed by a split ball throttling regulator with an extra cylinder which places the throttle valve under the influence of the air receiver pressure. Ordinarily, the governor varies the speed of the compressor to supply the demand for air, the halves of the ball by their centrifugal action pre-

venting the compressor from exceeding a safe speed.

The power-driven machines are fitted when desired with an unloading device placed on the air inlet of the compressor. This device is set to shut off the incoming air to the compressor when the receiver pressure exceeds a pre-determined point. This enables the compressor to run at regular speed, an essential in power-driven machines, compressing no air until the receiver pressure again falls below the point set. This secures important reductions in the amount of power used when the compressor is furnishing air intermittently. The device is smooth and even in its action, throwing the load off and on the compressor without sudden jar or strain.



The machines described are fitted with sight feed oil cups on important bearings and on the air cylinder. They are so simple in their mechanism as to require only the most ordinary care, but as stated above are made of the very best materials which can be secured for the respective purposes of each part and they are manufactured and assembled with the same care employed on the largest and most expensive machines manufactured.

Machines of similar capacity are furnished for operation by electric motor, or gasoline engine, as desired.

Personal and General

The respected Dean of the Canadian Mining Institute, Major R. G. Leckie, is to be felicitated upon the arrival of a small daughter.

Mr. G. G. S. Lindsey left for England on January 6th. He will return to Toronto before the end of February.

Mr. Phil. H. Moore, E.M., has been appointed Canadian representative of the McKiernan-Terry Drill Company, 115 Broadway, New York. Mr. Moore has made the King Edward Hotel, Toronto, his temporary headquarters.

Mr. C. S. Herzig has removed his office to 42 Broadway, New York.

Mr. F. H. Sexton, director of technical education for Nova Scotia, is to accompany the Technical Education Commission on its visit to Europe.

Mr. Joseph C. Houston, late of the Right of Way, Cobalt, is at present at 163 Westminster Avenue, Toronto. Mr. Houston is one of the pioneers of Cobalt. He has lately returned from Mexico.

Mr. W. J. Woolsey, manager the Robertson Asbestos Mining Company, Thetford Mines, is absent on a business trip through Great Britain, the Continent, and the United States. He will not return until late in February.

Mr. E. T. Corkill has returned from the West, accompanied by Mrs. Corkill.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay.—The output of the Dominion Coal Company's collieries for 1910 was 3,529,700 tons. Compared with previous years the figures are as follows:—

1907	3,541,253
1908	3,555,068
1909	2,734,774
1910	3,529,700

The outputs of the individual collieries were as under:—

No. 1	578,942
No. 2	687,918
No. 3	277,027
No. 4	395,346
No. 5	364,926
No. 6	181,331
No. 7	180,466
No. 8	156,590
No. 9	327,353
No. 10	160,271
No. 12	162,429
No. 14	47,664
No. 15	9,037
	3,529,700

The output at No. 1 Colliery was the largest since the fire in 1903. The output of No. 7 (Hub Colliery) was the largest ever obtained from that mine. It will be noticed that about 220,000 tons of the total output was obtained from mines Nos. 12, 14, and 15, which are situated in the new coal field at Lingan. At some of the older mines, notably Nos. 3, 5, and 8, the output shows a considerable falling off and will continue to do so, but the consequent reduction in output will be more than made up by the contribution from the newer mines.

The U. M. W. strike was called off at the end of April, and the loss in output due to the strike amounted to probably 300,000 tons. Had conditions been normal, the yearly output would easily have reached 3,800,000 tons. If the demand for coal continues to be good and trade conditions continue to be as prosperous as at present, the output for 1911 should be somewhere between 3,750,000 and 4,000,000 tons.

Explosion at Sydney Mines No. 3.—An explosion occurred on January 3rd about four o'clock in the morning in the No. 3 Colliery of the Nova Scotia Steel and Coal Company at Sydney Mines, which caused the death of eight men. At the time of writing only six bodies have been recovered, but there can be no doubt but that the two men who are still missing were killed by the explosion. The explosion was a very severe one and completely wrecked the main deep below No. 12 level.

The severity of the detonation may be gauged from the fact that a small hoisting engine which was near the end of No. 12 level was lifted bodily from its bed and displaced a distance of over twenty feet. At the time of writing the men occupied on repair work had penetrated as far as the sixth cross-cut on No. 12 level, but their progress is very much hampered by extensive falls of roof. The bodies of six shiftmen were found all together under the debris on the deep near the end of No. 12 level. It is thought that the bodies of the two deputies who are missing will be found in No. 14 level. Until the exploration has been completed and the two missing men have been found, the cause of the explosion cannot be ascertained. The mine had been idle on the Sunday and Monday previous to the explosion on account of the New Year holiday, and it is thought that gas may have accumulated and been ignited by a defective safety lamp, but until the workings have been thoroughly explored and an investigation has been held the cause of the disaster can only be a matter of surmise. The workings of No. 3 Colliery are entirely submarine and safety lamps only are used.

The Nova Scotia Company has twelve Draeger helmets and the first parties to descend the mine after the explosion used these for exploration purposes before the ventilation was restored. The extensive falls which blocked the deep rendered it impossible to do any rescue work, and nothing could be accomplished until the ventilation had been restored up to the point where the falls occurred. This was speedily done and every effort was made to discover the missing men, there being a faint hope that they might be found alive behind the falls. This hope was speedily dissipated by the finding of the six dead bodies as related above. It is extremely fortunate that the explosion did not occur at a later hour, as had this been the case the loss of life must have been severe. The usual day shift numbers five hundred men.

The explosion appears to have been very local in its character, but from all accounts it was one of the severest which has yet been experienced in Cape Breton coal mines. It has been for many years a matter for congratulation that Cape Breton coal mines have been free of the disastrous explosions which have characterized other coal fields, but this incident is a significant reminder that this fortunate immunity should not be presumed upon.

ONTARIO.

Cobalt.—The Green Mechan and Red Rock properties are being worked again by Mr. A. M. Thomson on a royalty basis. Twelve men are at work and operations have commenced at the 100-foot level. A royalty of ten per cent. is to be paid on ten-ounce ore, 50 ounces, 17½ per cent., and all over 50 ounces, 25 per cent. In the event of royalties going over $50,000 Mr. Thomson has the option of another five-year lease.

The Gould Consolidated lease on Cart Lake is to be worked again. It is stated that $10,000 is already on hand to work the property and that $30,000 will be spent in operations this winter. A capable engineer will be engaged to superintend the work.

On the last day of the old year the shipments totalled 418.96 tons and 13 cars left the yards. The shipments were made from the Nipissing, McKinley-Darragh, Cobalt Lake, Coniagas, Temiskaming, Crown Reserve, La Rose, and Trethewey.

A new vein of calcite carrying some smaltite and native silver has been cut on A90 of Gillies Limit or the Webb property. Considerable work is being carried on at this claim.

The Nipissing mines and La Rose Consolidated have yielded net profits for the year of $3,400,000. The Nipissing contributed to the total $2,228, 092 and La Rose $1,138,240.

The quarterly report of the City of Cobalt ended December 31st, shows a gain of $17,000. At the end of September the balance was $11,870, at the end of December, $28,525.21. Returns from smelters amounted to $51,850.74, while ore at smelters is estimated at $19,000.

Some of the most remarkable ore ever seen in Cobalt camp is now being mined at the Lawson. No. 8 vein, at the 200-foot level, has two ore shoots, one 25 feet long, the other 21 feet. The average width of these shoots is eight inches and values will go over 5,000 ounces. In places the vein is a foot wide of 12,000-ounce ore. Another good vein has also been cut along the Foster line. It is about two inches wide, shows up well for forty feet and there are occasional patches of high grade.

The Hudson Bay Company has cut another rich stringer at the 200-foot level. This is the fourth new vein discovered this fall. The new mill should be running by the end of this month or the beginning of next.

The sale of the Standard Cobalt mine, fixed for December 28th, was postponed and attempts are now being made to declare the company solvent. It is understood that a prominent New York engineer has been offered the post of consulting engineer and that the mine is likely to resume work on a legitimate mining basis.

The annual report of the McKinley-Darragh, which will be published at the end of this month, will contain a statement by Mr. P. A. Robbins, the retiring general manager, that there are three years' ore reserves in sight at the McKinley-Darragh alone. The cost per ounce of silver has not been reduced. The production will be in the neighbourhood of 1,700,000 ounces. The average tonnage milled is now 127.25, and, while the mill heads are running about the same as at the beginning of the year, the tails have been cut down from 7.24 to 5.80 ounces.

From a cross-cut, 510 feet below the top of the cliff, the King Edward has cut one of its veins. It contains some smaltite, but does not show up very well so far.

The mill report for November for the Buffalo mines reads: Mill ran 591 hours; ore milled, 3,417 tons; average assay per ton before milling, 32.03; ounces of silver recovered, 87,266 ounces; ounces silver shipped, 117,099.07 ounces.

The Empire Cobalt Mines has issued a statement to the effect that work will be resumed. Treasury stock is to be sold to defray the cost of development.

The production of the Buffalo for the first six months of the old year was 850,000 ounces, against 700,000 ounces for the same period of 1909. Development on the 300-foot level continues most satisfactory. No. 19 vein frequently shows nine inches of high-grade smaltite ore in the nine feet of milling rock.

The Hargrave has picked up the Kerr Lake No. 3 vein within its own territory. Two short but very rich ore shoots have already been passed through and driving on the vein still continues. Good values are being obtained by the Drummond on the extension of the No. 1 vein of the Hargrave.

Several discoveries of importance have been made on the Beaver mine within the past month. On the 250-foot level some distance from the main workings two or three inches of high-grade have been cut in a vein which on the surface showed nothing but cobalt and bloom. On the 300-foot level two shoots of high-grade ore have been driven through and good ore is being stoped out. A high-grade car will be shipped early in the new year.

The Coniagas annual statement shows a surplus of almost a million dollars and an increase of 3,000,000 ounces estimated ore in sight. The cost of production was lower by 13.28 cents per ounce. The total revenue was $1,010,000, and net profit, $753,888.

Porcupine.—The Vipond stamp mill is now in operation. About ten tons of hand-picked ore was all ready for the time when the mill should commence to operate, and it is expected that the Porcupine gold mines will be able to show results soon.

The Healey group of eight claims in southeast Deloro, the Ritchie four claims and the two Mancha claims have been taken over by a syndicate of Haileybury and Kentucky men.

Mr. A. J. Young, of North Bay, and Cyril T. Young, of Haileybury, have purchased two claims of W. S. Edwards for $10,000 cash. The claims lie near the Dobie claims in Tisdale on the edge of the Reserve.

The Hudson Bay, the Trethewey, and several other strong Cobalt interests are developing claims in the Redstone River section. A small settlement is starting up and a store and stopping place are being built.

Several finds of visible gold have been made on the Martin claims lying east of Simpson Lake and north of the Preston and Brydge properties. The claim is owned by S. A. Powers, L. G. Mayhew and C. T. Young, all of Haileybury.

There are now no less than seven townsites located round or in the vicinity of Porcupine Lake. There is a lively trade in real estate and the announcement of the route of the new Porcupine railroad is awaited with the greatest interest.

The Scottish Ontario, the first property to start operations in the Porcupine camp, has cut its vein at the hundred-foot level. At a depth of 47 feet, the vein dipped out of the shaft and was cut in a forty-foot long cross-cut. While the quartz shows no free gold it pans well.

Two shafts are being sunk on the Armstrong McGibbon property with the object of discovering, as soon as possible, how the ore runs below. Thirty-five men are at work and Mr. C. E. Watson is installing his small plant. The most spectacular portion of the find has been housed in to prevent high-grading.

To operate the old telephone lines from Matheson to Porcupine a company has been formed capitalized at $40,000. Communication has been reopened and it is stated that good business is being done.

A daily mail delivery in Porcupine has now commenced. It is better than the bi-weekly distribution, but the service is very poor yet.

Failure to do settlement duty on the Richard Mulchany veteran claim in Tisdale has led to the forfeiture to the Government of that valuable property. The lot adjoins Lake Simpson and is valuable on its location alone. It is thought that the Government may intend to lay out a townsite on Lake Simpson.

There is now a very lively interest in Thomas Township and good finds are reported. The dykes are wide and the values from $2 to $5.60, though low, are very uniform.

Mine owners are already commencing to take precautions against high grading. All gold showings in the Dome are plastered with black paint, so that any high-grading can be at once detected. On the Tisdale property the big lead will be housed in. Mr. Timmins has made the proposal that all mine owners should insist on all miners changing their clothes when they come up from below.

The Quebec Government has issued a report stating that free gold and sylvanite have been discovered in quartz bodies on Lakes Fortune and Renault, near the north end of Opasatika Lake, 45 miles from Haileybury. Mr. Robert Harvie, who made the examination, stated that but one specimen was discovered with visible gold, but it was quite representative. The gold occurs in combination with the sylvanite. Several properties have been working in this section of Northern Quebec for some time. The Porcupine Exploration and Mines Company has taken an option on three Deloro claims and has added them to the Herleahy-McPharland group it is already working.

A considerable amount of machinery is going into Munro Township. The Detroit syndicate is taking in two small boilers and a compressor, and the Gold Pyramid Mining Company a small mill.

The Porcupine trail is crowded after the New Year holidays, Fifty stages are running and they are crowded all the time.

The report of the quarantine of Porcupine has not foundation in fact. A suspect case found in a local restaurant has been isolated and an isolation hospital has been established.

Gowganda and Elk Lake.—The road into Gowganda is now in excellent shape. The road has been considerably shortened and it can now be made from Charlton in nine hours.

Sixty teams were, at the beginning of the month, on the trail taking in machinery.

The Hudson Bay Company, on its property at South Hangingstone Lake, is sinking three shafts on three promising veins. A boiler and compressor plant will be installed with all speed. Three tons of 3,000-ounce ore have already been bagged.

The machine shop at the Bartlett mines has been destroyed and the engine room damaged by a fire that broke out there last month. The management states that the machinery was only slightly damaged, and the net loss will only be $1,500. Mining operations will proceed as usual.

The Millerett has shipped two more cars of ore and the Miller Lake O'Brien has one on the road. Over 500 tons have now been despatched from the Gowganda camp.

The La Brick property will resume operations early this month. The La Brick belongs to the interests controlling the King Edward mines at Cobalt.

At Elk Lake it is reported that the Silver Alliance, Toledo and United States Silver Mining Company, all holding properties near the line of James and Tudhope, will resume operations this year.

Kenora.—The Kenora mining division and the adjacent lands in Manitoba between Ingolf and Rennie, round West Hawk Lake and Star Lake, are at present giving rise to speculation and rumour as to the probability of a second boom there.

The Mikado mine is being operated by the Kenora Mines, Limited, and the management is so much to the liking of the present shareholders that all treasury stock has been withdrawn from sale, and, although the mine has only been in operation under the present company for three months, and they have not at present got a cyanide plant, gold bullion to the amount of $3,911 has already been sent into the bank here, while Mr. Nickerson, the manager, reports that without the cyanide plant he can only extract 25 per cent. of the gold, and advises shutting down the mill and proceeding with development work only until the spring, when the new cyanide plant is to be installed.

This course will, undoubtedly, be followed, since a large sum has just been paid to the English syndicate formerly owning the mine, showing the Kenora Mines, Limited, shareholders to be amply satisfied with the showing of the mine and to have the utmost confidence in the outcome of purchasing and operating this mine.

Mr. Nickerson reports the presence of bismuth, molybdenite, arsenic, copper and iron pyrites in the ore, a splendid body of which has been located on the 7th level, 16 feet wide and extending upwards almost vertically to the 4th level, besides showing signs of strengthening as the depth increases.

On the hanging wall there is a streak of rich ore between 18 inches and 2 feet wide, giving values between $50 and $75 per ton, while the rest of the lode averages between $5 and $6, giving an average value for this immense body of ore of $20 per ton.

Locations K47 and K49 in Clear Water Bay, Lake of the Woods, are now under development and showing some good values. The main shaft is down about 50 feet, and the vein strengthening.

Oscar Cronlund is developing what promises to be a splendid property on Hell Diver Bay, Shoal Lake, not far from the Mikado. While development work only is being done here, there is enough free gold to make one expect interesting results from these claims.

Another property, "The Ophir," which formerly produced some of the richest specimens from this country, but which had to be closed down on account of litigation, has again been started up and a gang is now at work sinking. Great things are expected from this mine and rightly so from the richness

of lode right on the surface. There are some test pits and a 20-foot shaft already sunk and the work now going forward will open the property up and give the owners a chance to gauge the real value of the mine.

A new company is being formed to be known as "The Eagle Lake Consolidated Mines, Limited," to operate properties on Eagle Lake, which is partially developed and so far has shown itself to be well worth investigation. Mr. Newton Higbee is managing director, and was the original owner, and associated with him is Mr. Harding Rideout, of Kenora.

BRITISH COLUMBIA.

Cariboo.—Operations at Mr. John Hopp's Lowhee placer mine in 1910 were on a much larger scale than in earlier years. About 200,000 cubic yards of gravel was moved, as compared with 60,000 yards in 1909. More improvements were made, ditches having been extended, reservoirs constructed, and more plant put in. On the Mucho Oro property water was so short last fall that the quantity of gravel moved was much less than in ordinary seasons. The Forest Rose mine, also, suffered from a shortage of water, so the amount of gold recovered was smaller. At Mosquito Creek, the Alabama and Williams hydraulic mines were worked with fairly good results, 50,000 yards of gravel having been moved, notwithstanding unfavourable water conditions.

The hydraulic mines on China Creek and Nugget gulch are reported to have had a fair run for the season. The Waverley Hydraulic Company made a bedrock cut through a rim into another channel and opened ground that promises good results.

Other hydraulic properties worked were the old South Wales, near Van Winkle; H. H. Jones' property on Last Chance Creek, and several more in different parts of the district.

The Lightning Creek Gold Gravels and Drainage Company has been sinking a shaft at Wingdam, and is reported to be nearing ground from which rich prospects have been obtained.

Atlin.—The estimated amount of placer gold recovered in Atlin district in 1910 was $260,000, which is larger than in either 1909 or 1908. McKee, Pine and Spruce Creeks are the larger producers, the yield of other creeks not being nearly as much. The operations of the North Columbia Gold Mining Company are stated to have been successful, that company having had the benefit of an abundant water supply. Quartz mining received a little more attention last year than previously, and in several cases with promising results.

East Kootenay.—Last year's production at the St. Eugene mine totalled 77,500 tons of ore, practically the whole of which was put through the concentrating mill, the product having been about 12,600 tons of lead concentrate, which was shipped to the Consolidated Company's smeltery at Trail. This production compares unfavourably with that of 1909, in which year there was about 150,000 tons of ore mined and shipments to the smeltery totalled nearly 22,000 tons.

From the Sullivan group, which was not a producer in 1909, between 24,000 and 25,000 tons of ore was taken and sent to the smeltery. This ore contained about 172,000 oz. of silver and 8,494,000 lbs. of lead. Operations were commenced in December, 1909, and the first shipment of ore under the Consolidated Company's lease was sent out about January 1. Since then a skip hoist for hoisting coal from the railway track to the top of the lower terminal of the aerial tramway has been put in. A bin to hold 100 tons of coal was built at the mine, and a 200-ton ore storage bunker at the lower terminal of the tramway. At the mine, electric lights were provided for the surface plant. A skip in the shaft, a belt conveyor for hand-sorting ore, and a rake, attached to a double-drum hoist for moving the ore in raises or stopes where the footwall is too flat for the ore to run by gravity, were added to the mine plant.

Ainsworth.—Prior to the fire which, last summer, destroyed the Whitewater concentrating mill and so damaged the Kaslo & Slocan railway as to prevent trains being run to Whitewater, the following shipments were made: Whitewater mine, crude ore 184 tons, silver-lead concentrate 47 tons, zinc concentrate 290 tons; Whitewater Deep mine, crude ore 275 tons, silver-lead concentrate 357 tons, zinc concentrate 2,052 tons. The total metal contents of all the before-mentioned shipments were: Gold 75 oz., silver 104,583 oz., lead 642,028 lbs., zinc 1,920,078 lbs. The Whitewater lease was abandoned by the lessees after the destruction of the mill, and the Whitewater property(outcrop) reverted to the English company owning it (The Whitewater Mines, Ltd.). The "deep" of the Whitewater vein was developed up to the time of the fire, and development is being continued throughout the winter by The Deep Mine, Ltd. Since the fire the latter company has been engaged in making necessary repairs to power plant and equipment, this involving the construction of practically new equipment. Further development is being done this winter below the "outcrop" property by J. L. Retallack & Co. In the property controlled by this firm, about 400 feet of development tunnels and raises was driven prior to the fire. The Deep Mine, Ltd., also did some 300 feet of development about the same time, but when the vein was cut by this company, the rush of water drove the miners out and prevented work from being continued.

Slocan.—Work done in 1910 on the Panama, which is situated high up on the mountain above Bear Lake, was about 500 feet and 75 tons of high-grade ore was mined. Of this, 55 tons was shipped to Trail; its average silver content was 200 oz. per ton. Snow having fallen in sufficient quantity to make the hauling good, ore is being hauled from the Rambler-Cariboo mine to the Canadian Pacific Railway at Three Forks. More than 350 tons had been hauled half-way before the snow came. It is expected that while the road shall continue good enough for hauling to be continued, the output will be fully 200 tons a month. There is much ore available, shoots having been opened on several levels down to the 1,050-foot. The further development of the Washington mine was continued during the greater part of last year. The total footage of work done was more than 1,300 feet. No ore has been shipped from this property for some time, but the mine is being prepared to make a large production later.

No other mine in the Slocan has attracted so much attention during recent months as the Standard, a description of which was published lately in the Canadian Mining Journal. The sensational accounts sent out last month from Spokane, Washington, to the effect that a 65/100th interest in the Standard group had been sold on a basis of $2,500,000 for the whole, it has since transpired were quite unwarranted. The truth is that an option has been taken on a controlling interest, probably that mentioned, but the statement that a large sum of money has been paid is at variance with the facts. There is reason to believe that the Spokane syndicate that has obtained the right to purchase control will work more men on the property so as to develop it more quickly and so enable them to sooner determine more concerning the big shoot of ore that has been opened on No. 5 level.

Rossland.—A brief summary of the results of mining in Rossland camp to the end of 1910 gives the following information: The records of production of Rossland mines to the end of 1909 show a gross tonnage of 3,318,007 tons of ore, valued at $46,352,947, or nearly $14 per ton general average value. If the production of 1910 be added, an aggregate tonnage of more than 3,500,000 tons, and a gross value of approximately $50,000,000, will be the result. Of this large quantity, the production of the Le Roi mine totals about 1,550,000 tons, value $20,600,000, and that of the Centre Star-War Eagle group, a rather larger tonnage and higher value. Then the mines of the Le Roi No. 2, Ltd., have produced, roughly 300,000 tons of ore, of a total value of $6,000,000, or more. The Jumbo, Rossland-Koo-

tenay, Rossland-Great Western, Velvet-Portland, Spitzee, White Bear, Giant, I.X.L., Evening Star, and others, together contributed the remainder of the aggregate production shown above. Notwithstanding the decision to wind up the Le Roi Mining Company, Rossland is still an important mining camp, and there is good reason to think it will long continue to be productive, for several of its mines are known to still have large reserves of ore.

Lardeau.—The Ferguson Mines, Ltd., in 1910, did about 1,600 linear feet of development work and mined between 800 and 900 tons of ore of shipping grade. The winze from the lower Sunshine tunnel of the company's Silver Cup mine entered the ore, while drifts from it also opened ore shoots. A commencement has been made to ship ore from the Beatrice mine, situated in the vicinity of Camborne, Fish River.

Boundary.—The total tonnage of ore from the mines of the Boundary district for the year 1910 was about 1,680,000 tons. In round figures the proportions of the respective mining companies were as follows: Granby Co., 1,100,000; British Columbia Copper Co., 383,000 tons; Consolidated M. & S. Co., 143,000 tons; New Dominion Copper Co., 54,000 tons. With the exception of that produced from the mines of the Consolidated Co., this large quantity of ore was smelted at the works of the Granby and British Columbia Copper companies.

Similkameen.—Mr. Chas. F. Law, of Vancouver, who lately returned from England, is arranging for commencing work on the property of the British Columbia Platinum Company, situated at the mouth of Slate Creek, near the confluence of that stream with the Tulameen River. Mr. Law has succeeded in interesting in this enterprise, Messrs. Johnston & Matthey, the well-known, old-established firm of platinum refiners, of London, England. The platinum-bearing gravels will be prospected with a Keystone drill. Slate Creek is stated to be the most highly auriferous and platinum-bearing stream in the district. The expectation is that an important platinum-producing property will be developed here and that British Columbia will hereafter supply an appreciable amount of platinum to the market, which is now largely dependent upon Russia for this mineral.

Princess Royal Island.—During 1910, Mr. A. B. Clabon and associates acquired nine mineral claims, known as the D.L.S. group, situated at or near Surf Inlet, Princess Royal Island. Two parallel veins had previously been opened on the Bluff claim of the group, chiefly by adits and a shaft. The adit on the upper, or west, vein was driven 140 feet, while the length of that on the lower, or east vein, was in 293 feet. The shaft was commenced at an elevation of about 265 feet above the lower tunnel and was sunk 60 feet, which leaves a distance of 205 feet between the bottom of the shaft and the lower adit. The difference in elevation between the two adits is about 100 course through the group. The usual outcrop is given as being feet. The veins are stated to run more than 6,000 feet on their 18 inches to 4 feet, but where opened shows a width of 6 to 12 feet. The ore is quartz, with iron pyrites containing gold and a small quantity of silver. A list of assay results from 40 samples shows value varying from $1 up to $207.20 per ton, the average of the lot being nearly $40 per ton, though only 15 of the 40 gave a return of $20 or over. The ore is regarded as of a character better adapted to concentration than to stamp-milling for the recovery of its valuable contents. The development done in 1910 was not considerable, but it served to show that where cross-cut in the lower adit, at nearly 200 feet from its portal, the vein is 16 feet in width and assays of average samples yielded a value in gold of $15 per ton. A winze sunk 20 feet in the vein from the floor of this cross-cut showed the occurrence of similar ore.

MINING NEWS OF THE WORLD.

UNITED STATES.

New York City.—At a meeting of the Tisdale Mining Company, Frank C. Armstrong, of New York, was elected president, E. P. Earle, president of the Nipissing Mines Company, vice-president, and D. Lorne McGibbon of Montreal and Samuel J. Dobie of Haileybury, directors. This company takes over the properties of the Armstrong-McGibbon syndicate, the 17 Dobie claims in Tisdale township, Porcupine mining district. All of the unissued treasury stock was taken up by the original syndicate, which also undertakes to provide the necessary money to develop the property. Charles E. Watson, who has been identified with the management of some of the most important properties in the Cobalt district, has assumed the management of the Tisdale Mining Company and will direct developments of the properties of this company.

Globe, Ariz.—While it was the intention of the Miami Copper Company to have its concentrator in shape to start at least one unit of its 2,000-ton mill by the first of the year there yet remain so many details that it seems that operations will not start before February next.

El Paso, Texas, December 28th.—An explosion of dynamite stored in a pit at the El Paso smelter has buried under the debris a score of workmen, many of whom, it is believed, have been killed. The smelter is the property of the American Smelting and Refining Company.—Reuter.

Washington, D.C.—Statistics and estimates received by the United States Geological Survey from all plants known to produce blister copper from domestic ores and from all Lake mines indicate that the copper output from mines in the United States in 1910 will fall considerably below the output of 1909, but will exceed the production of any previous year. The figures showing smelter production, which have been collected by B. S. Butler of the Survey, represent the actual production of each company for 11 months, and include an estimate of its December output. The November figures for a few companies were not available, and these companies furnished estimates for the last two months of the year. According to the statistics and estimates received the output of blister and Lake copper was 1,079,000,000 pounds, as against 1,092,951,624 pounds in 1909. Statistics showing the output of refined copper by plants in the United States are not collected by the Geological Survey at this time. Figures published by the Copper Producers' Association for the first 11 months of 1910 indicate that the production of marketable copper by the regular refining plants from all sources, domestic and foreign, will amount to about 1,448,000,000 pounds, as against 1,405,619,519 pounds in 1909.

Washington.—A bill which Senator Nelson of Minnesota will introduce will doubtless be regarded as the most thoroughly effective conservation measure that has ever been brought to the attention of congress. Senator Nelson, as chairman of the committee on public lands, has giveu careful consideration to this question and he has embraced in this bill which relates to Alaskan coal lands, two or three striking features, namely:—That the coal lands of Alaska shall be leased or operated under license upon conditions which shall place the question whether the price of coal so mined is fair and reasonable under the jurisdiction and control of the interstate commerce commission. That provision shall be made for payments of royalty to the United States on every ton mined. That no lease of coal lands shall be acquired except under regulations prescribed by the secretary of the interior who shall see that no monopoly in mining in Alaska be permitted. That provision be made for acquiring coal in Alaska for the use of the United States navy under a system of leases to firms or corporations who may con-

tract to furnsh coal for the navy at agreed price. Senator Nelson is engaged in considering a number of measures intended to conserve the national resources of the United States in the public lands and a general bill will soon be offered by him intended to secure for the United States all the coal and oil lands under systems of leasing and rentals somewhat along the lines of the Alaskan bill which he will present.

Ely, Nev., January 6th.—The year which has just closed has been a banner one for production for the Nevada Consolidated Copper Company. Few people living in the district, familiar as they are with the working of the great Eureka pit at Copper Flat, have any real conception of the vast amount of work which is going on there. Ore trains passing daily through the district, from the mine to the concentrator at McGill, tell in part the story of production; but the results at the end of the year tell the whole story. For the fiscal year commencing October, 1909, and ending September 30, 1910, the ore output was 2,237,-028 tons dry weight, the average assay of copper being 2.06 per cent. and about 22 cents in gold and silver. For the calendar year of 1910 the ore production will amount to 2,350,000 dry tons, averaging the same percentage in copper and the precious metals. All of this great output came from the steam shovel pit at Copper Flat, and there has been more than that in overburden taken from the workings. The stripping operations, meaning the removal of overburden from the Eureka ore bodies, must be kept in advance of the production of ore, and during the year, in addition to the output of ore there have been removed 1,650,000 cubic yards of this waste. In all the Eureka pit has been stripped over an area of 22 acre.s

So many factors enter into the determination of the output of copper that a forecast of the probable production for 1911 is of little value. During the latter part of 1910 several of the large companies were reducing their outputs and it is probable that this policy will be continued into 1911. Two large companies, the Miami Consolidated and the Ray Consolidated, will begin production early in the year, and the Chino Copper Company, and probably the Bonanza mine of Alaska, will be producers late in 1911, but so that unless there is a decided curtailment by the older companies the output for 1911 will exceed that of 1910.

Goldfield, Nev., January 7th.—An estimate of mineral production in the state of Nevada during 1910 places the total at $40,521,000, which is divided into counties as follows: Esmeralda, $13,311,000; Nye, $9,525,000; White Pine, $9,000,000; Eureka, $2,000,000; Humboldt, $1,500,000; Lander, $2,000,000; Storey, $1,500,000; Lincoln, $800,000; Churchill, $500,000; Clark, $200,-000; Elko, $50,000; Washoe, $25,000; Douglas, $10,000; total, $40,521,000.

WALES.

After having been on strike for two months 5,000 men employed at the Powell Duffryn Collieries, Aberdare, resolved at a mass meeting recently to resume work immediately and to relegate their grievances to the Conciliation Board. The 8,000 men at the Bwllfa and Cwmaman Collieries, who ceased work in sympathy, have resumed work.

SPAIN.

Spain, January 10th.—One hundred and ninety workmen in Anita mine, at Castro, Santander, Urdiales, were entombed alive when the roof of a shaft caved in. Fire followed the crash, which is supposed to have been caused by explosion.

Rescue parties were prevented from entering the pit mouth by the dense volume of smoke which rolled outward.

With great effort one party of rescuers were able to penetrate a short distance into the shaft and removed four dead bodies. Members of this party expressed the fear that all in the mine had perished, as the supply of air was cut off.

GENERAL MINING NEWS.

NOVA SCOTIA.

The strike situation at the Port Morien colliery is considerably improved, and is developing nicely toward a peaceable end of the difficulty. About half of the total number of employees are at work to-day. Nearly all that can be placed are now at work in the new section of the mine. The construction work in the old sections is proceeding well. Many who ceased work are anxious to go back, but it will be some time before places are ready for them. The statement that the company had violated the Lemieux Act is incorrect. There has been no violation of the Act, the management having notified the employees of the proposed reduction of rates for the winter as long ago as the latter part of November. Nor is it correct that the management has been notified by the labour organization of the claim of the latter that the company has violated the Act. No notice of the kind has been received by Manager McKenzie. It is reported, however, that former President Dan McDougall of the U.M.W. stated that their solicitor was writing a letter to the company to that effect.

Sydney Mines, Jan. 5.—The body of another victim of the No. 3 disaster was taken from the mine at three o'clock today. The body was that of Henry Purchass, a deputy, who with Archy Ferguson was inspecting the mine in that section where the explosion occurred. When found Purchass was lying face down across the haulage rope. Underground Manager John Hill, Henry Walsh, Peter Coll, and James Hurone, the advance guard of a searching party, came upon the body at No. 11 landing. These men had directed their search down the slope while another party was working towards them, having gone through the rooms off the last two levels. There was not a cut or bruise on Purchass' body, and it was at first thought that the man was alive. Doctors McDonald and Love quickly made an examination, but found that life had been extinct for some time. From this it is evident that unlike the rest, Purchass was not injured by the explosion but succumbed to the afterdamp. His lamp was found in his hand in the same condition in which it had left the lamphouse. The body after being prepared for burial was removed to the residence of Doran Ludlow, at Old No. 3, whose wife is a sister of Mrs. Purchass. Purchass was twenty-eight years of age, and was a native of Twilingate, Newfoundland. His widow and three children reside at Florence.

The bodies of five of the victims of the accident went down by the steamer Bruce to-night for interment at their homes in Newfoundland. These are: James Messervey and Israel Parsons, Sandy Point, St. George's Bay; John Wade and Brian Murphy, Colliers, Haley's Point, Conception Bay; Eugene Reid, Hearts Delight, Trinity Bay. The last named was only seventeen years of age, and came here but five weeks ago.

Sydney, N.S., Jan. 3.—A serious explosion occurred in the Nova Scotia Steel Company's No. 3 colliery at Sydney Mines this morning. At the time of the explosion there were eight men in the mine, whose names are said to be John R. McIntyre, Archie C. Ferguson, Hugh Dickson, Henry Purchass, Arthur Amy, James Bond and Luke Drivel. The two latter have been rescued and McIntyre has been brought out from No. 1 level to No. 5 level, where attempts are being made to revive him. The fate of the others is in doubt. The other levels are full of damp and the heat is very great. A heavy fall of roof in levels Nos. 11 and 13 followed the explosion. There is thought to be a fire in No. 14 level. A gang of 100 men have gone down as a rescue party. The bodies of six of the eight men entombed have been recovered. The bodies were huddled together and so badly burned that it was impossible t

recognize one from the other. Owing to the deadly gases the rescuers were unable to reach the bodies of Deputies Ferguson and Purchass.

QUEBEC.

Quebec.—According to the report of the special commission appointed to investigate the Chibougamou mining region, which is 125 miles northwest of Lake St. John, the prospects are not sufficient to justify the Government in building a railway extension there from Lake St. John. Since 1903, there have been reports of rich discoveries of gold, asbestos and other minerals, but the report declares that none of the discoveries of copper and gold are in deposits of such magnitude or promise as would enable the experts to state without a considerable degree of hesitation that they would, with further development, become "mines" in the strict meaning of this term. The reputed "finds" of silver, smaltite and cobalt bloom must be treated as false. As to iron, it is possible that large and pure bodies might be discovered, but the expense of prospecting and the remoteness of the district will be ample deterrents. The asbestos noticed in the working faces of the various open cuts is insignificant in amount. The commission was composed of Dr. A. E. Barlow, lecturer in economic geology at McGill, chairman; Prof. J. G. Gwillim, professor of mining at Queen's, and E. R. Faribault, of the geological survey of Canada.

ONTARIO.

Sault Ste. Marie, Jan. 6.—Some sweeping changes among the officials of the several departments of the Lake Superior Corporation came into effect with the advent of the New Year. The department of transportation is now under the general management of W. C. Franz, who retains his seat on the directorate, while the general management of the entire corporation falls to Vice-President J. F. Taylor. Other changes are understood to include the elevating of Mr. C. H. L. Jones to be assistant secretary-treasurer, and that Consulting Engineer Ernest becomes general manager of the steel plant and the Algoma Steel Co., while C. E. Duncan, superintendent of steel plate, becomes general superintendent, succeeding D. J. Williams, retiring.

BRITISH COLUMBIA.

Nelson, B.C., Jan. 6.—Another dividend of 30 cents and an extra dividend of 20 cents a share has just been declared by the Hedley Gold Mining Company. The property, the famous Nickel Plate, at Hedley, B.C., continues to produce the precious metal in substantial quantities. This company has only been in existence a little over a year, having acquired the Nickel Plate from the Marcus Daly estate in August, 1909, and with the disbursements will have paid back to its shareholders a total of $203,520, or profits at the rate of $1.70 a share, par $10. This is the fifth dividend during the current calendar year.

A general meeting of the shareholders of the St. Eugene Consolidated Mining Company, the Rossland Power Company, the War Eagle Consolidated Mining and Development Company, Limited, and the Centre Star Mining Company, Limited, is to be held at Rossland on Monday, February 6th next for the purpose of receiving the liquidators' reports.

COMPANY NOTES

DOMINION COAL DIVIDEND.

The Dominion Coal Company has declared the regular half-yearly dividend of 3½ per cent. on the preferred stock, payable February 1st, 1911. Books close 18th to 31st January, inclusive.

CUMBERLAND RAILWAY.

The annual meeting of the Cumberland Railway and Coal Company will be held on February 8th. Books close from February 1st to February 10th, inclusive.

CANADA COMPANY'S DIVIDEND.

The interim dividend of 10s per share just declared by the Canada Company is an increase of 2s as compared with the corresponding period of 1909, and reflects the increased prosperity that has attended operations this year. A statement of the land business down to the end of November shows that 4,244 acres have been disposed of, as against 4,562, the average price realized being $19.10, as compared with $14.91 per acre. This is an increase of 28 per cent. on the 1894 valuation. The cash receipts for the same period were £22,200, or £400 more than in 1909.

CROWN RESERVE.

When the Crown Reserve dividend and bonus of 15 per cent., payable January 16th, has been paid, the company will have paid back over half a million dollars more than its capitalization, the dividend record of the company being as follows:

Date.	P.C.	Bonus.	Amount
1908.—July 2nd	4	.	$ 70,752.56
1909.—January 15th	12	4	238,010.24
1909.—April 15th	6	9	265,322.10
1909.—July 15th	6	9	265,322.10
1909.—October 15th	6	9	265,322.10
1909.—December 20th	.	10	176,851.40
1910.—January 15th	6	9	265,322.10
1910.—April 15th	6	9	265,322.10
1910.—July 15th	6	9	265,322.10
1910.—October 15th	6	9	265,322.10
			$2,387,808.90
Payable January 16th, 1911	6	9	265,322.10
			$2,653,131.00

STATISTICS AND RETURNS

NOVA SCOTIA PROVISIONAL FIGURES.

Coal	$15,675,000
Coke	1,960,000
Gold, iron and other metals	379,500
Gypsum, limestone, etc.	830,000
Building materials	260,000
Pig iron	1,000,000
Steel, steel rails, rods, etc.	14,200,000
	$34,304,500

PROGRESS AT GRANBY.

At a cost approximating 10.20 cents a pound, Granby produced in November 1,410,261 pounds of copper, as compared with 1,184,234 pounds in October. Precious metal contents totalled 36,228 ounces of silver and 2,587 ounces of gold.

In November six furnaces of the smelter were in blast. Early in December another furnace was blown in, and soon after January 1st the eighth and last will be started, so that the entire battery will be in operation.

The company's copper product by months, in pounds, follows:

January	2,077,985
February	1,958,294
March	2,059,257
April	1,915,475
May	1,866,625
June	1,677,257
July	1,671,000
August	1,430,315
September	1,120,732
October	1,184,234
November	1,410,261
Total, 11 months	18,373,435

MONTHLY AVERAGE PRICE OF SILVER.

	London.		New York.	
Month.	1909.	1910.	1909.	1910.
January	23.843	24.154	51.750	52.375
February	23.706	23.794	51.472	51.534
March	23.227	23.690	50.468	51.454
April	23.708	24.483	51.428	53.221
May	24.343	24.797	52.905	53.870
June	24.166	24.651	52.538	53.462
July	23.519	25.034	51.043	54.150
August	23.588	24.428	51.125	52.912
September	23.743	24.567	51.440	53.295
October	23.502	25.596	50.923	55.490
November	23.351	25.680	50.703	55.635
December	24.030	25.160	52.226	54.428
Total	23.706	24.670	51.502	53.486

COBALT ORE SHIPMENTS.

The shipments for the week ending January 6th and for the year in tons now read as under:

	Week ending Jan. 6.	1911.
Nipissing	140.60	43.40
Coniagas	113.40	54.75
McKinley-Darragh	71.73	.....
Cobalt Lake	65.70	.....
Trethewey	48.62	26.32
Townsite	32.85	32.85
Temiskaming	40.65	.....
Beaver	31.75	31.75
Crown Reserve	32.00	.....
Buffalo	31.55	31.55
La Rose	31.15	.....
Kerr Lake	30.16	30.16
Silver Cliff	23.96	23.96
	694.12	274.74

BRITISH COLUMBIA ORE SHIPMENTS.

Year ending December 31st ,1910.

The following are the returns of the ore production and movement for the week, and also for the year to date:

Boundary Shipments.

Granby	29,539	1,112,925
Mother Lode	8,234	364,650
Snowshoe	2,343	146,845
Jack Pot	420	16,783
Rawhide	4,000	47,350
No. 7	50	1,042
Other mines	.....	9,523
Total	44,586	1,699,118

Rossland Shipments.

Centre Star	2,930	192,309
Le Roi No. 2	376	31,354
Le Roi No. 2, milled	300	15,600
Le Roi	118	13,904
Other mines	.....	1,692
Total	3,724	254,859

Slocan-Kootenay Shipments.

St. Eugene, milled	2,775	144,300
Queen, milled	420	21,841
Granite-Poorman, milled	250	13,000
Nugget, milled	110	5,720
Wilcox, milled	75	1,425
Richmond-Eureka	31	4,071
Rambler-Cariboo	59	802
Mollie Hughes	26	378
Sullivan	223	22,790
Utica	21	165
Hope	55	418
Athabasca	21	91
Hewitt	23	131
Aurora	29	48
Society Girl	50	50
Twilight	19	19
Other mines	.....	91,880
Total	4,187	307,128

The total shipments for the week, including the estimated milling, were 52,497 tons, and for the year to date, 2,261,105 tons.

B. C. Copper Company's Receipts.

Greenwood, B.C.

Mother Lode	8,234	364,650
Jack Pot	420	16,783
Rawhide	4,000	47,350
Other mines	.....	9,339
Total	12,654	438,122

Granby Smelter Receipts.

Grand Forks, B.C.

Granby	29,539	1,112,925
Other mines	.....	120
Total	29,539	1,113,045

Consolidated Company's Receipts.

Trail, B.C.

St. Eugene, concentrates	110	13,557
Le Roi No. 2, part concentrates	376	31,354
Centre Star	2,930	192,309
Le Roi	118	13,904
Snowshoe	2,343	146,845
Richmond-Eureka	31	4,071
Rambler-Cariboo	59	802
Mollie Hughes	26	378

Sullivan	223	22,790
Utica	21	165
Hope	55	418
Athabasca	21	91
Hewitt	23	131
No. 7	50	1,042
Aurora	29	48
Society Girl	50	50
Twilight	19	19
Other mines		30,141
Total	6,848	458,115

The total receipts at the smelters, including concentrates were for the week, 48,677 tons, and for the year to date, 2,009,282 tons.

SILVER PRICES.

	New York. cents.	London. pence.
December 22	54⅜	25⅛
" 23	54⅜	25⅛
" 24	54⅛	25
" 26	Holiday.	
" 27	54	Holiday.
" 28	53⅞	24 15/16
" 29	53⅞	24 15/16
" 30	54⅛	25 1/16
" 31	54⅛	25 1/16
January 2	Holiday.	
" 3	54⅝	25¼
" 4	54⅝	25¼
" 5	54½	25 3/16
" 6	54½	25 3/16
" 7	54⅝	25¼
" 9	55	25⅜

COBALT STOCKS—High and Low, 1910.

Amalgamated	.07½	.01
Bailey	.12½	.06⅞
Beaver Consolidated	.38¼	.18½
Buffalo	2.50	1.97
Chambers-Ferland	.42¾	.13¼
City of Cobalt	.55	.19½
Cobalt Central	.23	.06
Cobalt Lake	.29⅞	.12
Coniagas	5.62	4.50
Crown Reserve	4.10	2.53
Foster	.31	.04
Gifford	.220	.03
Great Northern	.12½	.05¾
Green Meehan	.11¾	.01
Hargraves	.44	.14
Hudson Bay	143.00	98.00
John Black	.17	.02
Kerr Lake	10.99	6.03
La Rose	5.02	3.30
Little Nipissing	.35	.12
McKinley	1.42	.75
Nancy Helen	.17½	.03
Nipissing	11.80	9.80
Nova Scotia	.48¼	.14½
Obalr	.91	.11½
Orisse	.20	.01
Peterson Lake	.29¼	.13¼
Right of Way	.34	.19
Rochester	.23	.03
Silver Leaf	.13¾	.05
Silver Bar	.19½	.01
Silver Queen	.23	.04⅞
Temiskaming	1.00	.52
Trethewey	1.45½	1.13
Watts	.16	.02
Wettlaufer	1.42	.52

COBALT ORE SHIPMENTS.

The following table shows the shipments from Cobalt for 1909 and 1910. There are now 29 shippers, as compared with 30 in 1910:

Mine.	1909.	1910.
Bailey	36.85	.....
Beaver	51.38	140.06
Buffalo	648.86	1,244.88
Casey of Cobalt	8.50	20.00
Chambers-Ferland	517.88	885.47
City of Cobalt	466.82	329.40
Cobalt Central	399.01	285.12
Cobalt Lake	95.47	263.95
Cobalt Provincial	.....	20.08
Cobalt Townsite	27.35	339.39
Colonial	.....	178.60
Coniagas	806.93	1,268.37
Crown Reserve	3,167.52	2,843.75
Drummond	1,225.47	2,232.76
Foster	113.90	.....
Green Meehan	.....	.....
Hargrave	.....	343.68
Imperial Cobalt	.....	.....
Kerr Lake	1,173.42	5,114.90
King Edward	146.58	134.12
La Rose	6,758.21	5,131.38
Lawson	.....	.....
McKinley-Darragh	1,056.49	2,389.39
Nancy Helen	116.32	.....
Nipissing	6,470.52	6,826.14
Nova Scotia	224.79	.....
North Cobalt	6.87	.....
O'Brien	1,419.11	582.28
Peterson Lake Leases—		
Little Nipissing	39.62	313.16
Nova Scotia	121.15	.....
Provincial (Govt.)	.....	32.05
Princess	.....	.....
Red Rock	.....	.....
Right of Way	1,608.99	980.72
Silver Bar	.....	.....
Silver Cliff	149.06	156.84
Silver Leaf	.....	.....
Silver Queen	316.64	.....
Temiskaming	852.14	1,118.62
Temiskaming Cobalt	.....	.....
Hudson Bay	743.64	259.62
Trethewey	1,134.50	535.66
University	.....	.....
Victoria	.....	.....
Violet	.....	.....
White Silver Mining Co.	.....	.....

Waldman		31.99
Wyandoh		24.15
Total	29,942.99	34,026.45

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous—January 12th, 1911.

	Bid.	Ask.
Amalgamated Asbestos	11	12
Black Lake Asbestos	16	..
Dominion Coal	..	..
Dominion Steel	..	..
Dominion Steel Corp.	56½	57
Granby	37	39
Consolidated Mining	50	60
Nova Scotia Steel	86½	..

Cobalt Stocks.

Amalgamated	.01	.03
Bailey	.06½	.06¾
Beaver Consolidated	.26	.27
Buffalo	2.15	2.35
Chambers-Ferland	.14	.14½
City of Cobalt	.17	.20
Cobalt Central	.08½	.10
Cobalt Lake	.13	.13¼
Coniagas	6.40	6.53
Crown Reserve	2.42	2.48
Foster	.05	.07
Gifford	.01	.03
Great Northern	.11&	.12¼
Green Meehan	.01¾	.02¼
Hargraves	.22½	23½
Hudson Bay	110.00	117.00
John Black	.01	.03
Kerr Lake	6.70	6.85
La Rose	4.39	4.45
Little Nipissing	.14	.14½
McKinley	1.39	1.41
Nancy Helen	.01	.04
Nipissing	10.50	10.75
Nova Scotia	.20	.24
Ophir	.05	.11
Otisse	.01	.02
Peterson Lake	.15¾	.16¼
Right of Way	.14⅞	15½
Rochester	.04¼	.04½
Silver Leaf	.04⅜	.05
Silver Bar	.01½	Sellers
Silver Queen	.04	.05
Temiskaming	.75¾	77½
Trethewey	1.16	1.20
Watts	.01	.03
Wettlaufer	1.04	1.08
Hollinger	4.21	4.28

New York Curb.

British Columbia Copper	.06½	.06¾
Butte Coalition	.17¾	18
Chino Copper	.21 5/8	.21¾
Davis-Daly Copper	.01 1/16	.01½
Ely Consolidated	.31	.33
Giroux Mining	.06⅝	.06¾
Goldfield Consolidated	.07	.07¼
Greene-Canadian	.06⅝	.06 11/16
Inspiration Copper	.08⅝	.08¾
Miami Copper	.19⅜	.19½
New Baltic Copper	.05	.08
Nevada Con. Copper	.18½	.18⅞
Ohio Copper	.01 7/16	.01½
Rawhide Coalition	.03	.04
Ray Central	.01 5/16	.02
Ray Consolidated	.17½	.17¾
Union Mines	⅝	¾
Yukon Gold	.03⅞	.03 15/16

TORONTO MARKETS.

Metals.

Jan. 11th (Quotations from Canada Metal Co., Toronto).

Spelter, 5.60 cents per lb.

Lead, 3.65 cents per lb.

Antimony, 8 to 8½ cents per lb.

Tin, 44 cents per lb.

Copper, casting, 13.40 cents per lb.

Electrolytic, 13.40 cents per lb.

Ingot brass, 8 to 12½ cents per lb.

Jan 11th—Pig Iron (Quotations from Drummond, McCall Co., Toronto)—

Summerlee, No. 1, $23.00 (f.o.b. Toronto).

Summerlee, No. 2, $22.50 (f.o.b. Toronto).

Midland, No 1, $20.00 (f.o.b. Toronto).

Hamilton, No. 1, $18.75 (f.o.b. Hamilton).

Hamilton, No. 2, $18.25 (f.o.b. Hamilton).

Clarence, $20.00 (f.o.b. Toronto).

Cleveland, $20.00 (f.o.b. Toronto).

General Markets.

Coal—Anthracite, $5.50 to $6.75.

—Bituminous, $3.50 to $4.50 for 1¼ inch lump.

Coke.

Jan 9th—Connellsville Coke (f.o.b. ovens).

Furnace coke, prompt, $1.40 to $1.50 per ton.

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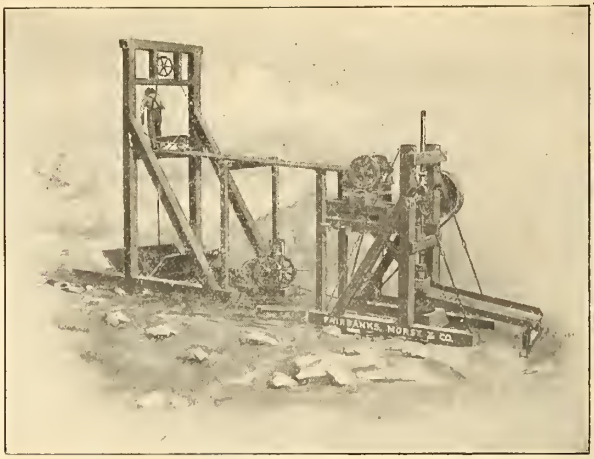

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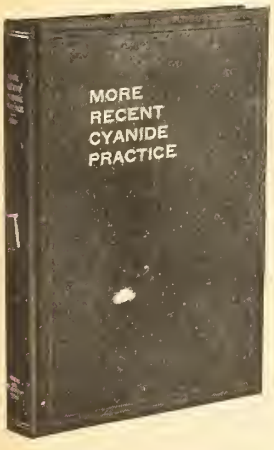

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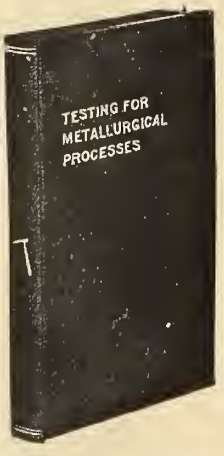

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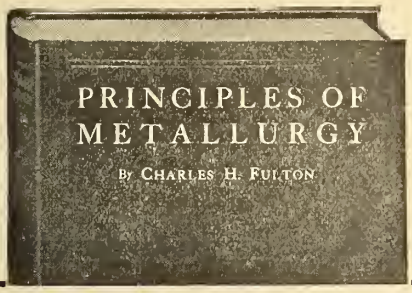

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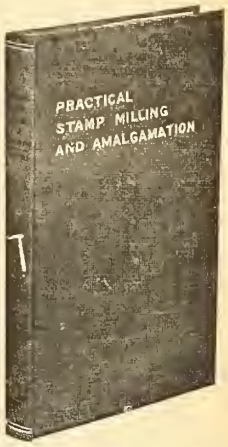

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Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Government of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unsurveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10 00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minimum being 40 acres in unsurveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

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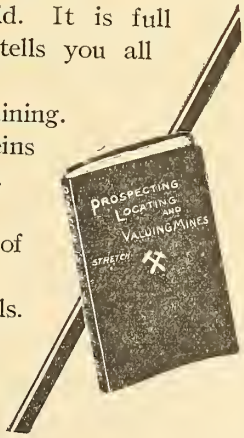

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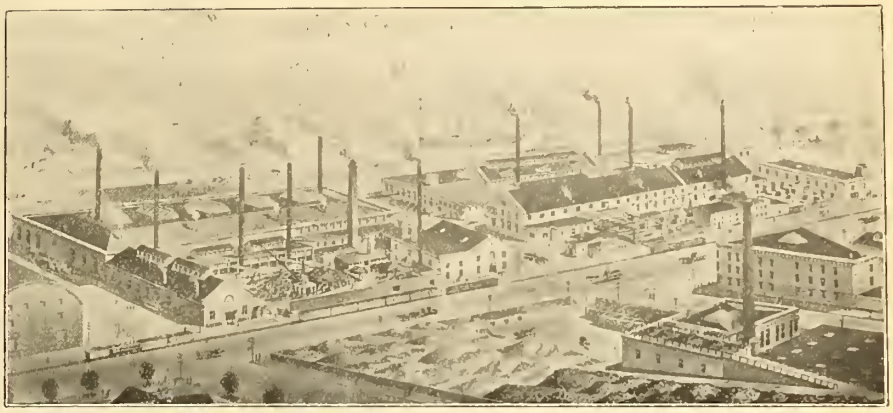

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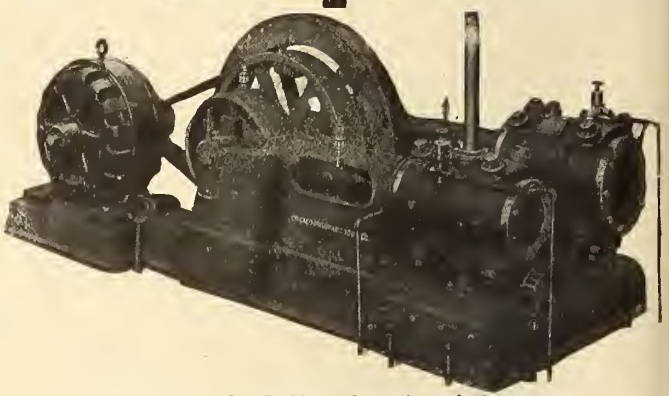

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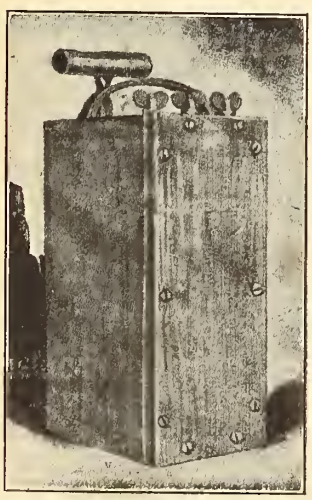

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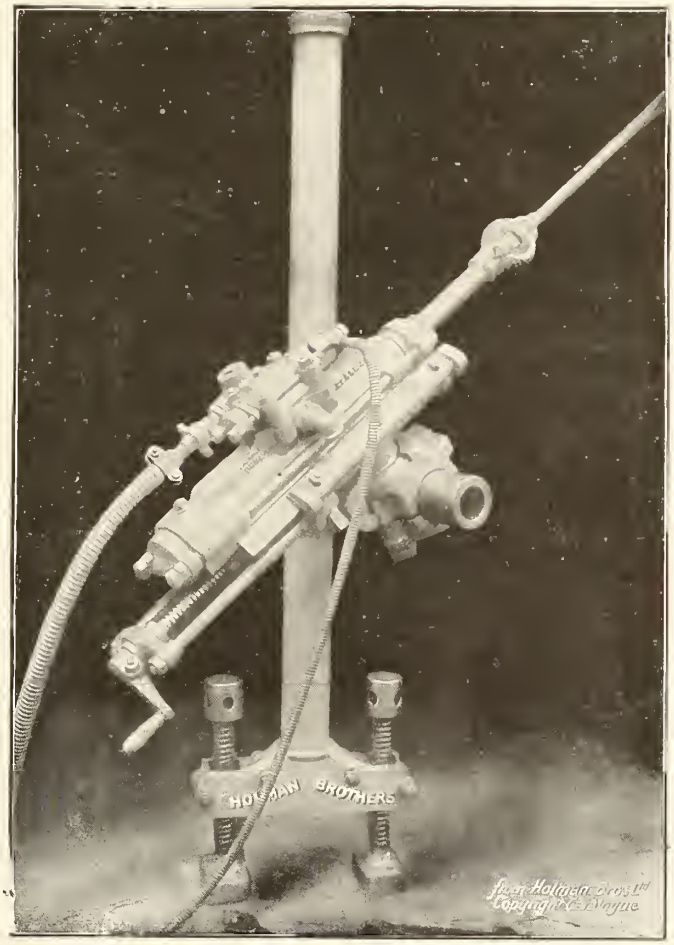

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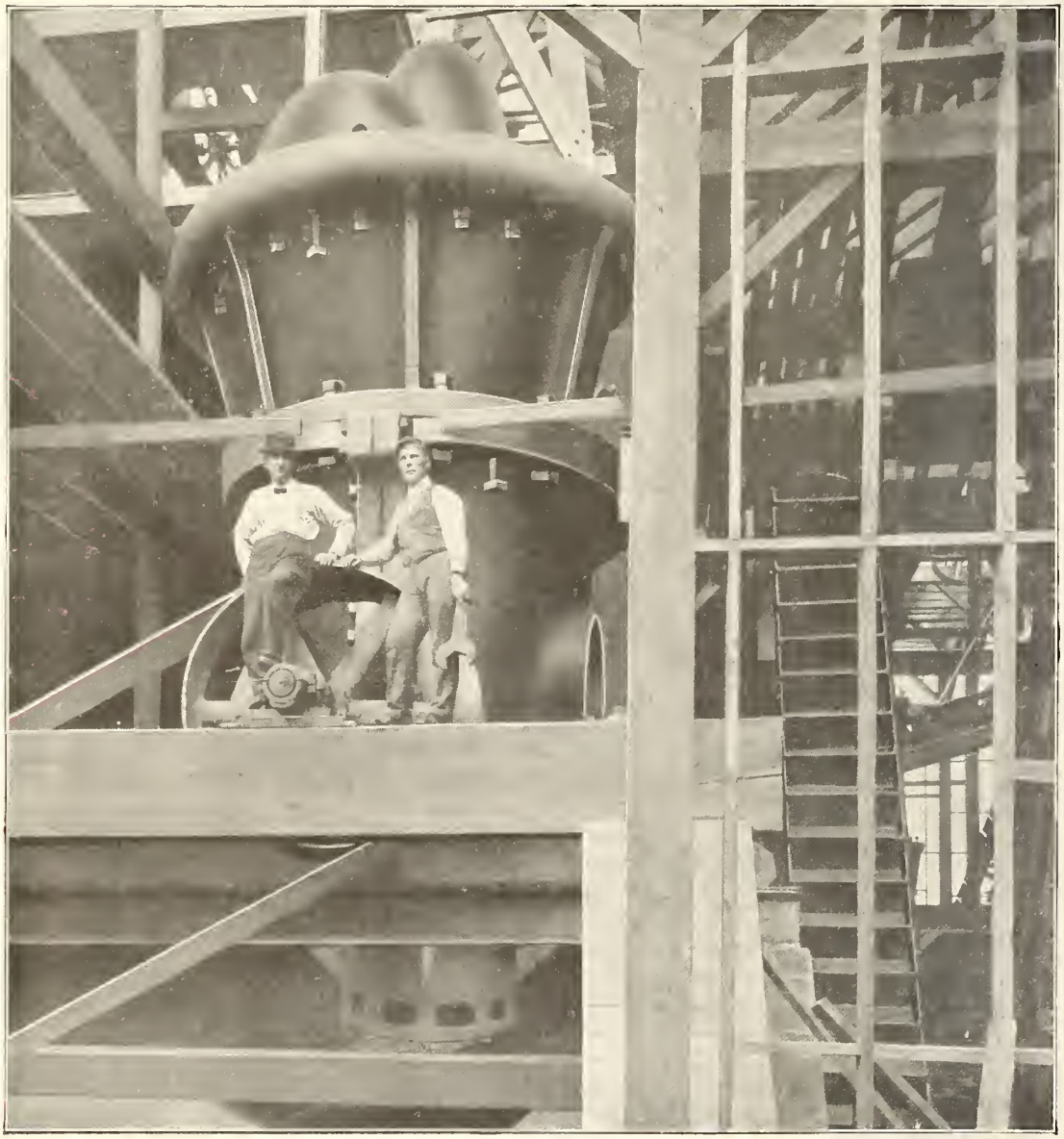

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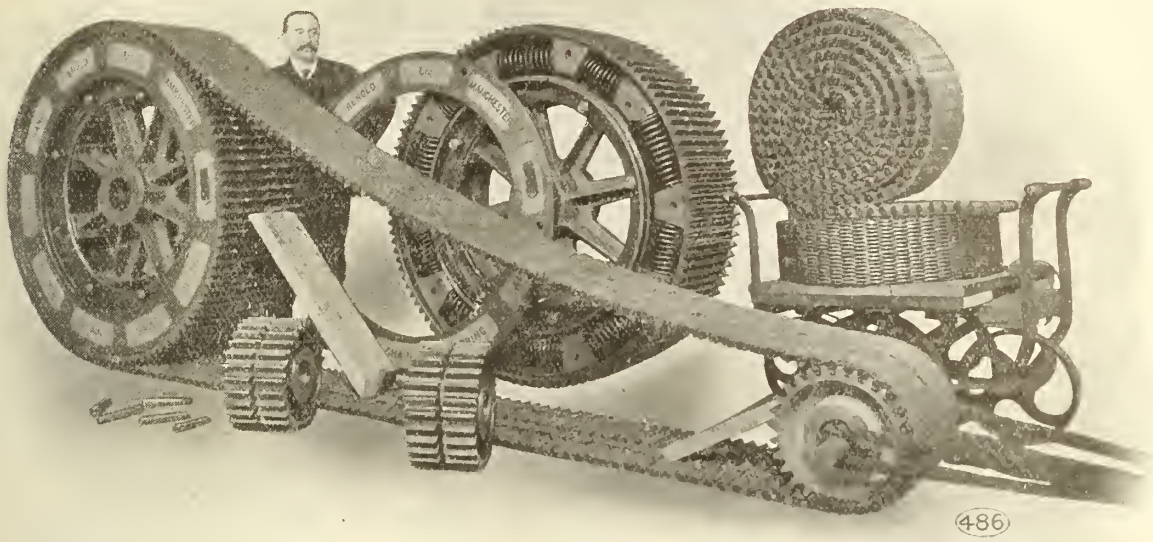

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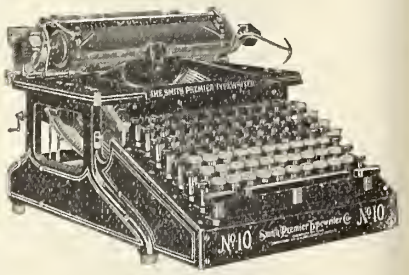

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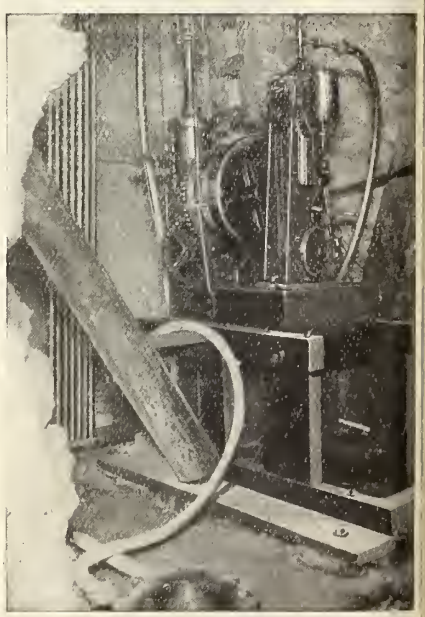

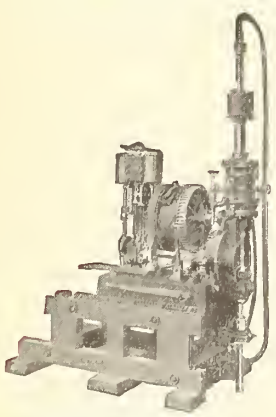

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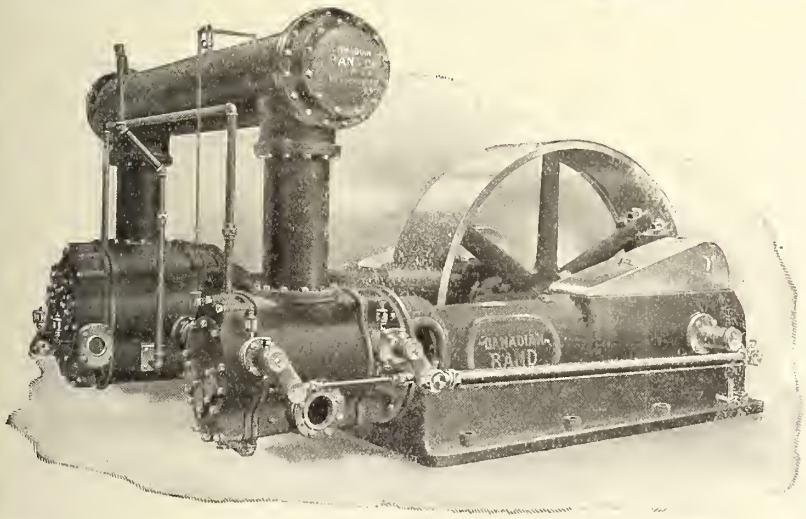

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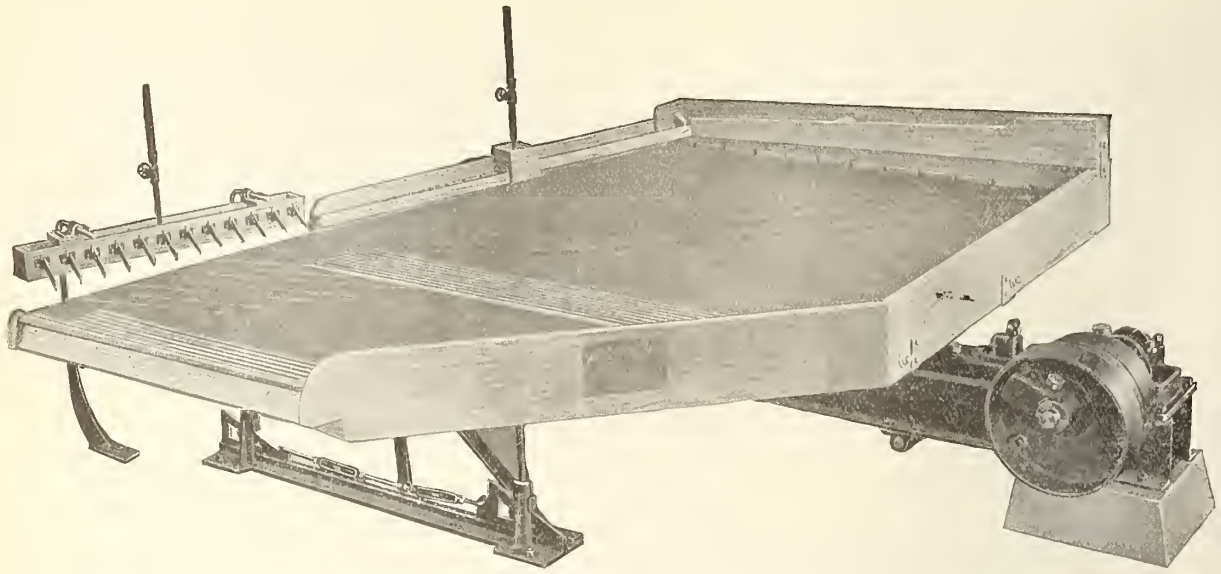

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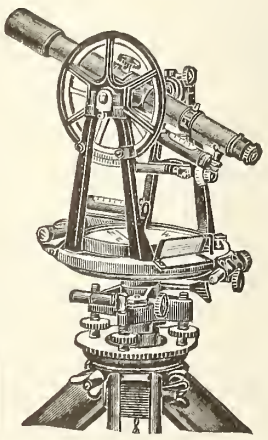

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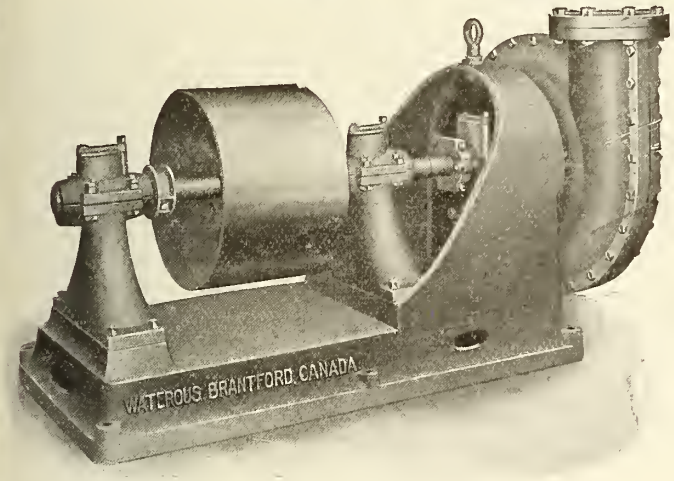

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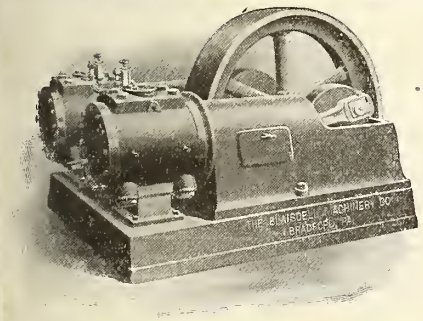

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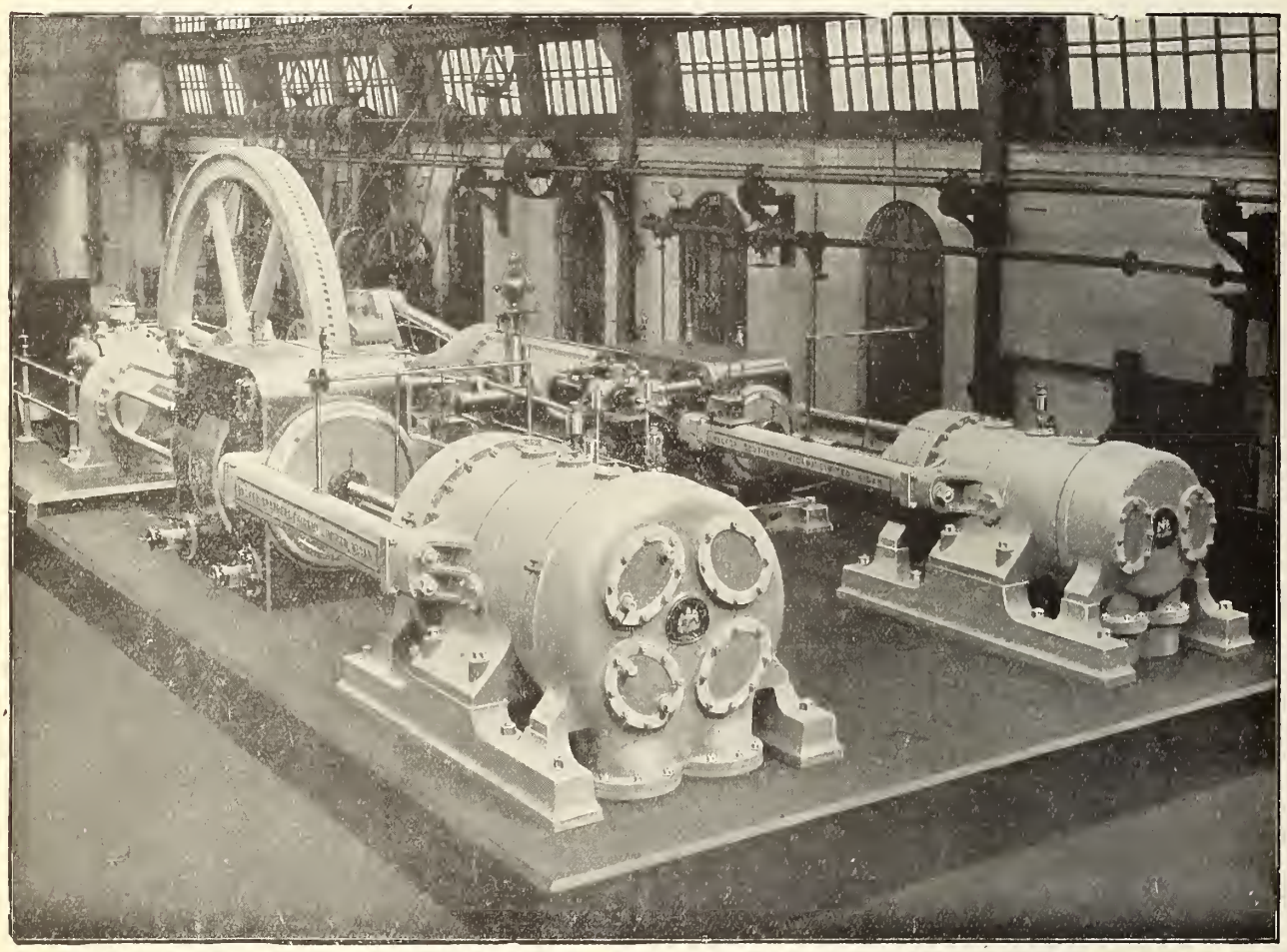

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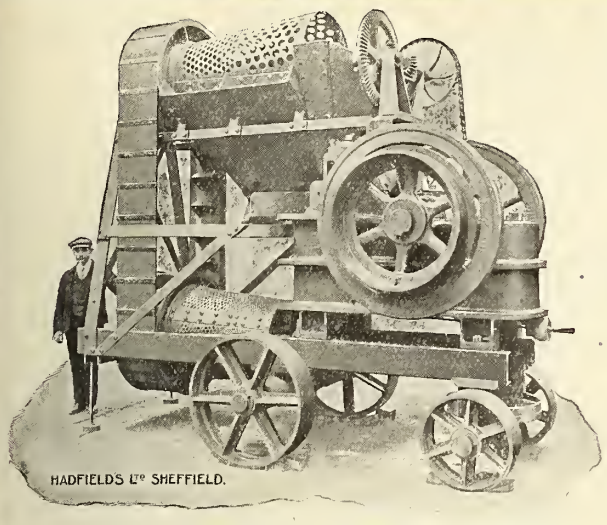

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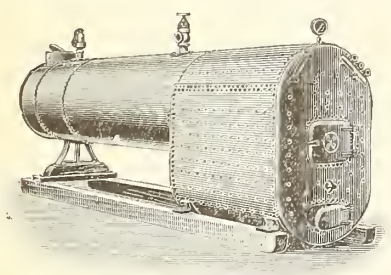

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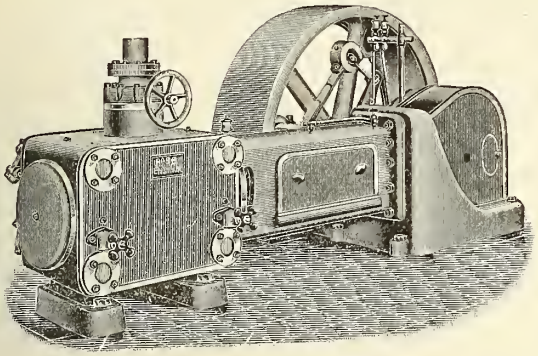

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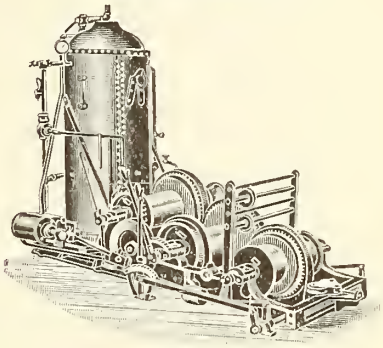

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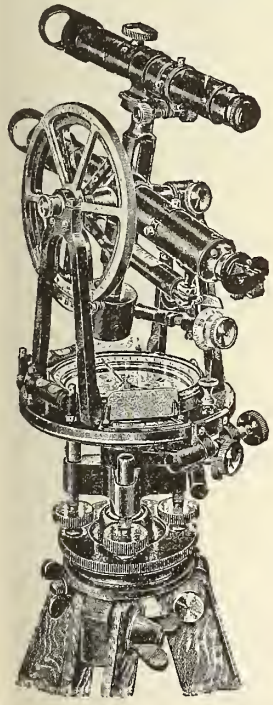

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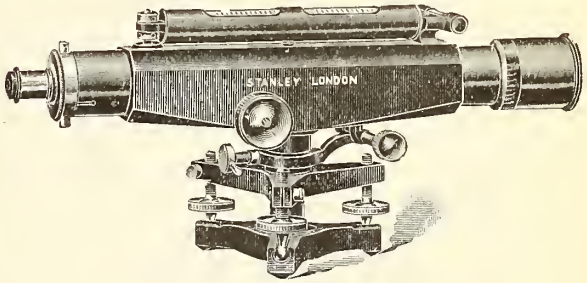

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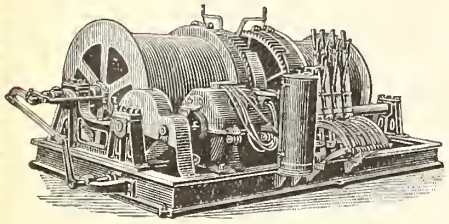

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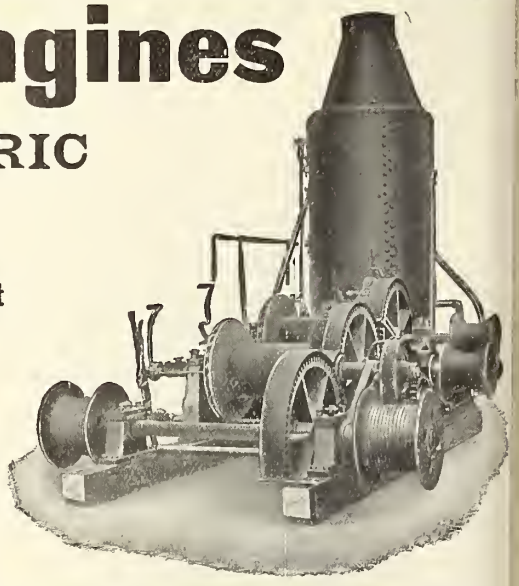

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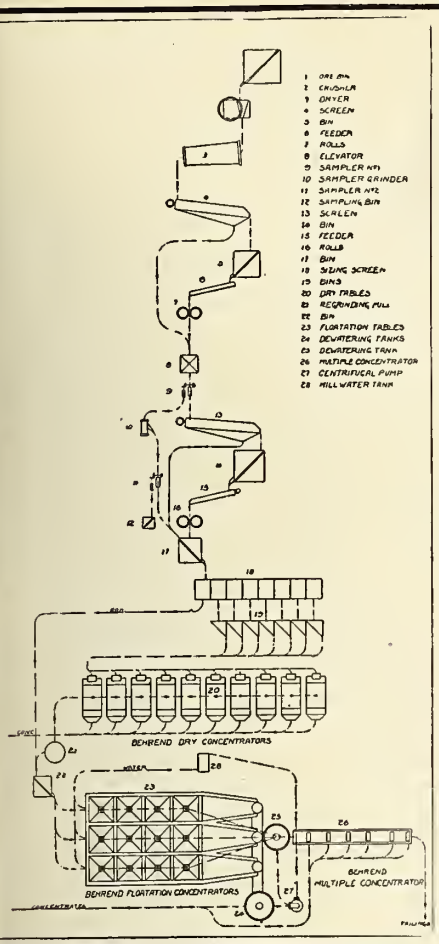

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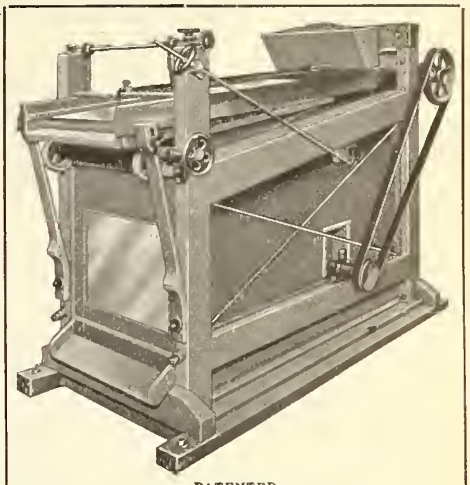

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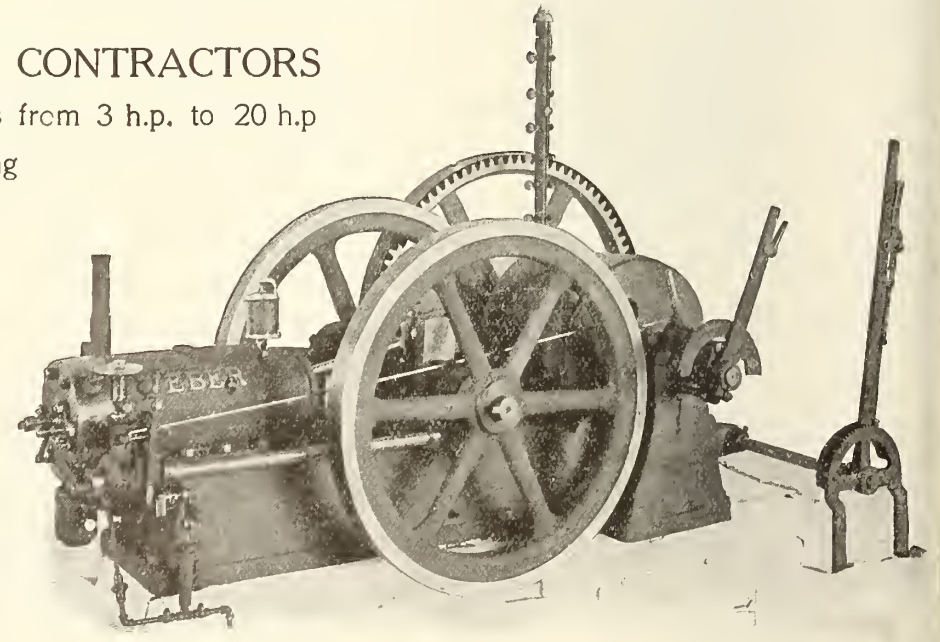

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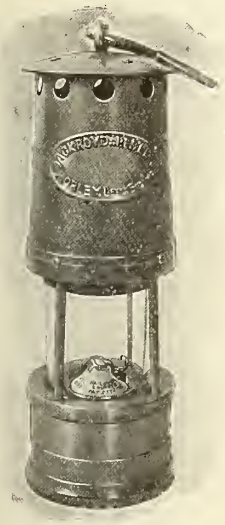

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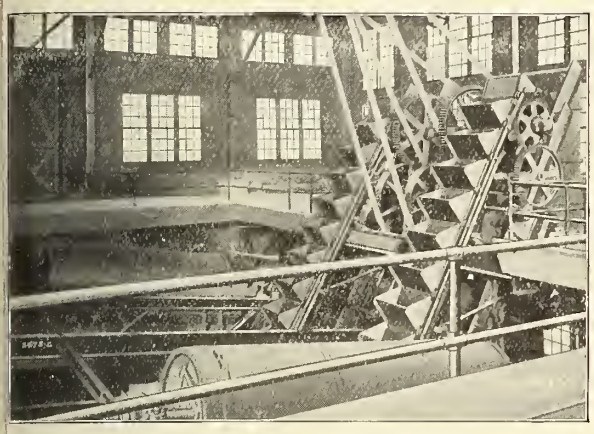

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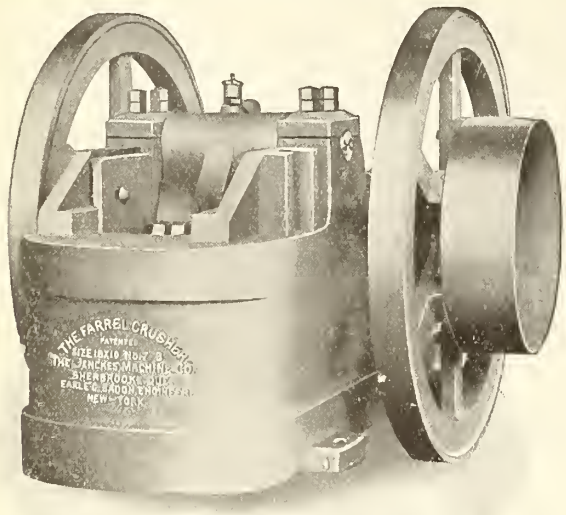

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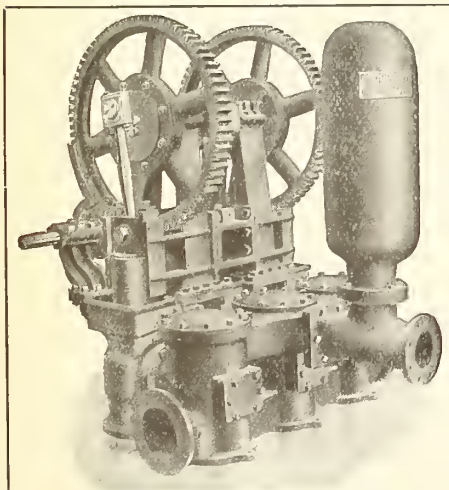

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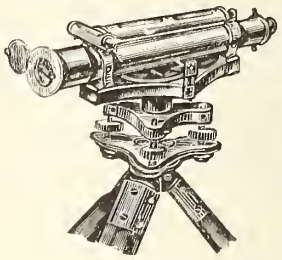

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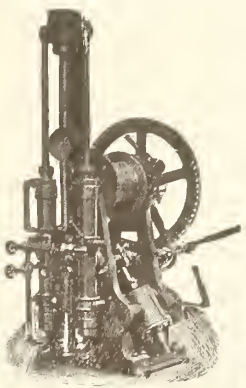

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THE CANADIAN MINING JOURNAL

VOL. XXXII. TORONTO, Feb. 1, 1911 No. 3

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

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Editor:
J. C. MURRAY, B.A., B.Sc.

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CIRCULATION.

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NOTICE.

THE OFFICES OF THE "CANADIAN MINING JOURNAL" WILL BE MOVED ON FEBRUARY 15TH, FROM ROOMS 312-313 CONFEDERATION LIFE BUILDING, TORONTO, TO THE MANNING ARCADE ANNEX, ROOMS 17-19-21. AN ALTERNATIVE ADDRESS IS 26 KING STREET WEST, TORONTO, ONT.

THE PROPOSED TARIFF CHANGES.

As we are going to press, announcement is made of the proposed tariff changes. The changes are much more comprehensive than had been expected. They include, we are gratified to note, several mineral commodities.

Amongst the mine products that are affected are the following:—

FELDSPAR, crude, powdered or ground, upon which there is a United States duty of 20 per cent., and upon which there is no countervailing Canadian duty, is now to be reciprocally free.

FLUORSPAR, on which there is a United States duty of $3 per ton crude, and 20 per cent. ground, and upon which no Canadian duty was imposed, is now to be reciprocally free.

MICA, unmanufactured and rough trimmed, and ground and bolted, is to be reciprocally free. The present Canadian preferential, intermediate, and general tariffs are respectively 15 per cent., 17½ per cent., and 17½ per cent. The United States duty is 20 per cent.

TALC, ground, bolted or precipitated, naturally or artificially, not for toilet use, is to be free. The present United States duty is one cent per pound.

From GYPSUM or PLASTER ROCK, crude, not ground, the United States duty of 30 cents per ton is to be removed. This is also the case with salt, from which duties of 7 cents per 100 lbs. and 5 cents per 100 lbs. are to be removed, respectively, by the United States and Canada.

ASBESTOS, both crude and ground, but not further manufactured, is to be free. Both countries are to wipe out a 25 per cent. duty on the ground, and Canada removes a 17½ per cent. duty on the crude.

COKE, upon which there is a United States duty of 20 per cent., with no countervailing Canadian impost, is to be free.

SODA ASH and SALTCAKE are placed on the free list.

The prohibitive duties on GRINDSTONES, unhewn

BUILDING STONES, ROOFING SLATES, etc., have been materially reduced.

On the part of the United States there has been a reduction of 5 cents in the duty on IRON ORE, making the present tariff 10 cents per ton.

As regards round and run-of-mine BITUMINOUS COAL, the Canadian duty has been brought down from 53 cents per short ton to 45 cents per short ton, as against the standing American duty of 45 cents per long ton.

* * * * *

If, as will probably be the case, these changes crystallize into actuality, then the mining industry of Canada will have received a strong stimulus. It will be noticed that amongst other minerals, gypsum, feldspar, fluorspar, and talc, both crude and ground, except in the case of gypsum, where only crude is admitted free in the United States, although both crude and ground are admitted here, are now reciprocally free. This means much to all of Eastern Canada, and will probably affect favourably Alberta and British Columbia. We regret, of course, that both ground and calcined gypsum have not been placed upon the free list. Nova Scotia and New Brunswick, with their enormous reserves of high grade gypsum, would have benefitted largely. But even the removal of the duty on crude will be of service.

As for feldspar, talc, and fluorspar, the commercial possibility of handling these minerals has been definitely enlarged. Feldspar mining is growing in importance every day. Apparently we possess the best and largest deposits on the continent, and there appears to be no reason why we should not curtail at once the shipment of crude and become shippers of ground feldspar.

The revision also provides an added outlet for our manufactured talc. The situation as regards mica and asbestos is improved. Fluorspar, mentioned above, is not yet mined in Canada, largely because of the very limited market and because of tariff inequalities. Now that these inequalities have been levelled, we shall hope to see two or more promising prospects developed.

As coke has been made reciprocally free, we shall expect a decided enlargement in the western output. Railroad tariffs are the controlling factor here. But any incidental amelioration of present conditions will be welcomed.

The whole question of mutual concessions in coal duties is too complicated to be discussed briefly here. We shall take this subject up at a later date. We may, however, remark here that this is at once the most vital and the most comprehensive topic of all.

In the main, we feel inclined to congratulate Canada's delegates upon having secured a fair quid pro quo. Canada is justly looked upon as the immediate source of raw material. Canada wishes to be looked upon more and more as the source of commercial products. The whole meaning of the tariff, or of any revision of the tariff, so far as Canada is concerned, lies in the opportunities afforded to establish manufacturing and milling plants on this side of the International Border.

THE BELLEVUE VERDICT.

The coroner's inquest into the cause of the death of 31 men in the Bellevue colliery on December 9th, has resulted in a formal verdict attributing the fatalities to carbon monoxide poisoning. This verdict, dealing solely with proximate facts, is of little significance. The five riders attached to the verdict are much more important. They are put in the form of recommendations and read as follows:—

"1. That more inspectors be appointed.

"2. That a Draeger apparatus station be established in this district.

"3. That telephones be established in underground workings under the supervision of the chief inspector wherever practical.

"4. That a thorough investigation be made of means of preventing loss of miners by cave-in in mines.

"5. We consider that negligence is in evidence on the part of operators and miners in the carrying out of the Coal Mines Act, and we would most strongly recommend a stricter adherence to the intent of the Act."

The first three riders are part and parcel of a necessary general movement. Inspection of coal mines in Alberta is casual, rather than systematic. Even if it were thorough, the means are lacking to make it effective. To be effective, inspection must be supplemented by rigidly enforced regulations. And, most assuredly, there must be a sufficient number of well paid officials appointed to cover the whole territory.

We are informed that, contrary to the recommendations of the manufacturer, the Draeger apparatus installed at Hosmer, B.C., which were hastily called into requisition after this Albertan disaster, were fitted only with 30-minute cylinders. The person or persons responsible for this gross error should be made to suffer. The modern respiratory apparatus is designed to supply oxygen to the user for approximately two hours. This by the way.

As pointed out in a former editorial, prevention through inspection and control of mining methods, explosives, lighting, and ventilation is the one prime necessity. Breathing-apparatus outfits are excellent accessories. But they cannot do more than supplement the work of complete inspectoral control. Mine telephones are also admirable and necessary devices. They also must be considered as units in a well organized system. No one device is a cure-all.

The last rider indicates that in the opinion of the coroner's jury there was evidence of carelessness on the part of operators and miners alike in carrying out the requirements of the Coal Mines Act, and strongly urges a stricter adherence to the intent of that Act.

In the course of the inquest evidence was adduced that proved criminal carelessness on the part of one of the miners, carelessness that implied a shocking lack of moral sense, and that, in itself, might easily have been the cause of the catastrophe. Such instances are not rare. It is hard to educate certain types of miners. While the great majority are intelligent and good citizens, the lives of hundreds may be jeopardized by the selfish recklessness of one. Hence it is imperative that steps be taken to inculcate into all a sense of personal responsibility. The individual who is willing to endanger the lives of his fellows should be treated as a criminal.

No sharp line can be drawn between management and men in the matter of responsibility. Usually both are culpable. Upon both devolves the duty of seeing to it that every possible precaution be taken to prevent the loss of life. In no less degree does the burden fall upon the Federal and Albertan Governments.

PORCUPINE PROSPECTUSES.

It appears impossible to rob the mining prospectus of its superfluous trimmings. Nor does it seem practicable to convince the promoter that a sound venture never requires bolstering with general quotations from other reports.

That recent incident, when the Hon. Frank Cochrane felt it his duty to correct a misquotation attributed to an English engineer, should go far towards clearing the atmosphere. The engineer in question had been credited in a newspaper advertisement with a sweeping eulogy of Porcupine. Of course, he had been guilty of no such silliness. But certain innocuous remarks of his had been garbled and mangled by the newspapers, and, falling under the eye of the prospectus-artist, had been promptly used. The Hon. Mr. Cochrane's correction was prompt and to the point. It is possible, even probable, that the inclusion of this quotation was done in all good faith. But it was totally unnecessary in any case, and, as the event proved, the quotation was not itself authentic.

Glancing over the prospectus that gave rise to the above-mentioned episode, we are surprised to find much evidence of carelessness and of absence of business acumen. For instance, on one page it is stated that more than fifty quartz veins have been uncovered. Later the number of veins is placed at ten. On one page, also, we are informed that stripping and trenching can be easily performed; whilst a few pages further on the opposite is affirmed. Moreover, the rash general statement is made that a certain vein will yield continuously handsome returns. This kind of vaticination has become unfashionable.

Promoters who are asking the public to take part in what may be a costly venture, can surely afford to put together a careful and accurate statement of facts. It is infra dig to permit sloppy errors and contradictions to creep into a prospectus. It is regrettably foolish to allow one's fancy to gild the future with imaginery gold. All this is not so much a question of honesty as it is a question of horse sense.

The function of a prospectus is to present observed facts, and not to lend fictitious value to unproved mining claims.

THE MINERAL PRODUCTION OF BRITISH COLUMBIA.

Promptly with the close of the old year, the preliminary estimate of British Columbia's mineral production during 1910 has been published by the Provincial Bureau of Mines. Mr. W. Fleet Robertson, Provincial Mineralogist, is the compiler of this timely pamphlet. Once again we must felicitate the occidental Province upon its enterprise.

Taking Mr. Robertson's estimates for 1910, we note that the net increase in non-metallic products is $2,809,116. Against this must be written off a net decrease in metalliferous products amounting to $1,068,636. This leaves a balance of $1,740,480 in favour of 1910 as compared with the gross output for 1909.

The appreciable falling off in copper, lead, and zinc was more than counterbalanced by an unusually substantial increase in the output of coal. The 1909 output of coal was 2,006,476 long tons. For 1910 the output was 2,800,000 long tons, an increase of 794,000 tons. This, as Mr. Robertson points out, is much larger than the two largest previous annual increases taken together.

Whilst slight enlargements of gold outputs, both placer and lode, are recorded, silver has fallen slightly. Apart from the disappointing results from the St. Eugene mine, the chief cause of the drop in lead production was the damage resulting from forest fires in the Slocan district. A larger output is predicted for the current year. The lessening of the copper output by about 6,000,000 pounds (the 1910 output being only 39,000,000 pounds), is not serious; new producing mines will bring up the 1911 totals. Zinc has been distinctly disappointing. The output for 1910 is but half of that for the previous year. Whilst there is no lack of ore, the forest fires delayed production considerably. The destruction of the Whitewater mill and the storage of a considerable quantity of concentrate by other operators contributed to cut down the returns. The outlook is not rosy, neither is it hopeless.

For 1911, prospects are in general most satisfactory. The Boundary country will, we doubt not, exceed itself. Coal production will certainly be largely expanded. The demand for coke will be distinctly better than during 1910. Gold should more than hold its own. Zinc may, or may not, gain a stronger position. One favourable symptom of 1910 was the payment of several considerable dividends by several of the larger companies.

Rand mines, during 1910, distributed a total of £9,115,500 in dividends. This enormous sum ineludes dividend payments from 45 eompanies. The largest dividend eame from the Crown Mines. It amounted to £1,128,126. The rates of payment ranged all the way from 5 per eent. to 150 per eent.

Correspondence

THE EXPLOSION AT BELLEVUE COAL MINE, ALBERTA.

Editor, Canadian Mining Journal.

Sir,—While on other pages of the Canadian Mining Journal of January 1st you referred to the loss of life in an Albertan colliery and the duty of the Alberta Government to provide for the family of Fred Alderson, who saerificed his life to save that of another miner, you also, in two parts of the same issue, left it to be inferred that the disaster oecurred in British Columbia. Knowing that you have from time to time freely accorded the British Columbia Department of Mines eredit and praise for having taken the lead in its efforts to safeguard the lives of miners employed in its eoal mines, I am well aware that you would not intentionally leave room for the eonclusion that there was or is any blame attaehable to that department for the lamentable loss of life that took place at Bellevue last month, yet I venture to think it may be well to make it quite clear that the following item, taken from your General Mining News of the above-mentioned date, lacked the speeifie information that the disaster took plaee in Alberta, not in British Columbia. I quote the news item as you printed it:—

BRITISH COLUMBIA.

"Fernie, December 13.—Six of the Slav victims c the Bellevue disaster were buried here in one grave, an the body of Fred Alderson will be interred at Hosme to-morrow."

"It is a significant fact in eonnection with the di aster that a Government mine inspeetor viewed th mine for eseaping gas three days before the fatality, an posted a notice to the effect that the timbering an ventilation were good, and that there was no gas.

"The Miners' Union had asked that an inspeetion c the mine be made and told Inspeetor Sterling, it stated, that there were volumes of gas in the mine. It thought that there is yet one unrecovered body."

You will probably agree that in the foregoing there absolutely nothing to indicate that the disaster an suggested inefficient mine examination were in anothe Province, for British Columbia is the only Provinc mentioned—henee this letter.

Separately, I send you some particulars of the la Fred Alderson, who for the benefit of a strange min —not even a working eomrade in the mine in which h was employed, but an utter stranger in a mine in a other province, to whieh he had hastened on the eall the eommon humanity that prompts miners to deeds heroism—took the grave risks whieh eost him his li and left his wife a widow, and his ehildren, orphan You will note, too, that the British Columbia Gover ment was prompt, first to send its mine-rescue appa atus to a provinee that had negleeted to provide an and, next, to contribute money for the relief of the di tress of Alderson's widow and orphans.

E. Jacobs.

Vietoria, B.C., January 13, 1911.

ABSTRACT OF PRELIMINARY REPORT ON THE MINERAL RESOURCES OF THE CHIBOUGAMOU REGION.

I.—Introduction.

Object of the Present Investigation:

The present investigation was designed to obtain the fullest information from a single season's field operations regarding the natural resources, espeeially from the mining standpoint, of what has been ealled the "Chibougamou Mining Region," with speeial referenee to the asbestos and gold deposits already diseovered there.

Ever sinee the first mineral discoveries in this district in 1903, the Government of the Provinee of Quebee had been repeatedly and strongly urged either to undertake the building of a railway to Chibougamou or to give sueh substantial assistanee that private enterprise would be indueed to undertake its eonstruetion. Before however, eommitting themselves to any policy or definite line of aetion, which in any case would involve the expenditure of a very large amount of publie money, the Prime Minister and the Minister of Mines, on the recommendation of the newly appointed Superintendent of Mines, determined to obtain the judgment of those who compose the present Chibougamou Commission, not only as to the real value of the mineral diseoveries already made, but also their opinion as to the future mining possibilities of this region.

With this object in view the present Commissione examined in detail all of the prospeets and mini development work which they could find or eoncer ing which they had any information. In addition careful and critieal geologieal examination was ma of the whole district in order to make possible the pr paration of a geological map whieh would show t relations of the various mineral deposits studied. T Commissioners, therefore, in the present report, aim answer the question, "Is the construetion of a railw at present justified by reason of the mineral diseoveri already made and partially developed?" And in t second place to furnish in detail the results of the va ous surveys and examinations arising out of this i vestigation.

Personnel of the Chibougamou Commission:

As it was desired that the verdiet of the Commissio ers should be as eonclusive and authoritative as p sible, it was decided that Dr. Alfred E. Barlow, Spec Lecturer in Eeonomie Geoloy at McGill University, a late of the Geological Survey of Canada, should act Chairman, while Professor J. C. Gwillim, Professor Mining at Queen's University, Kingston, and Mr. E. Faribault, of the Geological Survey of Canada, shou

be the other Commissioners. Professor Gwillim, with Mr. A. M. Bateman, B.Sc., as assistant, devoted most of his time and attention to a critical examination and study of the numerous prospects, while Mr. Faribault's judgment was eagerly sought and appreciated in the appraisal of the gold discoveries. Dr. Barlow's work consisted primarily in the study and mapping the distribution of the several geological formations, although considerable time was devoted in company with Prof. Gwillim to the examination of the mineral deposits. In addition, Dr. Barlow, as a consequence of his direct control of the whole investigation, devoted considerable time and energy in the necessary administrative work. As it seemed desirable to cover as much of the territory as possible during the comparatively short season available for the work, the party was made unusually large.

On arriving at the scene of operations it was found expedient to sub-divide the large party into several smaller parties, each carrying on independent work, but reporting at frequent intervals to headquarters. In this way it was found possible not only to embrace the whole of the Chibougamou Mining region with a rather detailed and critical reconnaissance, but also to examine and study very closely the origin, mode of occurrence and geological relations of the various mineral deposits.

Mr. J. H. Valiquette, Q.L.S., the Assistant Superintendent of Mines of Quebec, and Mr. Arthur J. Merrill, of McGill University, did most of the topographical work, although after his arrival in the district Mr. Faribault did a very large part of this work.

Mr. Valiquette was assisted in his work by Mr. Eugene Poitevin, jr., of the Laval Polytechnic School, Montreal, while Mr. A. O. Dufresne, of the same institution, acted as assistant to Mr. Merrill. Mr. Theodore Lefebvre, of Montreal, assisted Mr. Faribault for a short time, afterwards joining Mr. Merrill's survey party.

The Commissioners wish to take advantage of this opportunity to express their keen appreciation of the zealous and intelligent work of all who aided in the scientific part of the work, often in the face of many adverse circumstances.

Our grateful acknowledgments are due to Mr. Reginald W. Brock, Director of the Geological Survey of Canada, for maps and the loan of certain surveying instruments which it was impossible to obtain by purchase during the short interval between the organization and the departure of the expedition.

ITINERARY:

The Chairman of the Commission accepted office on February 15th during a personal interview with the Premier, Sir Lomer Gouin. Owing to certain other engagements it was impossible for Prof. Gwillim to accept until March 17th, while Mr. Faribault's agreement to join the Commission was not possible for the same reason until April 28th, and it was further stipulated that he should not leave Quebec for Chibougamou until July 15th.

The chairman, in company with Mr. Valiquette, paid a short visit to Roberval on March 23rd for the purpose of inspecting the supplies which had been ordered for the expedition and which left Roberval the following day.

The expedition left the end of the portage which comes down to the Ashuapmuchuan River on the northeast side almost directly opposite the River aux Trembles (Poplar River), on Wednesday, June 15th, at 7.30 in the morning, and reached the headquarters camp at Pointe aux Bouleaux (White Birch Point) on Thursday, June 30th, at 1.30. The time thus occupied in actual travelling was 13½ days. The six canoes used were made specially for the expedition by the Ontario Canoe Company, of Peterborough, Ont., and were of the larger sizes of what are known as the explorers' canoes. They were built of cedar covered over with painted canvas. Each canoe, in addition to its crew of from three to four men, carried about 700 lbs. of supplies and luggage.

The main party left the headquarters camp on Monday, September 19th, at 6.30, and travelling by way of the Chigobiche River, reached St. Felicien on Friday morning, September 23rd, at 9.30 a.m. Dr. Barlow and Messrs. Faribault, Valiquette and Bateman, by leaving the main party at the foot of the Pimonka Rapids, and travelling by way of the Riviere aux Trembles and the Village of La Dore, reached St. Felicien at 11 p.m. of Thursday, September 22nd.

Saturday and Sunday, September 24th and 25th, were occupied in settling up accounts, packing and storing outfit, when the whole party left Roberval for Quebec, reaching the latter place on the morning of the 26th.

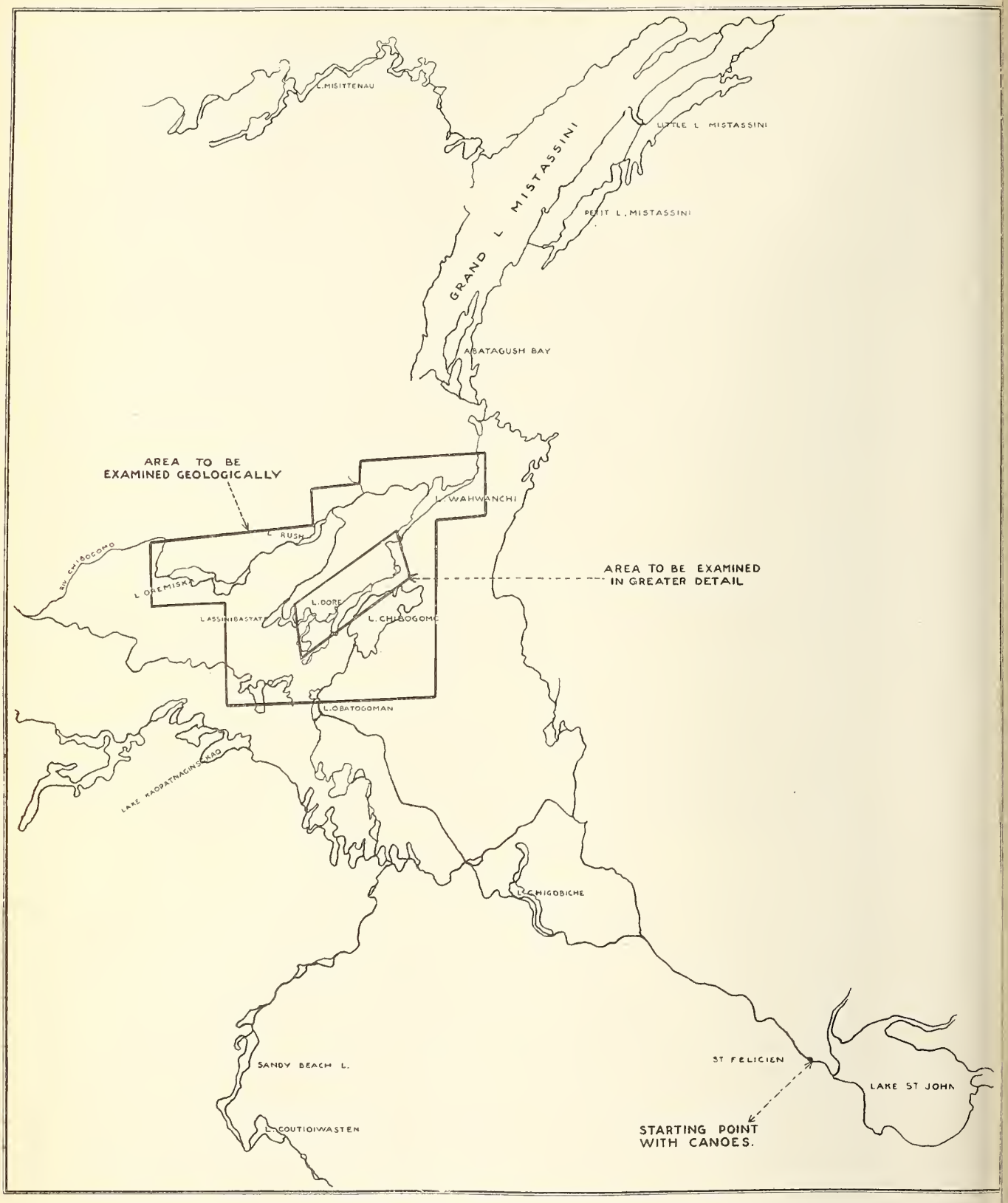
METHODS OF FIELD WORK:

The inadequacy for our purposes of the first surveys, as shown on the previous official maps of the district, became apparent soon after our arrival and preliminary examination of the district, so that it was found necessary to re-survey all of the principal lakes and watercourses. The results thus obtained, while not altering to any very great extent the general and relative position of these physical features, enabled us to depict our observations on the resulting map which accompanies this report in much more detail and with much greater accuracy.

The distances were measured with a Rochon micrometer telescope in terms of a known base, while the directions were determined by prismatic and surveying compasses. In the northern portions of Lac Dore and Lake Chibougamou and the route from Mackenzie Bay to Wakonichi Lake and from the southwest bay of Lake Wakonichi as far as and including Lac Bourbeau, the angles of direction were taken by means of a Gurley light mountain transit.

The distances obtained from point to point were further utilized as bases for a compass triangulation by which the position of many of the smaller islands and some of the more conspicuous points otherwise inaccessible were defined with sufficient accuracy.

In this way detailed surveys were made of the whole of Chibougamou Lake, including the large and irregular indentations known as Island and McKenzie Bays, as well as the bay which extends such a long distance towards the southwest. Chibougamou River was also surveyed as far as its outlet from Little Rush Lake, including Dore, David, Simon, Assinitchibastat and Rush Lakes. In addition to this, Wakonichi Lake was scaled as well as the route south to McKenzie Bay of Chibougamou Lake, and the route northeast from Wakonichi as far as Lake Mistassini. The crooked river which forms the canoe route from the northwest corner of Lake Wakonichi to the Chibougamou River and its tributary, the Chebistuenekan River, were also measured. Lake Bourbeau was also surveyed, including the route from its northeast bay to the southwest arm of Wakonichi Lake. Besides these a few of the more important tributaries of the Chibougamou River between Assinitchibastat and Rush Lakes, were ascended and surveys or sketches made of them. Besides, a survey was made of the Rapid River and the lakes which form its headwaters.



This map is from an old drawing. It is not revised to date.

THE AREA EXAMINED.

The altitudes of all the principal elevations were obtained by repeated observations with sometimes three aneroid barometers which had previously been compared with the mercurial barometer. An attempt was also made to determine by means of these same instruments the difference in elevation of all of the lakes, as well as to gauge the levels of the various streams, but with only indifferent success. These elevations have not as yet been fully correlated with one another an Lake St. John, and cannot, therefore, be given in th present preliminary report.

All of the mineral deposits were carefully sample by Messrs. Gwillim and Bateman and the resultin assays are included as part of Prof. Gwillim's report.

A systematic and typical series of all the rock typ recognized in the district was collected, and from the

the usual transparent thin sections have been prepared for examination under the microscope. These are now being carefully studied and their detailed description will be included in the final report to be issued later.

The map accompanying this report has been compiled by Mr. J. H. Valiquette under Dr. Barlow's direction, and is on a scale of 40 chs. (½mile) to an inch. It is not intended for final publication, but is included with this present report for purposes of illustration and elucidation of the various descriptions of localities.

There is also included a contoured geological map of part of Asbestos Island to show the principal excavations and pits. This is on a scale of 100 feet to the inch, with 25 foot contour intervals.

A large series of photographs (5 inches by 7 inches) was taken and the negatives developed in the field. It is intended that six albums, each including a complete set, will be prepared, three of which will be handed to the Department, while the Commissioners will each receive one.

These photographs are illustrative of the physical and geological features, as well as of the principal mining development work.

LOCATION AND AREA:

The position of the Chibougamou Mining Region covered by the work of the Commission extends from 49 degrees 30 feet to 50 degrees 15 feet north latitude and extends westward from 73 degrees 50 feet to 74 degrees 45 feet, thus embracing a rectangle measuring approximately 40 miles from east to west and 38 miles from north to south, or an area of 1,520 square miles.

The southern boundary of this rectangle is 300 miles almost directly north of Montreal, or nearly 250 miles N.N.W. of the City of Quebec. The southern end of Chibougamou Lake is about 125 miles in a straight line northwest from Roberval on Lake St. John. By the canoe route following the Ashuapmuchuan and Chigobiche Rivers, this same locality is 200 miles from Roberval, but by using the wagon road from Roberval by way of the Village of St. Prime and St. Felicien to the Ashuapmuchuan River opposite Riviere aux Trembles (Poplar River), this distance is reduced to 185 miles. From the south end of Lake Chibougamou to our headquarters camp at Pointe aux Bouleaux, is 9.5 miles.

MEANS OF COMMUNICATION:

Being situated on the other side of the height of land dividing the waters flowing south from those flowing to the west and northwest, this region can only be reached by ascending, to its head waters, one of the larger tributaries which enter the St. Lawrence from the north. Of these the Gatineau, St. Maurice and the Ashuapmuchuan are the largest, most easily navigable and the most direct. The shortest and probably, therefore, the easiest route is that which has been usually followed by way of Roberval and Lake St. John. With the construction of the Grand Trunk Pacific Railway, a shorter and better route will no doubt be found by way of the lakes and streams near the head waters of the St. Maurice River, but pending the completion of this railway, the usual route which was followed by the Commission is much to be preferred.

The Quebec and Lake St. John Railway reaches Roberval on the west shore of Lake St. John about 9 miles from the mouth of the Ashuapmuchuan River (usually abbreviated Chamuchuan). From Roberval, canoes and provisions may be transported by wagons (14.5 miles) or by steamer by way of the lake and river to St. Felicien, a village on the southwest side of the Ashuapmuchuan River (18.5 miles).

St. Felicien is really the assembling place for the guides, most of whom come from Pointe Bleue on the Indian Reservation, and the starting point of all expeditions. From St. Felicien canoes and provisions should be transported by carts to the mouth of the Riviere aux Trembles, the old route to the head of the Bear Portage (Portage a l'Ours) having been superseded by this one, which reaches the stream some miles further up and avoids three portages.

From St. Felicien there is the choice of two routes. One road follows the west side of the Ashuapmuchuan River by way of the Village of La Dore and reaches the Riviere aux Trembles (Poplar River) about 3 miles above its confluence with Ashuapmuchuan River. The last three or four miles of this road is bad, as it passes over a flat burnt, sand country, which is now covered with a very scanty growth of small jack pine. At rather frequent intervals it also passes through black spruce swamps. It has simply been cut out of the thin forest with little or no improvements. The Riviere aux Trembles is a shallow and crooked stream with many sand bars and is scarcely navigable by loaded canoes in dry weather. The route on the east side passes over a fine new bridge (Carbonneau Bridge) nearly 2,000 feet in length and is that usually travelled to Normandin and the settlements on the Mistassini River. A branch from this road about 5 miles in length reaches the Ashuapmuchuan River, almost directly opposite the Riviere aux Trembles. This last 5 miles is very bad through a jack pine plain road running over and between sand dunes. This latter route taken by our party is about 18 miles in length. It has little if any advantages over the road on the west side and is considerably more expensive by reasons of certain exactions by certain of the local people who pretend to have improved the road.

Table of Geological Formations.

The rocks of the Chibougamou Mining Region, arranged in the order of their geological age, may be tabulated as follows in descending order:

1. Quaternary.....Sands and Gravels, Boulder Clay.
2. Lower Huronian.....Slates, sandstones, arkoses and glomerates.

GREAT UNCONFORMITY.

IGNEOUS.

(Intrusive and of Different Ages).

3. Laurentian.....Granites. Granite and Diorite Gneiss, Igneous Contact.
4. Anorthosite.....Gabbro, Igneous Contact.
5. Keewatin.....This series includes the asbestos bearing serpentines which are altered dunites and conglomerates. quartz porphyries and porphyrites, amygdaloidal basalts, diabases and gabbros.

General History.

This will deal with the early exploration and development of the district and will be fully treated in the final report.

PREVIOUS WORK:

A summary of this has been given by Prof. Gwillim in his report which is appended.

It will also be much more fully treated in the final report. It will then include a statement in as concise a form as possible, of all the previous reports, bearing on

the geology, topography and natural history of this region and that to the southeast by which it is reached.

Summary of Conclusions.

General Geology and Age, Relations and Formations.

The area under consideration is underlain by rocks of Archæan or Pre-Cambrian Age. These are included in the Keewatin, Laurentian and Lower Huronian formations. In addition a rock which seems peculiar to this Archæan area has been called and the name is here retained "gabbro-anorthosite," because, although it is of gabboric type, there is a marked absence or paucity of ferro-magnesian minerals, which are almost invariably present and sometimes abundant in typical gabbros. In this respect the rock resembles the anorthosite formerly classified as Upper Laurentian.

The Keewatin formation is important from an economic standpoint, because it includes certain serpentinous rocks (altered dunites and peridotites) portions of which contain veins of asbestos. These are the oldest rocks of the district. They are penetrated by the batholithic mass of the gabbro-anorthosite already mentioned and which, as shown in the map, extends in a west-southwest direction from the Bay of Islands across Chibougamou, Dore, Cache, David and Simon Lakes, where it seems to end abruptly, being replaced in this direction by granite and granite schist breccia. The northern contact of this mass with the Keewatin rocks is economically important, because it is in this vicinity usually in the green schists of the Keewatin, but also sometimes in the anorthosite gabbro itself, that the gold-bearing quartz veins have been developed. Indeed it has been established almost beyond a doubt that the intrusion of the gabbro-anorthosite has been the direct cause of the formation of these quartz veins in which gold as well as copper has been found. Such quartz veins with chalcopyrite (copper pyrites) and occasionally dikes containing the same mineral are deposits which owe their presence to the differentiation of the same magna from which the anorthosite gabbro has solidified. In addition, the deposits of chalcopyrite and pyrrhotite occuring at Copper Point on Portage Island, are similar in origin, though much smaller in volume, to the nickel and copper deposits of the Sudbury district. They are thus a direct differentiate product of the anorthosite-gabbro, and occur close to the line of junction between this rock and the Keewatin green schists. The titaniferous magnetite deposits found at Sorcerer Mountain, north of Copper Point, and also on the islets near the southern or main outlet of Lake Chibougamou are also of magmatic origin and occur at or in the immediate neighbourhood of the line of junction between the anorthosite-gabbro and Keewatin green schists.

This gabbro-anorthosite is also an economically valuable rock formation, because the feldspathic dykes, which cut the serpentines on the shores of McKenzie Bay and Asbestos Island, are believed to be the surface expression or upward extension of the anorthosite-gabbro. It is the intrusion of these dykes which has contributed to the formation of the silky asbestos at Pits 3, 4 and 7, while the presence at the surface of a small dyke of similar material a short distance northeast of No. 6 Pit, may be an indication that the main body of the gabbro-anorthosite is not very deeply buried in the vicinity of Pits 1, 2 and 6.

Both the Keewatin schists and gabbro-anorthosite are intruded by certain granites and diorites, some portions of which, especially near the junctions with the older rocks, are very plainly foliated. From their general composition, appearance and geological relations, these rocks have been classified as Laurentian. Both the gabbro-anorthosite and the granite in certain areas intrude the Keewatin in the most intricate manner, forming a breccia which in certain localities underlies a comparatively large area, as on Assinitchibastat Lake in the vicinity of and opposite to the inlet (Chibougamou River).

The Lower Huronian is represented by certain conglomerates, arkoses, sandstones and slates which either in horizontal position or in low broad anticlinal and synclinal folds rest unconformably upon the upturned edges of the Keewatin and the uneven or the hummocky surfaces of all the older rocks which have already been described.

These conglomerates when resting directly upon the Keewatin often contain very few pebbles, while the greenish chloritic matrix, in which the pebbles are embedded, is by far the more abundant portion of the rock. Where, however, they rest directly upon the granites or gneisses of the Laurentian, the lower beds are an arkose conglomerate or arkose made up almost altogether of the broken up fragments of the granite. The Lower Huronian presents a transition upward from a basal conglomerate usually into arkose or arkose-quartzite; these in turn pass into comparatively dark grey or greenish grey feldspathic sandstones and these again upward into slates which sometimes show the cleavage planes as quite distinct from the bedding. Sometimes there is an alternation of coarser and finer grained sediments, so that at the tops of some of the hills as on Wako Mountain, we find in the upper beds a comparatively coarse conglomerate, while further down the hill were noticed strata of sandstone and slate.

Economic Geology:

From an economic standpoint the junction between the gabbro-anorthosite and Keewatin schist is perhaps the most important geological feature in the district, for it is at or in the immediate vicinity of this line of structural weakness that the copper bearing quartz veins, in which gold has been discovered, occur. It is in this neighbourhood also that the iron (magnetite) of Sorcerer Mountain and the sulphide deposits carrying small amounts of gold and nickel of Copper Point, occur. Both in the gabbro itself and in the Keewatin green schist, veins and patches of quartz and sometimes calcite and dolomite, often occur either with or without sulphides, but their small size and irregularity would seem to be serious obstacles to their economic development as mines.

Serpentine and Asbestos:

The serpentines of Rapid River, McKenzie Bay, Lac Bourbeau and Assinitchibastat result from the alteration or decomposition of certain dunites and peridotites. These serpentines are very dark green in colour sometimes almost black, and have a distinctly harsh rather than an unctuous feeling characteristic of pure serpentines, except in the vicinity of certain feldspathic dykes, and other favoured localities where almost all of the iron has been leached out and removed to other places, leaving a comparatively small band (3 to 6 inches in width on either side of the dyke) of very pure pale green serpentine.

In certain places, usually in the immediate (3 to 6 inches) vicinity of the feldspathic dykes, small veins of silky asbestos have been found, many of which are of a high grade, but these do not constitute a large percentage of any considerable bulk of the rock, nor are they continuous for any great length, as they are subject to frequent dislocation and faulting and very often

thin out altogether in every direction. Most of these veins vary from the thickness of a knife blade up to a quarter of an inch and the widest is not more than three-quarters on an inch.

Geological Probability of Occurrence of Gold:

As has been already mentioned, the rocks embodying the whole area examined by the Commission are of Archæan or Pre-Cambrian Age. This, therefore, in common with other similar areas of our hinterland, is very promising from a mining geological standpoint. The large areas of Keewatin schists present precisely similar rock types as have been found associated with the gold of the Porcupine and Larder Lake gold districts in Ontario, while the geological relations so far as known are not dissimilar. In addition the almost invariable presence of gold in the quartz and its occurrence over such a wide area, although usually in a small amount, is distinctly encouraging and should stimulate prospecting if the region was not so usually and deeply covered with peat and moss, and if it was not so remote from civilization and thus difficult of access. The sulphide deposits of Copper Point are also worthy of further development work. This occurrence seems to have puzzled the earlier mining engineers at this place and under these conditions. None of the discoveries of copper and gold is in deposits of such magnitude or promise as would enable your Commission to state without a considerable degree of hesitation that they would with further development become "mines" in the strict meaning of this term.

Possibilities of Asbestos:

Although the possibilities of the Chibougamou serpentine as an asbestos producer have not been exhausted by the mining development work so far undertaken, the results so far are decidedly disappointing. The amount of asbestos noticed in the working faces of the various open cuts and workings as well as in the dumps, is insignificant and altogether insufficient for their successful exploitation as mines. The previous reports on the occurrences of this mineral are, to say the least, optimistic and misleading. Not only does the serpentine of Chibougamou cover a much less area than was described and outlined in previous reports and maps, but the serpentine itself is much less pure, except in very restricted outcrops, and as a consequence is very much less in area than that of the Eastern Townships with which it has been compared. In addition, the geological relations are essentially different from Thetford and Black Lake, for whereas at these places the differentiation in the magma as shown by the various rock types extends to the most acid phases and is therefore very complete, the most acid rock type noticed at Lake Chibougamou is only at most of intermediate composition as exemplified by the feldspathic dykes already mentioned as cutting the serpentine.

Possibilities of Iron:

The deposits of iron ore (magnetite) which are perhaps large and more typically exposed on the southern face of Sorcerer Mountain than elsewhere in the region, are not of any great importance at the present time.

The chief occurrences of pyrite are on Portage Island near the northern end of Paint Mountain. The mineral here occurs as abundant disseminations in chlorite schist and decomposed diabase. No large body of pure pyrite capable of economic development as a source for sulphur was, however, noticed. Similar outcrops on one of the western summits of Sorcerer Mountain may be a continuation of this belt, but here likewise no massive deposit was found. Similar occurrences, some richer and some leaner, are by no means uncommonly met with in the Keewatin formation of Northern Ontario and Quebec; in fact, their frequency seems to be a characteristic of this formation. It is possible that a large and pure body of pyrite might be discovered, but the expense of prospecting and the remoteness of the district will be ample determents.

No Probability of Silver or Cobalt at Chibougamou:

The conglomerates of McKenzie Narrows, McKenzie and Rapid Bay on Lake Chibougamou, as well as those on Wakonichi Lake, are of Lower Huronian and thus presumably of the same geological formation as those of Cobalt, in which many of the silver veins of Cobalt have been found.

The newer diabase, however, which is the real "silver bringer" and to whose intrusion the silver bearing veins owe their presence, was not found, although careful search was made for it.

It is not likely, therefore, that any similar deposits will be found in the Chibougamou Region, and the reputed "finds" of silver, smaltite and cobalt bloom must be treated as false. It is possible, although unnoticed by any member of your Commission, that cobalt bloom may occur in small amount, but an examination of the localities where it was reported as occurring, failed to show any sign of this mineral, while the rocks themselves at one of these places was not at all favourable to its presence.

Occurrence of Lead and Zinc at Mistassini May be Important:

Galena and zinc blende are present, both in small amount, in the flat lying limestones occurring at the Narrows about two miles north of the Hudson's Bay Company post at Mistassini. Although the deposits there examined are not economically valuable, the presence of these minerals, even in small quantities and in such geological association, is of somewhat more than scientific interest, as it is under precisely similar conditions that the great deposits of the Mississippi Valley occur.

(To be continued.)

The Investigation and Development of Gold Areas,

(Written for the Canadian Mining Journal by R. B. Lamb.)*

The examination and development of gold-bearing deposits present some features so very different from other metalliferous ore bodies that discussion and consideration of their many problems is always in order.

Too much reliance is invariably placed upon immature observation and assay values of grab samples of gold-bearing rock.

Nothing should be so vigorously condemned as the faith placed in samples selected by untrained samplers. Such information is uniformly misleading and is the source of false reasoning and of money losses. It is not the intention here to discuss methods of sampling, examining, and valuation of gold deposits, but rather to point out some of the pitfalls into which the younger engineer may trip.

It should be noticed that:

1. Gold occurs free, in association with other metals and minerals, and as alloys.

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2. It is found almost invariably in shoots "pitching" in the ore body.

3. Gold is usually irregularly distributed in the pay shoot.

4. Values exist frequently beyond the limits of the pay shoot.

5. There is a very small weight of metal per ton of gangue material.

6. Free gold in an ore shoot is usually found in crevices, cracks, vugs—in crushed and fractured parts of the vein matter—in association with other minerals softer than the gangue—in aggregations, bunches, flakes, etc., irregularly distributed in the rock matter of the vein or deposit. It is sometimes discovered in the wall rock in releases, gouges, etc.

Frequently parts of the vein within the ore shoot are wholly barren. In replacement deposits, as altered limestones, great irregularity of gold deposition occurs and barren material in the limits of the ore shoot are of common occurrence.

"Horses" of barren material often cut into the vein or ore body; in many instances within the pay shoot itself.

7. Gold values, in many types of ore deposits, present a banded structure, the gold being found in parallel or irregular lines with barren or low grade material between the higher grade bands.

8. Some types present definite but narrow streaks of pay-ore with irregular direction within a low grade or barren gangue material.

The above factors are the principal reasons why sampling and investigation of gold-bearing deposits differ substantially from those of most other metals. It will readily be seen that should conditions such as the above obtain, inexperienced sampling must of necessity be absolutely worthless. An assay from any portion of a gold vein is only representative of the sample taken. The sample and not the assay is the determining factor.

It may be said that a free gold condition with sulphides, for proper appraisement requires samples cut under an engineer's direction, which means due regard in cutting for all the eight factors stated above and such minor considerations as will present themselves to the valuer making the appraisement.

The closer the sampling and checking such as additional time and expense will permit, the more reliable will be the conclusion. The fire assay results should be invariably checked by the pan. It may be almost needless to observe that exact valuation of gold deposits depends largely on frequency of sampling and the methods employed. Generally a difference up to fifty cents per ton is a close check on ore under six dollars per ton between different engineers on average conditions; and up to one dollar per ton on ore of ten dollars per ton up to twenty dollars per ton. Under one dollar per ton with ten dollar or twenty dollar ore is usually regarded as a trace in mine sampling.

The accuracy of sampling in mine work in ores from ten dollars to twenty dollars per ton as a general rule need not be calculated closer than the above-named margin between different engineers. The whole of the sampling should be properly mapped and calculated on the widths taken. The usual methods of calculation are followed.

A departure at this point is usually made by experienced gold engineers. Notwithstanding the care taken in sampling, free gold makes for irregular results and the engineer is frequently called upon to give the milling average of the deposit under observation. A deduction after calculation is made for this and the result obtained should show what the ore can be depended on to mill; that is, to return to the mine owner in bullion. This deduction varies from two and a half per cent. to about twenty per cent., and is determined by the experience of the engineer making the observations. It is possible to eliminate entirely this deduction in developed properties by going to greater expense in sampling.

In sampling and observing prospects local conditions will largely influence the observer, but no final conclusion should be reached on purely surface showings. Sampling should be done on the surface outcrops and stripped showings, but it should be supplemented by samples from pits, trenches, etc., put down under the direction of the examining engineer during the time of his investigations. It is usual to accept the indicated observations of prospects that look favourable only on condition that development work be allowed before substantial payments are made.

The whole of the pioneer work in gold areas should be directed to "following the ore"—stick to the values and develop for further examination and observation. Permanent development work and the laying out of a mine cannot be properly begun until there is something exposed to do it upon. The prospect under working exploration will show conditions that will indicate to the engineer in charge how to lay out future development and what kind of managerial policy to recommend. It is impossible to make a two-day infant walk—a prospect is not a mine—don't kill a possible mine by conducting and managing an encouraging prospect like a proposition of blocked out reserves. A windlass is needed before a Nordberg, and picks and powder are required before a stamp battery. It is important to have a shaft on the ore shoot before a completely stocked warehouse is placed on the claim.

Spend your money on men and dynamite and assay, map and tabulate your results. Then it is known what your proposition is and what it stands for. More money can then be intelligently spent or the shaft can be nailed down.

PORCUPINE GOLDFIELD IN WINTER

(Reginald E. Hore, Houghton, Mich.)

The potentialities of Porcupine being now well recognized, and a good temporary road available, strenuous efforts are being made in preparation for the exploration and development of the gold deposits. Testing work in Tisdale Township during the past year has proven two large ore bodies, for the mining and milling of which there is machinery now on the road. Surface prospecting has disclosed some very promising deposits, which are now being explored, and a very large number of less promising or less favourably situated deposits which are being investigated in varied degree according to the supply of faith and funds. Notable efforts are being made by merchants who wish to participate in the business arising from the mining activity. Others have been

The tented City west of the Shuniah, Porcupine

attracted by the opportunity for speculation in claims and town lots; but there has been no remarkable boom.

On the sleigh road from the railroad to the camp over 200 teams are engaged in hauling in supplies. The lack of good summer roads, followed by two or three weeks of isolation during the freeze up, left the camp in the fall with a meagre supply of foodstuffs. During the last week of November a winter road became available, and the immediate needs were soon served. Then followed hundreds of sleigh loads of building materials, part of it for the mines; but much also for the housing of mercantile enterprises on the numerous townsites. Then in January began more frequent shipments of mining machinery. Building materials, food and machinery will be hauled in in large quantities during the next few weeks, and then in March and early April the camp will be stocked with food sufficient to last until the arrival of the railroad in midsummer.

Kelso Mines.

As a result of the activity on the trail, a temporary town has sprung into existence at mileage 222, and has been officially designated Kelso Mines. The T. & N. O. Ry. has provided good yard facilities for handling the incoming freight., and has erected a suitable station house in place of the old day coaches which served in the summer. Besides numerous buildings for the accommodation of men and horses there is, facing the railway, a long line of shops. Once the branch line into Porcupine is completed the yards will be usually well filled with cars, but there are at present sufficient teams to handle 200 tons per day, and the road should be good until the end of March at least. The freight charges vary according to the demands, but 60c. per cwt. is quite frequently quoted. The larger consignments are being handled on contract.

To take care of the large quantity of supplies and machinery ordered for the Dome Mines, the management has a private siding with office and warehouse. Other large interests also have special facilities, and there is, consequently, little confusion in the yard.

The Sleigh Road.

There is a remarkable contrast between the summer and winter roads to Porcupine, the former exceedingly bad and the latter unusually good. It is doubtful whether there could be found in Ontario a 30-mile road better suited for the hauling of freight than is the sleigh road to the gold mines. It is more nearly level than most roads of equal length, is remarkably well protected by thick forest, and on account of the low temperature presents an unusually hard and firm surface. Heavy loads are, consequently, readily handled, and the average drawn by single teams must be nearly three tons. An ordinary load of rough lumber contains 2,500 to 3,000 feet.

From Kelso the stages follow the wagon road to Frederick House Lake, then go along the shore to the mouth of the Frederick House River. The river is then

Noonday scene at Price's Stopping Place.

The Shuniah Hotel, Porcupine.

pine is constructed there will be little reason for the existence of Kelso, and most of the buildings have evidently been erected with this in view.

It seems likely that the large volume of freight will be handled without great difficulty. The yards are followed for a few hundred yards to Richardson's stopping place. Here there is a bridge leading across to a winter road recently cut to Hill's Landing on the Porcupine River, and making a remarkably pretty driveway through close snow-covered spruce and cedar. Four miles from Richardson's is Price's halfway house, and here a stop is made to rest and feed the horses, giving the passengers an opportunity to partake of a meal and warm their toes and noses. The journey is then resumed, and the Porcupine River is crossed at Hill's. Then the narrow, high-crowned, deep-ditched summer road is followed to Golden City and Porcupine Lake. South Porcupine is reached by crossing on the lake, and thence there are good roads to several of the leading properties. One leads west to the Hollinger, Rea and Vipond, and a second southwest to the Dome and Foster.

The stage trip is under ordinary conditions quite a pleasant one, and rarely a severe one if made in daylight. Since many of the travellers reach Kelso in the evening, it is the custom to send stages over the road during the night. Travelling in the dark gives the advantage of a road free from teams; but, especially along Frederick House Lake, has led to undesirable experiences on cold and stormy nights. It is unfortunate that the lake shore has been used rather than do a little additional cutting through the wind-defying forest, and it is remarkable that no marks have been set to guide the teamsters.

While most of the freight travels over the same road as the stages, there is a second road from Kelso to Hill's. This runs past the Kelso nickel mine and avoids the lake; but for various reasons has not been used so extensively as the route described above.

Most of the sleigh roads end in Tisdale Township, and supplies for outlying properties are taken in on toboggans. Off the trails, travelling without snowshoes is practically impossible. To draw the toboggans, dogs are much used, though the prospector is frequently himself the beast of burden. The sleigh dogs are of very numerous types, and mostly mongrels; but there are few of the hybrids such as are used in the far north. An occasional Labrador wolf dog may be seen, but it is the exception rather than the rule.

Mail and Telephone Service.

Porcupine has at last been given a daily mail service, and the summer's second-class mail was taken in in time for Christmas. It is hoped that adequate post office facilities will soon be established, though there is no remarkable haste to this end manifest. A telephone company has connected the mines and town with the outside world, and proposes to establish telegraphic connections at an early date.

Townsite.

Of townsites at Porcupine, there are seven or eight and much speculation and confusion has naturally resulted. Some of these are evidently better than others but none are remarkably favourable. The lake shore does not present a good natural townsite of any great extent, since for the most part the land is low and the water shallow. Drainage and water supply will be serious problems for a town of any size on any of the present lake shore sites. Under the circumstances, the location of the railroad will probably determine that of the town. Well informed persons have remarked on the superior conditions at Mattagami River, a few miles west of the Hollinger Mine, and though perhaps too far distant from the present centre of mining activity

On the Winter Road.

Grading on Porcupine Branch of T. and N. O. Railway.

Machinery on road to Timmins Mine.

A scene at Kelso Mines, at right is road to Porcupine.

Hollinger Stamp Mill, Porcupine.

to be as yet seriously considered, the natural advantages on the river will doubtless be generally recognized later. Certainly the railroad should be extended thus far.

On the various townsites, numerous buildings are being erected. Among these are two hotels, and as the Shuniah is being enlarged, there should soon be good accommodations for visitors. Very conspicuous are the numerous banking offices, making plain the desire of these institutions to get a foothold in Ontario's gold camp.

The Government Railway.

After private interests had, after much delay, begun the construction of a railroad into the camp, the Ontario Government announced that the Province would build the road. From a point two miles above Kelso the work is now being carried on. Several miles of the line has been cleared of forest, and some grading, which is very light, has been done. The exact location has not yet been made public; but the line will evidently cross the Kelso wagon road twice before Frederick House Lake is reached, and probably pass near Price's stopping place. It is expected to touch at the north end of Porcupine Lake, and then run down the west shore to South Porcupine, and thence to the Dome Mine. Probably later an extension will be made westward to Pearl Lake and the Mattagami River. The appropriation of $450,000 for the building of the road allows about $15,000 per mile. It is expected that there will be steel to Porcupine Lake by July.

Development.

Owing to the deep covering of snow, surface prospecting in winter is in most cases unsatisfactory. Few new finds are made, and of the nature of these little is determined before the snow melts. Some surface work is being done, however, including the stripping of finds made during the past summer, and the trenching of some well located ground which was too wet to work in the fall. It was found that in some such places water filled the trenches almost as quickly as the clay was removed, and hence it is an advantage to have the ground frozen. The removal of a few feet of snow is a small item when the trenches are of any considerable depth.

Freight on Siding at Kelso Mines.

On a number of properties which have good surface showings, preparations for development work are now in progress, camps are being built, and supplies and machinery assembled. On two properties, Dome and Hollinger, development work has already been carried on to such an extent and with such satisfactory results, that preparations for mining and milling ore on a large scale are under way. The quartz mass at the Dome Mine has been blocked out by drifts and cross-cuts run at regular intervals on the 60-foot level, while the surface has been carefully sampled. The several drill holes proved the deposit to a depth of 400 feet, showing the ore body to be very large and giving a more definite idea of its shape. No tests have yet been made at greater depth, and exploration work is now postponed, while the permanent hoisting shaft is being sunk. The exploration shafts will probably be used in blasting down the ore by underhand stoping, while all hoisting will be done at the new shaft. That the cost of mining will be low is evident. The cost of milling has yet to be determined, as some of the conditions are not remarkably favourable. To reduce the ore, a 40 or 50-stamp mill, and a complete recrushing and cyanide plant will be erected in the spring. It is planned to handle about 250 tons per day.

On the Kelso Road.

On the Timmins-McMartin-Dunlap properties, the chief development is on the claims held by Hollinger Gold mine. On one large vein two shafts, 250 paces apart, have been connected at the 100-foot level by a tortuous drift following the vein for most of the distance. From the first level a winze has been sunk in the vein, and is said to be in good ore. The 2-stamp test mill handles about 4 or 5 tons per day, with a maximum capacity of 10 tons when the steam pressure is good and favourable ore is being fed. The quartz crushes readily; but the schistose carbonate wall rock is more troublesome. One of the owners is quoted as stating that the 300 tons of ore first treated in the mill averaged $50.00 to $250.00 per ton. Only a small fraction of the ore mined in development work has been milled. A 30-stamp mill, to crush Hollinger ore and take custom work, has been ordered by the Timmins syndicate, and will be erected in the spring. It is apparently not the intention to put in a cyanide plant immediately, as there is considerable quartz that is reasonably free from sulphides. It will evidently be possible to keep the stamps busy crushing for some time before feeding much of the pyritic country rock.

This property has been incorporated as the Hollinger Gold Mine, and shares representing a minority interest were recently placed on the market. The control lies still with the quintette who developed the La Rose Mine.

Aside from the Hollinger claims, the Timmins syndicate has done some development work on promising veins on the Miller-Middleton claims. If these veins prove as satisfactory as the surface showings indicate, there should soon be another producing mine in the camp.

At the Vipond property of the Porcupine Gold Mines Company, there have been two stamps put into commission recently, and there are, consequently, now three Porcupine properties which are producing gold while exploring the ore bodies.

At a number of other properties, including the Rea (Consolidated Goldfields), Foster, and Armstrong-McGibbon (Tisdale Mines), exploration shafts are being sunk in ore, and much information as to the nature of the deposits should be gained in the next few months.

Spring should show the camp to be well stocked with supplies, power from Mattagami River available, and steel being laid. Important developments during the year are therefore to be expected.

WORK OF THE GEOLOGICAL SURVEY IN 1910

(Written for the Canadian Mining Journal.)

The geological and topographical field work undertaken by the Geological Survey during the past season has, as usual, been economic in its bearing, most of it directly so; but a little has been on the broader problems of Canadian geology whose solution is required for the interpretation of the facts gleaned in the detailed examination of the mining districts. Most of the fields selected are those in which work has been specially asked for by the mining profession, Boards of Trade, etc. Not all such requests received could be met, on account of the lack of specially qualified men to take charge of the operations. So far as possible, however, this was done. The guiding principle in the selection was to choose those districts in which the work would be likely to prove of most immediate or of greatest value. The parties were distributed as follows:

Mr. D. D. Cairnes was engaged in investigating the ore deposits of the Atlin District. This district has for a decade been known as a placer field. During the past season some promising developments in lode mining have taken place.

Mr. R. G. McConnell spent the season studying the geology and ore deposits of the Stewart district at the head of Portland Canal. This district attracted a great deal of attention during the summer. While promising deposits have been found, exaggerated reports sent out threatened a wild boom, which, fortunately, the Survey was able to assist in preventing by the publication of official despatches from its representative in this field.

Mr. G. Malloch made a topographical survey of this district.

Mr. W. W. Leach continued his topographical and geological mapping of the Hazelton district. The approach of the Grand Trunk Pacific Railway brings this section into prominence. Promising discoveries of silver-lead, copper and coal have been made.

Mr. R. H. Chapman, assisted by Messrs. Chipman, McLean, MacKay, McElhanney and Wookey continued the topographical mapping of Vancouver Island. Mr. McLean continued the triangulation of the island as control of the topographic maps. Mr. Chapman divided his forces into three parties and completed the mapping of three more sheets.

Mr. C. H. Clapp made a detailed examination of the area of the Victoria and Saanich sheets, which were topographically mapped the previous season by Mr. Chapman. Vancouver Island is now attracting many settlers and the topographical and geological mapping of the island is of great and immediate value.

Mr. C. H. Camsell completed his topographical and geological survey of the Tulameen district and made a reconnaissance from the international boundary line to the Nicola Valley. This section is noted for the variety of its minerals, and prospect of railway transportation is bringing it into notice.

Mr. L. Reinecke completed his topographical mapping of the Beaverdell mining district, West Fork of the Kettle River, and began a study of its geology and ore deposits.

Mr. W. H. Boyd made a topographical survey of the Deadwood Mining Camp and continued his survey of the Slocan district.

Mr. Mr. O. E. LeRoy made a study of the geology and ore deposits of Deadwood, completed his investigation of the ore deposits of the Slocan silver-lead district, and made a preliminary examination of Franklin camp, North Fork of the Kettle River.

Mr. S. J. Schofield continued his topographical and geological survey of East Kootenay.

For the correlation of the formations met with in the mining camps and for the deciphering of their complicated geological structure several detailed geological sections across the Cordillera in Canada are required. Such a section has been constructed by Mr. R. A. Daly along the international boundary line. A similar section is now needed along the main line of the Canadian Pacific Railway. Work upon this was commenced this season. Mr. J. A. Allan was at work in the vicinity of Ice River. Mr. H. S. Shimer studied in detail the Devon Carboniferous rocks near Field. The Cambrian rocks near Field have been made the subject of careful study for several seasons by Dr. C. H. Walcott, Secretary of the Smithsonian Institution, Washington. Incidentally it may be mentioned that Dr. Walcott found here one of the most remarkable deposits of fossils ever discovered.

Mr. D. B. Dowling continued his explorations of the coal-bearing rocks on the east slope of the Rockies. This year he was delimiting the coal formations in the neighbourhood of the Yellowhead Pass. Being right on the Grand Trunk Pacific Railway these fields are of special importance.

With the settlement of the country the demand for clays suitable for all kinds of clay products becomes urgent. If found, important industries are developed. Unless found, a serious burden is imposed upon the communities. Mr. Heinrich Ries, the most prominent clay expert in America, and Mr. Joseph Keele, spent the season investigating the clay resources of the Western Provinces.

Mr. W. McInnes mapped and more accurately defined the geological boundaries in the district north of Cum-

berland House and the Pass, work which is at present desirable in anticipation of the early construction of the Hudson Bay Railway.

Mr. J. D. Trueman spent the season in the Gunflint Lake district, Western Ontario. This area has never been mapped geologically. On account of its proximity to known iron districts its examination was called for.

Mr. W. H. Collins completed his geological map of the Gowganda district, and commenced the mapping of the unsurveyed but promising district west of the Temiskaming sheet and north of the Sudbury sheet.

Mr. W. A. Johnston continued his topographical and geological surveys in the Lake Simcoe district.

Mr. C. R. Stauffer began a re-survey of the geology of Southwestern Ontario, in which important non-metallic mineral deposits occur. No detailed study of its geology has been made since the early days of the survey, the reports and maps of which are long since out of print. r es. wells, borings, etc., have brought to light much additional information, so that a revision of the geology of this district will be welcomed.

Mr. Morley E. Wilson was engaged in mapping and examining the district east of Abitibi Lake. This district is similar to Northern Ontario, and it is hoped that similar mineral discoveries may be made in it.

Mr. J. A. Dresser continued his investigations in the Eastern Townships of Quebec, noted for their great and varied mineral wealth.

Mr. J. W. Goldthwait studied the raised marine beaches south of the St. Lawrence River. This work has a bearing on the clays, sands and soils of the region. The elevation of the land relative to the gulf has been comparatively recent; it is important to ascertain if it has been uniform or greater at one point than another and also, if possible, whether the uplift is still in progress.

Dr. G. A. Young made a geological and topographical survey of the Tobique district, New Brunswick. For some years this field has been brought to the attention of the Survey, there being a strong feeling in New Brunswick that it may prove to be possessed of mineral wealth.

Mr. M. Y. Williams made a detailed study of the district about Arisaig, N.S. This presents probably the best section of Silurian rocks in Eastern America, and their detailed study here may provide a key to their investigation elsewhere.

Mr. E. R. Faribault continued his mapping of Nova Scotia and his investigation of the gold tungsten-bearing rocks. Leaving his party at work in the field, Mr. Faribault spent the two summer months in the Chibougamou district, Quebec, as one of the Commissioners appointed by the Quebec Government to report on the geology and mineral resources of the Chibougamou Lake district, his services having been loaned by the Survey to the Quebec Government for this purpose.

Mr. W. J. Wilson spent a few weeks in the Maritime Provinces collecting fossils to aid in fixing geological horizons, and Mr. P. E. Raymond collected in the neighbourhood of Ottawa, with a similar object.

The Director visited Porcupine, Ontario; accompanied His Excellency Earl Grey on his Hudson Bay expedition; represented Canada at a meeting of the American Mining Congress at Los Angeles, Cal., where he was called upon on several occasions to address audiences on the mining possibilities in Canada; he also made an examination of Turtle Mountain, at Frank, Alta.

No detailed work was done by the Survey in Porcupine, as this district was receiving attention at the hands of the Provincial Bureau of Mines. By mutual arrangement, duplication of work is avoided.

At the instance of the Geological Survey, the Government of Canada and the Canadian Mining Institute, invited the International Geological Congress to hold its next meeting in Canada. This invitation has been accepted and in 1913 about one thousand of the leading geologists, representing every civilized country, will visit Canada and study the geology and mineral resources of this country.

Topographical Division.

During the past year considerable progress has been made in the organization of the topographical division. To this the generous assistance of the United States Geological Survey, afforded through Mr. R. H. Chapman, contributed in no small degree. A corps of carefully selected topographers is being trained, and our standard topographical maps, now being made, will compare favourably with those produced anywhere. Perhaps no part of the work of the Geological Survey is of more immediate economic value; for not only are these accurate topographical maps necessary as base maps for the detailed geology of mining camps to make it sufficiently exact for economic purposes, but these topographic maps are in themselves very valuable to the mining companies, as they may be used for many of the engineering problems which are constantly arising, thereby saving large sums to the operators. This saving represents just so much more capital that is available for developing and other directly productive uses.

A significant tribute to the character of the work now being done is afforded by a British army officer who, after visiting one of our parties in the field last summer, decided to send his son to Canada to receive his training in a Canadian university and on a geological survey topographical party.

In addition to geological work, the Geological Survey is called upon by the Department of Mines Act to engage upon work in natural history, anthropology, etc.

Natural History.

Mr. John Macoun spent the field season in Nova Scotia collecting information and illustrative material on the botany of the Province. He also supervised the work of Mr. C. H. Young, who was collecting marine fauna on the Nova Scotia coast.

Mr. James Macoun went to the north-west coast of Hudson Bay to collect the flora and fauna of that district.

Anthropology.

While the Survey has done some important work in anthropology in the past, it has been spasmodic and entirely secondary. With the rapid settlement of the country, the time has come when work along this line must be vigorously prosecuted, for settlement destroys the materials, and unless they are collected and preserved now, they will be lost forever, and the succeeding generations of Canadians will search in vain for authentic information concerning the native races of their country.

Since this work is called for in the organic law of the Department and the time was opportune, a Division of Anthropology was established this year, and Dr. Edward Sapir was appointed to take charge of it.

Mr. Sapir spent the field season in the West, more particularly in the neighbourhood of Alberni, Vancouver Island, studying the Indians of this section.

Mr. V. Stefansson, who is in the Arctic under the auspices of the American Museum of Natural His-

tory, continued his study of the life and habits of the Esquimo east of the Mackenzie River. He had a trying winter, on account of the failure of the hunt, but managed to pull through. The present winter he expected to spend near Coronation Gulf.

Publications.

The results of the investigations of the Survey are given to the public in the form of maps and reports. Since, however, a great many different classes and individuals find the work of the Survey of interest and value for very different purposes, it is impossible in a general report to present the matter in other ways and in the detail that might be desirable for any single class or individual. A great deal of information is acquired that may be of value to certain individuals but not to the general public, hence must be omitted in a report. Much of such information is given to individuals in the field, and this is perhaps the most practical work the Survey does. A great deal is supplied by correspondence. This branch of the Survey's work is growing rapidly. To avoid delay, information that is of immediate interest to the public is furnished through Press Bulletins, which are sent to the press throughout Canada and also to those individuals who have expressed a wish to have their names placed on the "Notice list" of the Survey. Timely information concerning the Porcupine gold district, the Stewart district, Portland Canal, the Atlin district, Hazelton district, etc., was made public in this manner.

Educational Work.

By a little extra effort and at a comparatively small expenditure, the Survey is able to assist materially the educational institutions of the country. Reports and maps that may be of use in the higher grade schools and colleges are supplied free of cost. To institutions of at least High School grade, attractive cabinets of typical Canadian rocks, minerals, and ores are also furnished free. Positions as student assistants on field parties are reserved for college graduates or students who have at least finished their second year, and who are specializing in geology, mining or topography. The experience gained in the field supplements the college work and is of great direct educational value.

Victoria Memorial Museum.

For many years both the museum halls and storage accommodation in the old building have been taxed to their utmost capacity and as a natural result little has been possible in the way of making new acquisitions. During the past year, however, some important collections were obtained and preparations made for moving the collections to the new Victoria Memorial Museum. Although the building was not completed but still in the contractor's hands, moving was begun in November and at the close of the year the greater part of the offices and collections had been placed in the new building, where the valuable material will no longer be in danger of destruction from fire. On account of lack of accommodation in the old building, not only was the museum stifled, but the general work of the Survey was seriously handicapped. These disabilities are removed in the new quarters. The museums can now expand and the work of the Survey be accelerated. The museums will include mineralogy and geology, biology, and anthropology. In the old museum mineralogy and geology were dominant, the other divisions being only sparingly represented. It is the intention to increase the economic material in the mineralogy and geology division so that Canadian ores and their products, their mode of occurrence, etc., may be thoroughly represented, and to greatly strengthen the biological and anthropological divisions. A large amount of material suitable for public display is already on hand, which for lack of room could not be placed in the old exhibition halls. For the present it is the intention to restrict the museum to Canadian material (except in educational collections where necessary objects may be lacking in Canada) in order to make it first of all the great Canadian museum, whose collections in Canadian material will surpass all others. When this has been accomplished in all divisions, it may be advisable to enlarge its scope, and make it a world museum. It is proposed to take some space for scientific collections. As a National Museum it will be the repository of all Canadian objects of scientific value. Most of such material is of no interest to the general public and should, therefore, not take up valuable space and costly cases in the exhibition halls, but they should be arranged and catalogued and be accessible to Canadian students and scientists from abroad who may wish to study Canadian material. It will be some time before the exhibition halls can be made ready for the public. The old furnishings are unsuitable, and new modern cases will be provided. The specimens for public display will each have to be selected, labelled, and placed in position. This involves an immense amount of labour that has to be done personally by the officials in charge and cannot be relegated to temporary helpers. On account of lack of space in the old building, little could be done in this direction. Now that the material is in the new building this work will be pushed.

REPORT OF THE COUNCIL OF THE CANADIAN MINING INSTITUTE FOR THE YEAR 1910.

In reviewing the activities of the Institute for the year ending December 31st, 1910, the Council takes the opportunity of congratulating the members on the present satisfactory condition of the affairs of the Society; on the expansion of its scope of influence and usefulness; the well maintained increase in its membership, and the manifest improvement in the value of its publications. The interest displayed in the meetings is strongly evinced by the statement that the registration at the annual general meeting in Toronto in March showed an attendance of over two hundred and thirty members and guests; or a representation of about thirty per cent. of the total membership. Considering the vast area over which the membership is scattered, so considerable an attendance is remarkable, and in the highest degree gratifying. The meeting of the western branch in Vancouver in February last was also well attended, and the papers read stimulated discussion of an exceptionally valuable character. A largely attended meeting of the Cobalt Branch was held in July at which Prof. Robt. H. Richards, the distinguished authority on ore-dressing, delivered a lecture on the

subject, having special reference to the conditions obtaining in the Cobalt district.

The special contributors to the Transactions this year, and to whom thanks are due, include Prof. Richards, for his comprehensive paper on "The Development of Hindered Settling Apparatus"; Dr. F. L. Ransome, Mr. B. B. Lawrence, Dr. James Douglas, and Dr. Heinrich Ries. It should also be noted that Dr. J. D. Irving delivered an exhaustive address on the subject of "Replacement Deposits," at the annual meeting, but by reason of other pressing duties has not found leisure in the interim to transcribe his notes for publication. It is hoped, however, that this contribution in printed form will be available to members in the near future.

In view of the considerably augmented cost of publishing the Transactions, partly ascribable to the increased bulk of the annual volume of Transactions, to the publication of a quarterly bulletin, and also to the general advance in prices charged for printing, the Council, recognizing that retrenchment in some direction was necessary, decided to discontinue the practice of binding the annual volume of Transactions in half-leather. In future, therefore, the volumes will be issued in paper covers. Provision is made, however, that members desiring it shall receive the volume in half-leather binding upon payment of one dollar per annum in addition to the regular membership subscription.

Unquestionably the most important work undertaken by the Institute during the year has been the endeavour to induce the Dominion Government to act on the recommendation of the Select Standing Committee of the House of Commons on Mines and Mining. These recommendations were (1) that there be assigned to the Mining Department the administration of mines, including the issue of title thereto, and of all mining laws; and (2) that an Act be passed consolidating all the laws relating to mines under Federal control.

Immediately after the annual meeting the Council appointed a committee under the chairmanship of Mr. G. G. S. Lindsey, to represent the Institute, and to take such steps as might be expedient to properly impress on the Government the need for early and prompt action along the lines indicated. The committee, therefore, proceeded to Ottawa, on Monday, March 21st, and waited on the Premier, to whom the issues were fully submitted, special stress being laid on the importance of providing that prevision of issue of title to mining lands controlled by the Federal Government, be fixed by Statute enactment, instead of by regulations subject to arbitrary and frequent change by orders-in-council. The committee also pointed out that the present opportunity was favourable to the framing of a mining law for the Dominion that would be so just and right in principle as to recommend itself for universal adoption in Canada, and expressed the hope that the introduction of such a bill would be the first step towards the accomplishment of this uniformity, which was very much desired by those interested in the development of our mining resources. The Premier's reception of the committee's views was entirely courteous and friendly, and before the close of the conference he gave a definite assurance that a transference of the administration of mining lands from the Department of the Interior to the Department of Mines would be made, and added the suggestion that the Canadian Mining Institute undertake the drafting of a mining law which could be introduced to and considered by Parliament at the next session. The committee consulted with the Hon. Wm. Templeman, Minister of Mines, and with members of the Parliamentary Committee on Mines on this point. No definite action was taken by the Government until Wednesday, December 14th, when the committee, having drafted certain recommendations, embodying what in their judgment should be adopted as the basis of a mining law, again went before the Parliamentary Committee to urge immediate action. These recommendations, which had previously been endorsed by the Council of the Institute, are as follows:

(1) That the title to be required should be leased for ninety years for all purposes.

(2) That the rental should be based upon the acreage and paid in advance at the rate of one dollar per acre per annum. Work done on any claim to the extent of the rental, but only where work alone amounts to at least $200 in any one year, is to be received in lieu of rental for that year.

(3) That, in addition, royalties at the rates at present provided, be paid (it to be made clear what the general clause in regard to royalties in the existing statute means).

In the case of coal, the present royalty, five cents per ton (2,000 pounds) should prevail up to the year 1930 (this date is given because the existing 21 years' leases based on the five cent royalty expire at that time), and after 1930, and up to the end of the present century the royalty should be ten cents per ton.

Note.—Existing lessees should be permitted to exchange for leases under the new statute.

(4) The prospector shall not be obliged to make discovery of mineral in place to the satisfaction of anyone, but having made what by him is believed to be a discovery of mineral in place, he is to be permitted to stake out a claim and then record it in the Government recording office at a nominal fee, on doing which a lease it to be issued to him, which lease is to be perfectly free from any condition dependent on the opinion or reports of officials.

(5) A license fee shall be required of persons applying for the lease of mining lands from the Crown, and a prospector must either obtain a license to prospect before going into the field, or qualify in this respect before recording a claim.

The argument in favour of the adoption of the leasehold system of mining land tenure was strongly presented to the Parliamentary Committee by Mr. Lindsey, and this as well as the other recommendations put forward were approved. The Minister of Mines having pointed out that under existing conditions the question arose whether the Minister of the Interior or of Mines should be responsible for the preparation of the Bill, the point at issue was referred to the Premier, who decided that the responsibility rested with the Minister of Mines. In consequence, Mr. Templeman immediately instructed Mr. J. M. Clark, K.C., of Toronto, to draft a Bill on the lines suggested by Mr. Lindsey's committee.

The Council consider that the committee is to be heartily congratulated on its success in advancing the business with which it was entrusted to the present stage, and confidently anticipate that as a direct result of the committee's exertion, a mining law which will be highly acceptable to the mining community, will, in the near future, be placed on the statutes of the Dominion.

It is also satisfactory to record that two resolutions adopted by the western branch, one advocating the removal of Customs duty from rescue apparatus for use in coal mines, and the other the establishment of telegraphic communication with the Portland Canal district, have been acted on by the Federal Government.

Two important international meetings took place dur-

ing the year in Europe, namely, that of the International Geological Congress in Sweden, and the International Mining Congress at Dusseldorf, Germany. The Institute was represented at the former by the President, Dr. Frank D. Adams, of Montreal, who was appointed one of the vice-presidents at the Congress, and contributed several valuable papers, dealing with Canadian geological conditions, to the proceedings. The President, on behalf of the Institute, also invited the Congress to hold their next meeting in Canada, and this invitation, which was made conjointly by the Dominion Government and the Canadian Mining Institute, having been accepted, the meeting will be held in Canada during the summer of 1913. The Council takes this opportunity of bespeaking the interest and co-operation of the membership in the organization arrangements which have been already initiated.

The meeting of the Congress in Canada, which will be attended by probably a thousand of the most eminent geologists from all parts of the world, will be an event of first-rate importance. Highly beneficial results of both a scientific and practical character may be confidently looked for, and the Council is most desirous that the Institute should not fail to do full justice to the occasion.

The meeting of the International Mining Congress was held at Dusseldorf, Germany, during the last week in June. The Institute was officially represented by the Secretary, who presented a paper on "The Mineral Resources and Industries of Canada," which has been widely circulated. The Secretary also delivered an address, illustrated by lantern slides, on the same subject in England, and several interviews with him were published in the London papers. As a result of a suggestion made to the chief clerk in the office of the High Commissioner for Canada, persons applying to that official for specific information respecting mines and mining in this country, have been advised to communicate with the Institute, and during the past few months numerous enquiries have been received and replies duly sent.

The effect of the by-law adopted at the last annual meeting, providing for the admission of members of the Institution of Mining and Metallurgy to the Institute at a reduced annual subscription, has been to further strengthen the relationship between the two organizations; and at a banquet tendered by the Council of the Institution to members of Council and officials of the Institute in London, in July last, reported in Quarterly Bulletin, C.M.I., No. 12, page, 3, appreciative reference is made by the President of the Institution to this action on the part of the Institute. The desire of the Institution to promote close and friendly relations, is also evinced by the extension of the post-graduate courses under the auspices of the Institution, to Canada, and on the recommendation of a committee of the Council, Mr. R. B. MacKay, a graduate of the School of Mining, Kingston, was awarded one of the Institution's Scholarships last spring, and has since left to follow the prescribed course in South Africa. A proposal to hold a joint meeting of the Institution and the Institute in Canada during the winter of 1911-12 is meanwhile under discussion, and it is hoped that arrangements to that end will shortly be completed.

Meetings.

The twelfth general annual meeting of the Institute was held at the King Edward Hotel, Toronto, on March 2nd, 3rd, and 4th, 1910. As already mentioned, the attendance was the largest yet recorded since the inception of the Institute. Other meetings held during the year were at Vancouver, B.C., on February 25th; at Grand Forks, B.C., on May 26th; at Sherbrooke, Que., on May 27th; at Cobalt, Ont., on July 6th; at Montreal on November 4th, and at Toronto on December 2nd. Five regular and two special meetings of Council have been held during the year.

Publications.

The papers presented at the annual meeting, together with those read at the branch meetings, and also others transmitted direct to the Secretary, in all, 41 papers, two of which were contributed by non-members upon the invitation of the Council, two contributed by corresponding members, thirty-three by members, and four by student members, together with the discussions thereon, are published in Vol. XIII. of the Journal of the Institute, which has been distributed to members in good standing. Four Bulletins, representing 796 pages of printed matter, have also been published and distributed during the year.

Branches.

The meetings at Vancouver and Grand Forks, B.C., held under the auspices of the western branch, were well attended, and interest in this branch is well maintained. At the meeting of the Cobalt branch in July, an attendance of upwards of one hundred members and guests is reported. The feature of the Toronto branch meetings is a fortnightly luncheon, after which matters of general interest as affecting either the mining industry or the Institute are frequently discussed. The Toronto branch has also on several occasions entertained distinguished engineers from abroad at their periodical gatherings. The reorganization of the Sherbrooke branch, established in 1900, is a further matter for congratulation, and has resulted in a considerable increase of membership from the Eastern Townships of the Province of Quebec.

Library.

A special effort has been made to increase the efficiency of the library, and a considerable appropriation was devoted this year to the purchase of new books, book-cases, and to binding. Sets of reports, society transactions, or reference works, from which early numbers were found to be missing, have been completed as far as possible, and in all some 300 volumes have been added to the shelves. An abridged catalogue of the books in the library has been printed in No. 12 of the Bulletin, and members have been advised on what terms they may borrow books, and informed that the Secretary will undertake to make searches, prepare bibliographies, and abstract information on special subjects upon request. Advantage has already been taken of these provisions. Use, to a considerable extent, has also been made of the library and reading room by visitors from abroad.

Secretary's Office.

The following returns are taken from the Secretary's records for the year ending December 31st, 1910:

Letters received	2,039
Letters sent, notices, etc.	5,477
Circulars issued	7,600
Publications issued	6,525

Students' Competition and Awards.

Eight papers were submitted this year by student members in competition for the Institute's annual awards. After receiving the report of the judges, namely, Dr. A. E. Barlow, Mr. J. C. Murray, and the Secretary, the Council awarded the President's Gold Medal to Mr. G. L. Burland, of McGill University, Montreal, for his paper entitled "Longwall Mining and Emery Pit, Dominion No. 10, Reserve, C.B."; while a cash prize

of $50 was equally divided between Mr. A. M. Bateman, of the School of Mining, Kingston, Mr. J. J. McEachern, of the School of Mining, Kingston, and Mr. A. G. Haultain, of McGill University, Montreal. The prize winning papers (with the exception of that by Mr. Burland, which is withheld for the present), as well as a paper contributed by Mr. G. A. Gillies, of McGill University, have been published in Vol. XIII. of the Transactions.

Commans-Frecheville-Marriott Prize.

The prize of two hundred and fifty dollars offered by Messrs. R. E. Commans, William Frecheville, and H. F. Marriott, of London, England, for the best paper dealing with mining or metallurgical progress in Canada between October, 1908, and October, 1909, contributed to the Transactions of the Institute prior to January 1st, 1910, was divided equally between Mr. H. H. Yuill for his paper on "The Hosmer Mines, B.C.," and Mr. Frank B. Lathe, for his paper on "The Granby Smelter."

Membership.

The membership now numbers, inclusive of all classes, nine hundred and seventy-four members.

The accessions during the year were as follows:

Honorary members	1
Corresponding members	2
Ex-officio members	5
Life members	3
Members	71
Associates	22
Students	5
	109

Deaths.

The Council records with profound regret the deaths during the year of the following members:

Members—Grundy, Frank, Sherbrooks, Que.; Hardy, G. D., Cobalt, Ont.; Reed, Dr. James, Reedsdale, Que.; Wiley, H. A., Toronto, Ont.

The resignations of the following members and associates have been accepted:

Members—Anderson, W., Rossland, B.C.; Farquhar, J. B., Vancouver, B.C.; Gamey, R. R., Toronto, Ont.; Hardinge, H. W., New York City, U.S.A.; Harris, J. M., Sandon, B.C.; Kaye, Alex., Vancouver, B.C.; Miller, Spencer, New York City, U.S.A.; Mills, S. D., Toronto, Ont.; Parkhurst, F. S., Niagara Falls, N.Y.; Powell, J. W., Coleman, Alta.; Sands, J. M., Rossland, B.C.; Sharp, B. N., Orient, Wash., U.S.A.; Sproule, G., Montreal, Que.; Stoek, H. H., Scranton, Pa., U.S.A.

Associates—Bowers, A. E., Northport, Wash., U.S.A.; MacKenzie, A. B., Rossland, B.C.; Morrison, G. F., Toronto, Ont.; Pringle, Clive, Ottawa, Ont.; Rugh, W. S., Rossland, B.C.

Students—Carr-Harris, A., Mexico.

The Destruction of a Valuable Water-Power on the Frederick House River, near Porcupine.

(Written for the CANADIAN MINING JOURNAL by C. W. KNIGHT.*)

Father Paradis is reported to have made the statement that the clay belt of northern Ontario should be drained, not dammed, and that the present drainage system might be likened to a man suffering from pneumonia. As to the verity of these assertions the reader must form his own conclusion; but, be that as it may, it is certain that the reverend gentleman must have had some such belief when in the fall of 1909 he lowered the water of Frederick House River by cutting away its embankment beside a falls, thereby destroying a valuable water-power. It is further certain that the prospecting and mining fraternity of that region does not believe, as a general rule, in draining the country, just as it is also certain, on the other hand, that it believes in heartily damning a certain gentleman who shall be nameless. For the lowering of Frederick House River caused a fall of four or five feet in Frederick House Lake, and, since the latter is shallow and flat, navigation by canoe or small gasoline boats became impossible. It would take the softening touch of Bret Harte's pen to put into decent and respectable print the language which floated away from many a belated canoe struggling across the sand-barred lake. But, like other situations, there are two sides to the question, and it may be that future generations of prosaic farmers, long after Porcupine is a dead one, may bless the worthy friar for draining areas of what might otherwise have remained, in part, swamp land.

* Assistant Geologist, Bureau of Mines, Ontario.

Thirteen years ago, Professor W. A. Parks, of Toronto University, examined the river for the Bureau of Mines, and his description of the part under consideration is as follows: "The water of Frederick House Lake passes out at the north end by a river of the same name. It is two or three chains wide at the head, with an easy current. About a mile and a half down, it bifurcates around an island forty chains in length and

Fig. 2. Fault in clay on Banks of Frederick House River.

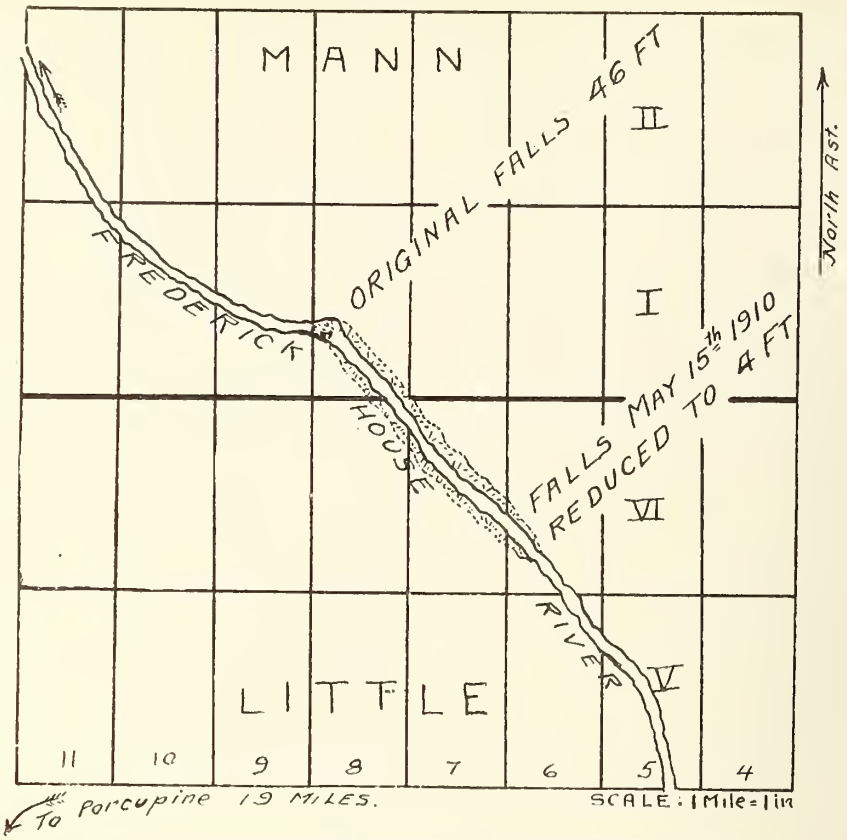

Fig. 1. Plan showing original position of Falls on Frederick House River.

continues a little west of north to the first falls, about seven miles down. A barrier of rock crosses here, N. 10 degrees E., causing a succession of cascades with a total descent of 46 feet. An island divides the river, and, in all, it may be said that there are three tiers of three cascades each, with a total width of five chains. A rather steep portage of three chains on the east enables us to pass the obstruction."

During the summer of 1910 Porcupine was the lodestone that attracted prospectors, and there were few who went out of their way for the purpose of visiting the scene of Father Paradis' operations on the Frederick House River. Early in May of last year the writer accompanied Dr. Willet G. Miller on his trip into Porcupine, but, before reaching the gold camp, a few days were spent in examining the effects which the lowering of the water had on the banks and bed of the river.

Originally the Frederick House River, at a point eight or nine miles below the lake of the same name, poured its waters over a rocky cliff fifty-six feet high. On the eastern bank, just above the falls, Father Paradis dug a trench in the soft clay and sand. It so happens that the rocky floor on which this clay rests dips steeply, almost vertically, in an easterly direction, and consequently the clay had here a thickness of about fifty feet. Part of the water thus diverted into a new channel began to deepen it, and before long the whole river was rapidly carving a gorge in the soft clay, abandoning its original bed on the solid rock. Father Paradis, in discussing the matter afterwards, said he introduced the

Fig. 3. Three successive faults in clay on banks of Frederick House River.

Fig. 4. Showing the results of lowering the water on Frederick House River.

principle and the river drew the conclusion. The trench which he dug was a comparatively shallow one. By May of the following spring the falls had cut their way up the river a distance of about one and a half miles, leaving in their wake a path of devastation.

As the old channel was deepened the clay banks gradually caved in, caused by a series of faults illustrated in two of the accompanying photographs. The faulted blocks of clay were sometimes hundreds of square feet in area, and, as the upper parts of the banks were covered with a dense foliage of birch, poplar, spruce and other trees, these were carried down with the soil on which they grew, and either cast into the torrent below or strewn up and down the new banks in the wildest confusion. Many of them were snapped in two like twigs and now lie crossed in all directions. In places whole masses of earth the width of a street have been

Fig 5. Showing the results of lowering the water on Frederick House River

dropped down bodily without disturbing the trees or vegetation growing on them, so that, if a man had been standing on one of these masses, he would probably have received no injury other than a severe jolt But, for the most part, the moss, trees, and surface soil have been disturbed and deeply buried under the heavy clay deposits. Originally the banks had a height of about thirty feet, and the channel a width of 200 feet. But, as a result of the landslides, the distance between the top of the banks has been increased in places to 800 feet, while the width of the water is only about 100 feet, the river having become a swift, impassable torrent.

The sections revealed in the new gorge show the clay to be partly stratified and to be in part without stratification, the latter facies containing a few pebbles or boulders. It was pointed out by Dr. Miller that the river in cutting its way back formed two or more horseshoe falls, suggestive of Niagara on a small scale. Each horseshoe was then slowly deepened, until finally the intervening walls became thin, collapsed, and were washed away, thus forming a single horseshoe, which again divided into others. So the process was continued.

It is interesting to speculate on what will be the course of events in future years as the river continues to cut back and deepen its old channel. Provided it meets with no obstruction in the form of solid rock, it is probable that Frederick House Lake may eventually disappear, seeing that it has a shallow, flat bottom. In that case the river would find a channel somewhere in the bed of the lake. However, there is at least one outcrop of rock half way between the present falls and the lake. If this barrier is large enough, it may arrest the progress of erosion, and a new falls would then be formed at this point, gradually increasing in height as the channel below was deepened in the soft clay.

Mineral Output of Russia.

The following report on the mineral output of Russia is made by John H. Snodgrass, United States consul general at Moscow:

Statistics recently issued by the government show that the gold production of Russia in 1909 amounted to 1,284,912 ounces, an increase of 171,696 ounces over 1908; platinum, 134,784 ounces, an increase of 6,000 ounces; copper, 40,572,000 pounds, an increase of 3,636,000 pounds.

During the first seven months of 1910 the output of copper was 29,664,000 pounds, compared with 21,744,000 pounds for the corresponding period of 1909, an increase of 7,920,000 pounds. The imports of copper into the empire consist principally of electrolytic copper, which is now produced at only two Russian works, but the production of which is making gradual progress. In 1901 Russia imported 29,520,000 pounds of copper; in 1907, 9,792,000 pounds, and in 1909, only 7,668,000 pounds.

The production of iron also shows notable progress, chiefly in the south of Russia, and the Ural district, and in 1909 the output, as well as the home consumption, reached the highest level known, being above that of the banner year 1904. In 1904 Russia produced 2,461,145 tons of iron; in 1908, 2,369,806 tons; and in 1909, 2,606,129 tons. During the first four months of 1910 the output was 922,838 tons, as compared with 825,322 tons in the corresponding period of 1909.

There were 3,117,742 tons of pig iron produced in the empire in 1909, against 3,193,548 tons in 1904, when the production reached the highest level in the history of the country.

The preliminary data for the first half of 1910 show a considerable increase as compared with the same period of 1909 and 1904, as follows:

Pig iron, 1904, 1,454,839 tons; 1909, 1,412,903 tons; 1910, 1,487,097 tons.

Half products, 1904, 1,503,225 tons; 1909, 1,488,709 tons; 1910; 1,687,097 tons.

Manufactured iron, 1904, 1,259,677 tons; 1909, 1,279,035 tons; 1910, 1,443,548 tons.

The production of coal in European Russia in 1909 aggregated 24,080,645 tons, compared with 24,677,419 tons in 1908, a decrease of 596,774 tons. The output in European Russia for the first quarter of 1910 was 6,225,806 tons, against 6,338,709 tons for the same period of 1909, a decrease of 112,903 tons. The falling off in the production is due to the decreasing consumption of this mineral by the Russian railways, which are now using naphtha for fuel on account of the prevailing low prices of this product.

The production of naphtha in the Baku district amounted to 7,908,064 tons in 1909, compared with 7,532,258 tons in 1908, an increase of 375,806 tons.

In the bituminous mines of Pennsylvania the death rate per thousand men employed was 2.72 during the year 1909. In the anthracite mines the death rate was 3.32 per thousand men employed.

Explosion at Bellevue, Alberta.

By E. JACOBS, Victoria, B.C.

On the night of December 9th an explosion took place in the Bellevue mine of the West Canadian Collieries, Ltd., situated along the Canadian Pacific Railway Company's Crow's Nest line, two miles east of Frank, southwest Alberta. Immediately after receipt of information concerning the disaster, steps were taken to send from Hosmer, British Columbia, distant 45 miles by rail from Bellevue, the Draeger oxygen breathing apparatus and auxiliary appliances from the British Columbia Government mine-rescue station, established there last autumn, and, as well, that of the Hosmer Mines, Ltd., which apparatus, used by men from Hosmer who had taken a special course of training in mine-rescue work, proved of much service in saving the lives of some of the men in the mine at the time the explosion took place, and kept the number of fatalities down to 31.

A specially noteworthy incident in connection with the mine-rescue work was the self-sacrifice of Fred Alderson, as indicated in the following account: "One of the special party rushed from Hosmer, with the British Columbia Government oxygen helments for use in the mine, Alderson led the rescue party direct to the danger zone, and himself succeeded in getting five men out of danger before he was overcome. He was skilled in the use of the helmet, and while the party was making its way back to fresh air, saw an unknown Italian fall to the ground. Hastily picking him up, Alderson pressed his helmet on the man (whose life was thereby saved) and, thinking he could stand the poisonous fumes until he could reach the purer air, started to run. He had not gone a dozen yards, however, before he was overcome, and although some of the party saw him fall they could do nothing to help him, as they were in bad shape themselves, and, in addition, were dragging other unconscious men to a place of safety. As soon as they reached an air station they sat down the men they had brought out and rushed back to save Alderson, but he was dead before he was brought into the pure air."

Fred Alderson was born in Durham County, England, in 1875. He worked in the Kimblesworth colliery for eight years, and prior to leaving there was deputy overman. At the Hetton colliery, where he worked three years, he was back shift overman. For two years he was engaged in shaft-sinking in the Transvaal, South African Republic, and next spent a similar period at Nanbada, Central India. Returning to England, he was company's inspector at the Kimblesworth colliery for two years, after which he went to Texas, U.S.A., where he was a year. About the middle of 1909 he removed to Hosmer, where he was actively engaged in coal mining until his recent untimely death. He held coal mine manager's certificates for Great Britain, British Columbia, and Alberta. In England he took the St. John's ambulance training course, and was instrumental in getting a class started in Hosmer. Last year, in compliance with the law of the Province, the Hosmer Mines, Ltd., put in Draeger mine-rescue apparatus, and at the time it was installed the mine officials were trained in its use. Alderson was one of these, and received instruction in the use of the oxygen breathing helmet and accessory appliances from the Draeger representative who supervised the establishment of the company's mine-rescue facilities at the Hosmer colliery.

Alderson left a widow and four young children. The miners at Hosmer promptly initiated a movement for the benefit of the bereft family, and public subscription lists were opened in several towns in eastern British Columbia and at others in Alberta. The Government of British Columbia has shown its appreciation of Alderson's heroic conduct by subscribing the sum of $500 to the fund being accumulated for the benefit of the widow and orphans.

A coroner's jury is investigating the cause of the disaster. The first witness called was James Burke,

Fred Alderson, the Hero of the Bellevue Disaster

secretary of the Bellevue local union of the United Mine Workers of America, who testified to having, on December 3, telegraphed the chief inspector of mines for Alberta asking for an inspection of the mine, the presence of gas in the mine having been reported by miners.

The Alberta Government report for 1908 contains the following reference to the Bellevue mine: "At the Bellevue mine, a new tipple has been erected, equipped with cross-over dump, and picking tables, capable of

handling one thousand tons per day. An electric light plant for lighting the tipple, mine buildings and main gangway of mine has been installed. Wolf safety lamps have been introduced, which add greatly to the safety of these mines, and all blasting is done by qualified shot-lighters."

The Government official report for 1909 was as follows: "A steel tipple fitted with Greene dump with a capacity of 1,500 tons per day, is being erected by the Bartlett Snow Company, and one high-pressure compressed air plant, one 8-ton and two 5-ton compressed air locomotives have been installed. The present mine track is being relaid with 40-lb. steel. One 78-inch Sirocco fan, capable of giving 100,000 cubic feet of air per minute with a 2-inch water gauge, and one 150-k.w. electric generator for lighting purposes, driving fan, tipple, etc., have been put in. The power house is being built of masonry. A considerable amount of diamond-drilling is being done on the property to ascertain the quality and position of the coal seams at a depth of 400 to 500 feet."

The official report for 1910 has not yet been published.

Retirement of Managing Director of Consolidated M. and S. Co.

About the end of December public announcement was made of the intention of Mr. W. H. Aldridge, of Trail, B.C., to retire from the active management of the Consolidated Mining & Smelting Company of Canada, Limited, of which he has been managing director since the organization of the company. In this connection, Mr. Aldridge has been quoted by the Daily News, Nelson, as having said: "While it is true that I am giving up the active control of the Consolidated Company's operations, yet I expect to remain as a director and in an advisory capacity, and intend to keep in as close touch with the various questions involved in the company's general policy as in the past. My decision to give up the general management was made in order to enable me to become associated with William B. Thompson, of New York, who is a director of several of the largest copper-producing companies in the United States, and who, with Gunn, Thompson & Company, has control of a number of the leading copper mines of Arizona and Nevada. Mr. R. H. Stewart, who has for several years so ably managed the Consolidated Company's mines, has been appointed general manager, and Mr. S. G. Blaylock, formerly metallurgist at the Trail smeltery and lately superintendent of the St. Eugene and Sullivan mines, becomes assistant general manager."

Mr. Aldridge left the Brooklyn Polytechnic in 1883; he graduated as a mining engineer at Columbia University, New York, in 1887. He was assayer, chemist, and metallurgist with the Colorado Smelting Co. (now the American Smelting & Refining Company), 1887-1892. Then he was general superintendent, assistant manager, and manager of the western interests of the United Smelting & Refining Works (now American Smelting & Refining Company) at Helena and Great Falls, Montana, 1892-1897. Next he was employed as mining and metallurgical engineer by the Canadian Pacific Railway Company, and was first engaged in reporting on Rossland, Boundary, and other Canadian mining camps. In 1898, the Heinze smeltery at Trail was purchased by the Canadian Pacific Railway Company, and thereafter for six or seven years it was known as the Canadian Smelting Works, until in 1905 it became the property of the Canadian Consolidated Mines, Limited, a company organized to acquire the various mining and metallurgical properties now held by the Consolidated Mining & Smelting Company of Canada, Limited, the changed title of the Canadian Consolidated Mines, Limited, as from January 1, 1906. Prior to the organization of the merger company, Mr. Aldridge's official title was that of Chief of the Mining and Metallurgical Department of the Canadian Pacific Railway Company. During the thirteen or fourteen years Mr. Aldridge has been associated with the Canadian Pacific Railway Company he has had the oversight of all the company's mining interests, including the collieries the company established and still operates at Bankhead, Alberta, and Hosmer, B.C., and the large though undeveloped coal mining interests the company holds in the upper Elk River district. The steady expansion of the operations of the Consolidated M. & S. Co. during the last five years has been under the active direction of Mr. Aldridge, who has been a member of the American Institute of Mining Engineers from 1889 to date, and as well for a number of years a member of the Canadian Mining Institute.

Mr. Robert Holden Stewart, who has succeeded Mr. Aldridge as general manager of the Consolidated Company, graduated as a mining engineer at McGill University, Montreal, Quebec, in 1896, obtaining first rank honours in natural science and the Governor-General's medal for highest general standing in final examination for his B.Sc. degree. He went to Rossland several years ago from the Bankhead mines, Alberta, and succeeded Mr. James Cronin as manager of the Consolidated Company's mines when that gentleman retired. He has since devoted himself assiduously to the further development and improvement of the mines, and is well-known in the Kootenay and Boundary mining districts as a fully competent manager and a tireless worker, very zealous in the promotion of the company's interests. He is a member of both the Canadian Mining Institute and the American Institute of Mining Engineers, and has been on the Council of the former.

Mr. Selwyn Gwillym Blaylock, the new assistant general manager, is also a McGill University B.Sc.; he graduated as a mining engineer in 1899. He has been in charge of the St. Eugene mine and concentrating mill for several years, and, like Mr. Stewart, has shown much zeal in the performance of his responsible duties. He is a member of the Canadian Mining Institute and is at present on the Council of the Institute.

Smelting in the Interior of British Columbia.

By E. Jacobs, Victoria, B.C.

The following notes will serve to give a brief description of the smelters now being operated in the Kootenay and Boundary districts of British Columbia:

Consolidated Mining & Smelting Co. of Canada, Ltd.

The works of the Consolidated Mining & Smelting Company of Canada, Ltd., include copper and lead blast furnaces. Distinctive features here, in comparison with other reduction works in British Columbia are the use of the Huntington-Heberlein roasters and converters, and the Betts electrolytic process for refining lead.

An idea of the extent of the company's operations during 1910 may be obtained from the following figures; Tons smelted, 445,210. Metal contents, gold,

138,901 oz.; silver, 2,017,007 oz.; lead, 33,871,837 lb.; copper, 5,282,139 lbs. Total value, $5,543,574. The figures for the company's fiscal year ended June 30. 1910, were generally higher, especially in lead produced (42.368,816 lbs.). while total value was nearly $400,000 greater. Some 550 men are employed at the works, which are situated at Trail, on the Columbia River, and within a few miles of Rossland, with which mining camp there is railway connection.

Lead Smelting.

Of the three sampling mills, two are arranged to deal with lead and dry ores. The equipment of one of these consists of Blake and Farrel crushers, rolls, and Vezin and Brunton samplers. The capacity of this mill is 30 tons per hour. Oxidized lead and dry ores are first crushed to a 6-inch ring, the final sample being ¼-inch, and the reject going direct to the furnace charge bins. Galena ores and coarse concentrates are crushed to ¼-inch and bedded. In each case the samplers cut 1-500th part and deliver it to the quartering floor. Fine concentrates are usually sampled by the fifth-shovel method and are placed on the lead beds.

The lead ore supply is mainly heavy sulphide, with comparatively little dry ore. the lead furnaces carrying a charge of from 35 to 45 per cent. lead, as compared with the customary 10 to 15 per cent. More than 30 per cent. of the ore received runs from 20 to 75 per cent. lead, the remainder consisting of dry gold and silver ores, a small quantity of oxidized lead ore, and some pyritic mill concentrates. The sulphide, with lime rock, lead matte, etc., is treated in the Huntington-Heberlein roasters and converters. The resultant lead sinter is smelted in the blast furnace with dry ores, etc. The lead beds are made up with heavy ores and concentrates only; they contain about 600 tons each. with 38 to 40 per cent. lead.

There are seven Huntington-Heberlein circular roasting furnaces, 26 feet in diameter, with hearths revolving once in three minutes. Stationary cast-iron rabbles work the ore through in about two hours. The making up of the roasting charge is important. An approximate analysis of the charge as now run is as follows: Lead, 40 to 44 per cent.; iron, 10 to 13 per cent.; silica, 8 to 11 per cent.: lime, 7 to 10 per cent.; zinc, kept under 10 per cent. if possible. Pyritic concentrates and matte form part of the charge. The converters number 24; they are 8 feet 8½ inches in diameter, and are made in four sections bolted together. The time of converting varies widely with the charge, but averages three 10-ton charges in 24 hours, with a 10 to 12 oz. blast, which is decreased to 2 oz. at the close.

Properly made up, carefully fired, roasted, and converted, the product will be fairly hard, yellowish or grayish yellow, showing some litharge, and be easily broken up with little fines. In the furnace it will run with cool top and bright tuyeres.

The two lead blast furnaces are, respectively, 45 by 160 inches and 45 by 140 inches at the tuyeres. One of these has smelted as much as 260 tons in a day, but the average is about 170 tons or ore, beside by-products, matte, slag, etc., these constituting 20 to 30 per cent. of the charge. The furnaces are standard type, with brick crucibles water-jacketed to the top of the bosh, above which is a firebrick shaft. The height of the charge is 17 feet 6 inches above the tuyeres, and the blast used is 32 to 34 oz. The lead bullion flows from the side of the furnace into a kettle of 50 tons capacity, from which it is pumped by a 1½-inch centrifugal pump into vertical anode moulds. Frame cars of special make, each holding ten anodes, are taken in railway cars to the refinery. The matte and slag are tapped into a large receiver at the end of the furnace; the slag overflows into a granulating launder, while the matte is tapped from the receiver into pots.

The charge usually has about 85 per cent. of Huntington-Heberlein roast, varying considerably with the ores, and some oxidized and siliceous dry ore and lime rock. The coke is about 12½ per cent. of the charge, not taking into account slag and easily smelted by-products. An addition of 100 to 300 lbs. of slag from the high-grade copper furnace is made to each charge to keep it open, make the furnace action uniform, and reduce the percentage of zinc. The lead in the charge averages about 40 per cent., but it has been successfully run as high as 55 per cent. Sulphur is kept below four per cent., the lower the better, as the matte fall is less. The speed of running decreases markedly with a small increase of sulphur. From 30 to 40 per cent. of the sulphur is eliminated in the blast furnace.

The slag is kept at about 31 to 33 per cent. silica, 18 to 20 per cent. lime, 24 to 30 per cent. iron and manganese, 7 to 12 per cent. zinc oxide, and 8 to 16 per cent. alumina. It contains about 0.4 ounces silver and a little more than 1 per cent. lead. With high zinc the lime is reduced to keep the slag fluid. It is not profitable to run siliceous ores to bring the slag much above 33 per cent. silica, as the furnace runs too slowly. Alumina gives no serious trouble. Iron and manganese may vary between the percentages above given without making much difference in the furnace running. Scrap iron is added occasionally, although unnecessary when the charge is good.

At present only one furnace is being operated, and this produces about 75 tons of bullion per day. A single day's production has been as much as 130 tons. An average analysis of the bullion is: Copper, 0.22; manganese, nil; zinc, 0.098; antimony, 0.32; arsenic, 0.28; nickel, cobalt and cadmium, nil; bismuth, 0.0133, and lead, 98.5 per cent.; silver, 100 ounces and gold, 0.5 ounces per ton. A furnace is operated continuously for about seven months; then if accretions have accumulated sufficiently to make it profitable to blow it out and clean up, the other furnace is blown in.

Lead Refining.

In the refinery there are 240 tanks, 3 x 8 x 3½ feet, and pumps keep the electrolyte circulating in these. Each tank has a capacity of 20 anodes, which weigh 370 pounds each; they are cast with shoulder lugs, which rest on copper current bars on the sides of the tanks. The anodes are spaced 4½ inches apart with the bodies down in the tanks. Cathodes, consisting of sheets of pure lead about 1-16 of an inch in thickness, hung on ½ by ¾-inch copper bars, are placed between and outside the anodes, 21 in each tank. The electrolyte used is lead fluosilicate with free fluosilicic acid, averaging 12 per cent. acid and 5 to 6 per cent. lead. Between half a pound and one pound of glue per ton of lead is daily added to the electrolyte to prevent the lead deposit becoming soft and non-coherent and the tanks from rapidly short-circuiting. The tanks are operated with a current density of 16 amperes per square foot of cathode area; a reduction to 12 amperes is proposed, it having been found that this gives better results. The voltage averages 0.32 volt per tank, the contacts causing a loss of not more than 0.02 volt per tank. A tank is worked out in about 8 days, and 15 per cent. of the anodes, as scrap, goes back to the melting pot after being washed. The cathodes are removed from the tanks, washed, melted, and cast into pigs of lead—of 190 pounds each for the Chinese trade, and half that

weight for other markets. An average analysis of 2,000 tons of lead ready for shipment was: Arsenic and bismuth, nil; zinc, 0.0005; silver, 0.0013; copper, 0.00075; lead, 99.9938; iron, 0.00075; tin, 0.0001; antimony, 0.0028.

Most of the slime adheres to the anode scrap, though some settles in the electrolytic tanks, which are cleaned out monthly. From the tank room it is taken in copper cars to the slime plant, where it is agitated in tanks with hot water. Afterwards the water is drawn off and evaporated in steam coil tanks to recover the electrolyte. The slime is filtered and dried, and next melted in a water-jacketed reverberatory furnace lined with magnesite brick. The impurities are oxidized off, and dore metal running 960 to 975 parts gold and silver is obtained. The fumes pass through a series of inverted U cooling flues, in which most of the volatilized metals is recovered, the condensed fume going to the blast furnaces. The dore metal is parted in sulphuric acid. The silver sulphate is run into steam-heated tanks, where the silver is precipitated as a slime by bars of metallic copper. The silver and gold are collected, melted, and cast into bars. The gold is 995 fine and the silver 999, the latter in bars of about 80 pounds each. Fine gold and some silver are sold to the branch of the Royal Mint at Ottawa, Ontario, and the United States Assay Office, Seattle, Wash. Silver finds its chief market in the Orient; refined lead is sold in Eastern Canada, the Orient, and other places.

By-products are copper sulphate and antimony. The copper sulphate solution, obtained in the course of treating the slimes, is taken to the bluestone plant where copper sulphate is crystallized from it, making a commercial product used by farmers to pickle their seed wheat and so kill the smut in it. When commercial conditions make it profitable to also save the antimony, this is recovered by a special electrolytic process discovered by Mr. A. J. McNab, superintendent of the company's smelting works.

COPPER SMELTING.—There are five copper blast furnaces, as follows: Two of 42 by 300 inches at the tuyeres; one of 42 by 263 inches, and two of 42 by 240 inches. The height of the charge is 9 feet above the tuyeres, and the furnaces are operated with air pressure of 36 ounces. Two forehearths are used for each furnace, but only from 0.25 to 0.50 per cent. of the total matte is caught in the second settler. Most copper ores are smelted raw to a low-grade first matte. The slag from the low-grade furnaces runs about: Silica, 43 to 46 per cent.; iron, 14 to 15 per cent.; lime, 20 to 22 per cent.; copper, 0.1 per cent., and a very little gold and silver. The first matte, containing about 15 per cent. copper, 27 per cent. sulphur, and 56 per cent. iron, is granulated, roasted in O'Hara furnaces to about 10 to 12 per cent. sulphur, blown in Huntington-Heberlein converters to a product which runs 3 to 4 per cent. sulphur, and then smelted in a high-grade furnace, with suitable ores, to a matte running about 40 per cent. copper, which last product is shipped to Tacoma, Wash., for Bessemerizing. The slag from the high-grade furnace analyzes about: Silica, 40 to 42 per cent.; iron, 26 to 28 per cent.; lime, 16 to 18 per cent.; alumina, 10 to 12 per cent., and copper, 0.35 per cent.; with gold 0.02 ounce. Some of this slag is used in the lead furnaces and part of its gold content recovered there.

(To be Continued)

SPECIAL CORRESPONDENCE

ONTARIO.

Cobalt.—At the annual meeting the condition of the Savage of the McKinley-Darragh group will be the chief subject of comment. From a mere prospect in one year the Savage has developed into a mine producing between 60,000 and 70,000 ounces per month with 300-foot ore body on two veins and five other veins that will certainly make some ore.

The damage at the plant of the Cobalt Hydraulic at Ragged Chutes has been repaired and mines are now getting a fair air service. It will, however, make a sensible difference in the production particularly at the Nipissing and La Rose where steam plant is now inadequate to the needs of the company.

Fifteen Cobalt companies shipped bullion in 1910, aggregating 934,666 ounces, and valued at $493,950. Already this month eight mines have shipped 133,135 ounces, worth $65,407.

The amount of concentration in the mills of Cobalt has more than doubled in 1910 and the tonnage was greater by almost ,000 tons. The bulk of the tonnage from the Cobalt camp went to the States, but more than half the values in the ore stayed this side of the line.

In declaring a dividend of 10 per cent. payable on March 15 the Kerr Lake has joined the other three Cobalt companies that have paid over a hundred per cent. The T. & H. B., the Crown Reserve, the Buffalo, the Kerr Lake and the Nipissing, with an aggregate capitalization of $12,007,718, have paid 14,272,113.

During December the Nipissing mined 371,559 ounces of the net value of $201,022. Ore shipped after mining expenses had been deducted amounted to $437,615. A good high grade lens of ore has been cut at 122 shaft; 40 feet of 64 has been opened up at the intermediate level and shows very rich; an inclined raise on the west side of the Fourth of July shaft has cut into great ore and the winze in the west drift is proving good below the 170 foot level.

Mr. A. P. Seymour has resigned his position as manager of the Cobalt Lake. He will be succeeded by Mr. M. B. R. Gordon, who has been manager for the Little Nipissing for some time. Mr. Gordon will act as the consulting engineer for the Little Nipissing for the next few months at any rate, but will live at the Cobalt Lake.

A number of Cobalt men are interested in the Beauce placer fields along the Famine River. Mr. J. Rose an old Australian miner, states that after persistent prospecting the ground offers good possibilities for a dredge. An old report stated that the average from 28 shafts was 15 dwt.

At the annual meeting of the Cross Lake Mining Company it was decided to allow the Cobalt Coalition to work through the property of the company provided that the former company should get a 25 per cent. royalty on any of the ore extracted. The main shaft of the Cross Lake has been sunk to the 225-foot level. At the 210-foot level a drift has been pushed towards the diabase contact 75 feet under the lake.

At the quarterly meeting of the directors the Coniagas declared the 3 per cent. regular and the 6 per cent. bonus, making in all $360,000. The property has now paid altogether 44 per cent., or $1,760,000.

The Crown Reserve has now definitely started to develop its claims in Porcupine. A gang of men have commenced development on the McEnaney property near the Hollinger.

The Union Abitibi, on Opasatika Lake, near the Larder Lake goldfield, announces that it has all its four-stamp mill on the ground and will erect it this summer. It has numerous quartz

leads in which some specks of free gold have been found.

The Thelma Gold Mining Company, of Montreal, has bought six more claims in Bryce Township to add to its property. A test consignment of ore has been sent from the 25-foot shaft to McGill University for sampling. The company announces its intention of putting in a plant soon.

With an ore body 180 feet long on the 175-foot level the Cobalt Provincial is now paying chief attention to the discovery of fresh ore and the completion of its ore sorting plant at the mine. The new camps are almost completed.

Elk Lake and Gowganda.—There has been a little revival in mining activity at Elk Lake. Some of the prospectors who went to Porcupine and did not make a stake have returned to the Montreal River section again. The Beacon Consolidated announces that it will surely develop the Cleaves claim. The Tee Arr has ordered a good new plant from England and the Syracuse states that it will open up its property again in the spring. Meanwhile transportation hangs up activity.

It is reported from Elk Lake that the Miller Lake O'Brien will ship this year in the neighbourhood of a quarter of a million from its property.

That the Gowganda camp is still in point of shipments the second best in northern Ontario is shown by the following table of shipments: Millerett 345, Reeves Dobie 62, Boyd Gordon 30, Lucky Godfrey 20, Miller Lake O'Brien 59, Burke Remey 2, and Welsh 1.25. Total 1,419.25.

Porcupine.—In all probability the railroad at Porcupine will go down the east or undeveloped side of Porcupine Lake, thereby leaving one or two townsites out in the cold. There is an excellent grade. The station will certainly be at the Government townsite at Golden City.

Fifty men are working at the Foley O'Brian and the four-drill compressor plant has been running since the early part of the month. The vein is from 18 to 20 feet wide and there is a good deal of galena associated with the gold in the lead. Three drills are working night and day.

It is stated that blanketing is as prevalent in the Cripple Creek section of the camp as it has always been wherever Cobalt prospectors have travelled. Whitesides Township has been staked solid while not more than 25 properties were recorded.

T. E. Godson, K.C., of Bracebridge, has been appointed police magistrate at Porcupine at a salary of a thousand dollars a year.

The Dome Mining Company is rushing in 4,000 tons of supplies for the next year, and including all its heavy machinery.

At the property a force of carpenters is erecting camps. Quite a number of Porcupine companies have been incorporated within the past month. One of these is the Preston East Dome mines, with a capital of $3,000,000.

The other is the Montreal Tisdale Gold mines, with a capital of $2,000,000, and headquarters at Sault Ste. Marie.

After working steadily for a year the Scottish Ontario has now cut its vein at the 100-foot level. The vein appears to be wide, and though only specks of free gold were discovered at first, values are now improving.

Jack Munro reports that he has now under option some good claims in Deloro and Shaw. The ex-pugilist expects to sell them at a good price to United States capitalists.

Mr. P. A. Robbins, of the McKinley-Darragh, has left the employ of that company and will go to Porcupine in the first two or three days of this month.

South Lorrain.—It is extremely improbable, in spite of the extravagant management of the Keeley, that more than $400,000 has been spent on the mine to date. It is understood that the worth of the Keeley lies in its big surface cobalt veins, which on neighbouring properties have shown silver at depth. There is good ore in a new shaft near the Beaver Lake line and it is reported that the vein has been cut at the 240-foot level with good results.

The Wettlaufer has declared a 2½ per cent. regular and 2½ per cent extra, payable in February and March respectively. The latest reports of the mine state that there is now an excellent ore body 200 feet long at the 300-foot level, and that some of the bunches are very spectacular. The head office will be moved from Toronto to New York, which probably means that the Lewisohns have now control.

The South Lorrain shipments to date are: Wettlaufer 421.50, Keeley 44.34, and Bellellen 7.50, making a total of 473.34.

The Wettlaufer shipments for 1910 were 150 tons of seconds and 160 tons of high grade. The seconds ran between 500 and 600 ounces and the high grade between 3,000 and 4,000. There are two more cars of high grade waiting to be shipped when it is possible to take them out conveniently.

ALBERTA.

Blairmore, January 14.—The severe storm that swept through the Pass from the 8th to the 12th of this month blocked the railways to such an extent that all freight traffic was abandoned. This necessitated the closing of the coal mines during that period.

The consumption of a deal is rumored involving the purchase of a considerable area of coal land in the South Fork district. The details of the transaction have not been made public, but it is understood that the purchaser is a well-known capitalist in the United States. The value of this acquisition is not readily apparent, as it is evident that the mines already opened are fully capable of supplying not only the present demand, but also the demand for years to come.

The coroner's inquest into the causes of the disaster at the Bellevue mine on December 9, of last year, has been completed. The thoroughness of the investigation may be judged from the fact that it extended over a period of ten days. It will be noted that the verdict of the jury attaches blame to no one. The verdict reads:

That thirty men came to their deaths by carbon monoxide poisoning, and one by a combination of carbon monoxide poisoning and fractured skull. The said carbon monoxide and fractured skull being caused by a percussion of air caused by a cave of rock over chutes No. 76 and No. 78.

The jury respectfully submit the following riders to the verdict:

1. That more mine inspectors be appointed.

2. That a Draeger apparatus station be provided in this district.

3. That telephones be installed under the supervision of the chief inspector of mines, where practicable, in the underground workings of coal mines.

4. That a thorough investigation be made of means of preventing the loss of life by caves in coal mines.

5. We consider that negligence is in evidence on the part of both operators and miners in the carrying out of the provisions of the Coal Mines Act, and we would most strongly recommend a stricter adherence to the intent of this Act.

BRITISH COLUMBIA.

[Owing to illness, our correspondent in British Columbia has been unable to prepare for this issue of the Journal his usual summary of mining news of that province. He has sent, however, the following notes on Rossland mines in 1910, which were written before he was taken ill.]

Rossland Mines in 1910.

So far as can be ascertained from the available information relative to mining operations in Rossland camp, the total production was larger in 1910 than in 1909. The preliminary figures indicate an increase of about 16,000 tons in the total tonnage of ore mined, and the recovery of metals shows a general gain as compared with that of the immediately preceding year. While this increase is not large—in value of metals produced it is estimated at nearly $100,000—it denotes progress, and is, therefore, gratifying. The output of the Centre Star group of mines constitutes more than two-thirds of the total tonnage of ore mined, and nearly a similar proportion of the metals re-

duced. The mines of the Le Roi No. 2, Ltd., come next, and then the Le Roi mine, the remainder of the total production being contributed by half a dozen small shippers, in quantities varying up to about 50 tons.

Centre Star Group.—The last annual report of the managing director of the Consolidated Mining and Smelting Company of Canada, Ltd., which owns this group of mines, among others, gave information relative to them for the fiscal year ended June 30, 1910. The ore reserves of the group, at the end of the fiscal year, were estimated at 245,640 tons. The following are among the developments during the latter half of the calendar year 1910.

Beside the new ore in the Centre Star, mentioned in the annual report, further development has proved the existence of ore not previously definitely ascertained as being in the mine. Ore was found on the 2nd, 3rd, 4th and 5th levels, and exploration is being continued with the expectation of finding these ore shoots on lower levels. A new drift (537) has developed the downward continuation of some of the ore shoots found on the 4th level; these are yielding a fair tonnage, with value above the average, and they give promise of a considerable increase in quantity. The ore taken from the Centre Star is generally of a good shipping grade, with value chiefly in gold, the silver running about one ounce to the ton, and copper 0.6 per cent. Diamond drilling is being continued in the lower levels of this mine. The 16th is the lowest level; it is at a depth of 2,300 feet on the incline, or approximately 2,000 feet in vertical depth. This is only about 1,600 feet above sea level, and is nearly down to the level of the company's smelter at Trail.

Conditions at the War Eagle during the latter half of the year continued much as stated in the annual report. One important change, though, was the development on the 12th level, which proved the existence of a strong vein, but the ore taken out was of rather low grade. Diamond drilling in the vein from this level was resorted to, with the result that high grade ore was found to occur 75 feet deeper. Assays of samples taken across 5 feet of this ore returned a gold value up to 3.25 oz. per ton and 0.4 per cent. copper. It was decided to sink in the vein from the 12th level preparatory to stoping the high grade ore found here. This important development resulted from following some small streaks of ore mentioned by the managing director in his report. Stope 1086 continued to produce a large tonnage of high grade ore during the latter part of the year, and stope 1168, opened since the annual report was made, has also been giving a considerable tonnage of ore of excellent quality.

In the Idaho, stope 470 has been holding out well, and stope 539 has been maintaining its producing capacity. Ore from this mine is of generally good grade, above the average of the Centre Star ore, the bulk of which does not run quite so high in gold as that from the Idaho.

Conditions in the Iron Mask remained much as during the fiscal year. Stoping has been in progress in the orebody opened by the cross-cut from the Centre Star 4th level, and ore has also been mined below the Iron Mask old 5th level, which is only 40 feet above the Centre Star 4th level cross-cut, which has made these ore bodies accessible.

The total footage of work done in 1910 in further development of the Centre Star group of mines was 12,566, chiefly drifting and cross-cutting. Diamond drilling totalled 27,698 feet. About 400 men are employed in these mines. The tonnage of ore for the year, allowing an average output for December, was rather more than 191,000 tons.

The following figures may prove of interest: Aggregate tonnage of ore mined since production was commenced in 1894, 1,477,324 tons. Metal contents of value: Gold, 721,636 oz.; silver, 850,750 oz.; copper, 28,239,017 lbs.; gross value, $19,508,-033. These statistics are to July 1, 1910; if the production made during the latter half of 1910 be added, an approximate tonnage of 1,570,000 tons, and a value of nearly $20,500,000 will be obtained. There have been fully 26 miles of underground development or narrow work done in the mines of the group.

Le Roi.—While the production, tonnage and development work figures of this mine for 1910 are higher than for 1909, they compare unfavourably with those of earlier years when the mine was being worked on a larger scale. Exploration work last year was chiefly with diamond drills, with which 11,421 feet of drilling was done; cross-cutting, drifting, etc., totalled 1,745 lin. ft. The output of ore was about 14,275 tons, and the valuable metal contents as follows: Gold, 9,567 oz.; silver, 8,070 oz.; copper, 294,194 lbs. The only work being done late in the year was that of stoping out some ore known to have been left in the ground above the 200-foot level.

The Le Roi Mining Company is now in voluntary liquidation, the shareholders having authorized the winding up of the company after much exploration with diamond drills had failed to find any large shoots of ore of a sufficiently high grade to give reasonable promise of profitable results should the operation of the mine be continued. What will be the future of the mine is not known. Mr. A. J. McMillan, late managing director, is liquidator, and he will doubtless dispose of the company's property, which includes the smelting works at Northport as well as the mine at Rossland, in such manner as will best conserve the interests of the shareholders.

Le Roi No. 2.—The gross tonnage of ore produced from the mines of the Le Roi No. 2, Ltd., in 1910, was about 47,000 tons, approximately one-third of which was milled at the mine (producing 1,370 tons of concentrate) and the remainder was shipped crude to the smeltery at Trail. The development work done underground totalled 4,400 lineal feet, beside which there was 11,500 feet of diamond drilling done.

The cross-cut from the Josie shaft, at the 1,300-foot level, commenced last year, was driven south until it reached the vein at about 1,000 feet from the shaft. The ore body opened proved to be large, but the value contained in the ore was less than had been hoped for, though the fair percentage of copper in it was regarded as a promising indication. Most of the year's work on this level having been dead work, there has not yet been time to develop the ore body extensively. Satisfactory results are expected from the further development of this ore, there being every reason to look for the ore in this deep part of the mine yet proving as profitable to the Le Roi No. 2 Company as that at depth in neighbouring mines has proved to other companies operating them.

In other parts of the mines, at various depths down to the 900-foot level, much work has also been done during the year, and in several instances important shoots of ore have been discovered. Ore was opened in the Hamilton vein, in the west end, between the 700 and 500-foot levels. In the May Day vein, discovered six years ago, ore has been found above the 100-foot level and work done in it. In the Annie vein ore was found above the 500-foot level, besides which stope 523 was opened and worked. A rich veins was quite lately found on the 500-foot level, but there has not yet been sufficient time to do much development in it. Driving towards an entirely new vein, known as the Shackleton vein, on which no work had previously been done anywhere on the property, has been in progress during the latter part of the year. On the northern part of the group, 100 feet of sinking was done, by contract, in the Surprise vein, and after ore of good grade had been found, work was stopped temporarily, but will be resumed in the near future.

Besides the foregoing work, some diamond drilling was done in No. 1 mine. There was little change made in the surface works, these being adequate to present requirements of the mines. An exception is that a self-acting tramway is being put in between the ore-sorting bins and the shipping bins, this to be worked by a small induction motor.

The company, which ordinarily employs about 110 men, with Mr. Ernest Levy in charge in the province, during the year paid

three dividends each of two shillings respectively on March 8, July 8, and November 8. Its capital is £600,000 in 120,000 shares of £5 par. The total of dividends paid to date is approximately $1,062,000.

Velvet.—Shipments of ore from this mine during two months of 1909 and four months of 1910 totalled 647 tons, containing 576 oz. gold, 647 oz. silver, and 45,290 lbs. copper. One lot of 17 tons averaged 3.13 oz. gold, and 5.3 oz. silver per ton, and 9.76 per cent. copper. Much of the ore shipped averaged about $24 per ton, gross value. Years ago this mine was opened by six levels to a depth of 500 feet. An adit drains the mine to the 4th level. The larger part of the ore above No. 5 level has been extracted. The vein in the upper levels has varied in width from 3 to 8 feet; diamond drilling has shown the occurrence below the 6th level of 11 to 13 feet of solid ore, samples of which have assayed $18 to $20 per ton. It is stated that as the country is less disturbed below the 6th level, the ore body is stronger and better defined than above it, and the ore of good average grade. The mine equipment including power plant, stamp mill, concentrating tables, etc., cost about $70,000. Excepting that done under lease in 1909 and 1910 no work of consequence has been done on this property since 1903.

Other Properties.—Very little information was received relative to other mines in Rossland camp, the following brief notes include all that can be given at this time. The Cliff is being developed by the Granby Company, under option of purchase. Two tunnels are being driven. Air for driving two machine drills is obtained from the Centre Star. Between 15 and 20 men are employed.

The Nickle Plate has been worked on a small scale during recent months by some leasers, who have shipped about 850 tons or ore. Part of this was gathered up on the surface and other ore has been taken from a drift on the 200-foot level of the mine.

The I.X.L. has also been worked in a small way and a few hundred tons of ore extracted.

In the south belt, galena ore of good quality has been reported as occurring in the Blue Bird and Mayflower mines, both of which have made small shipments to the smeltery.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

The Welsh anthracite coal trade during 1910 was a disappointing one. The year opened with every prospect of being a profitable one, but the mild Continental winter, the Paris floods, the uncertainties prevailing over the Eight Hour Act, and the absence of American and Canadian orders, which at one time formed an important factor in the market, all contributed to the period being one of the most disastrous in its history. The ruling price of Big Vein at the close of the year was 13s. 9d. per ton f.o.b., as against about 18s. for the same class of coal at the opening of the year, and alongside of the gradual fall in price has been constant loss of time at the mines, which has been greater than for several years past. In part, this was due to the sidings at Swansea being so completely blocked up with coal that the railway companies were unable to clear any more from the collieries, with the result that the latter were recently on stop for days together. Lately two anthracite collieries were put up for auction, but in view of possible labour troubles and the poor demand at the moment for the coal, no bid was made. The immediate outlook is somewhat gloomy for the trade in view of the opening up by British capital of the Russian anthracite fields, which will compete in places where Welsh anthracite has been used for years.

SOUTH AFRICA.

Johannesburg.—One of the most serious of the native faction fights which have taken place on the Rand during the Christmas holidays was waged at the Cason mine. One native was cut off from his comrades and was literally beaten to a pulp. Seventy were wounded. Fighting was renewed underground this morning. One man has been killed and many have been injured, several fatally—Reuter.

INDIA.

The gold production of the mines of the Kolar Goldfield (Mysore) and two outside mines (the Hutti Nizam's and the North Anantapur) for December was 48,419 ozs., an increase of 1,147 ozs. compared with the return of the previous month.

RUSSIA.

Warsaw, January 20.—Four hundred miners were entombed alive to-day and forty instantly killed by an explosion in the Casimir coal mine at Sosnowice on the Russo-Prussian frontier. Fire broke out following the explosion, cutting off the escape by the main shaft, but 360 cut their way through a wall separating them from a cross tunnel and came out alive. Rescue parties that were able to enter the mine after the fire had raged for several hours found forty men dead, their bodies badly mutilated. Negligence of the mine owners to apply proper safety devices was responsible for the disaster and the arrest of three of the owners was ordered by Government officials, who arrived on the scene and directed the work of rescue.

Rioting broke out among the rescued miners and the relatives of the men who were killed, and soldiers were called to prevent an attack on the mine owners when they were taken into custody.

AUSTRALIA.

The broken Hill South Silver Mining Company received the following cablegram on January 4 from Adelaide: "Four year and half wages agreement concluded. Supply of Water Bill has passed."

The North Broken Hill Mining Company also received a cable dated 4th instant, from its head office at Melbourne: "Labour troubles settled. Men are to receive 1s. per day extra; all other conditions remain as before."

UNITED STATES.

Butte, Mont., January 21.—The Tuolumne Company is now shipping on an average of about 350 tons of ore a day, which is running from 10 to 12 per cent. copper. At the same time development work is going on and large bodies of ore are being blocked out and the sinking of the shaft from the 1,400-foot level is proceeding and good progress is being made. The management has received bids or offers from at least two smelters for the treatment of its ore, but as yet no decision has been arrived at.

Washington, D.C.—According to Director of the Mint George E. Roberts, in the annual statement of the Bureau of the Mint on the gold and silver production of the world, although the production of gold in South Africa probably will increase, the increase will be slow, while the production in other parts of the world is standing still or declining.

The natural expansion in industry, commerce and wealth can be depended upon to offset the probable slight increase in gold production. The increase for 1910, according to the bureau figures was only $451,100. Africa leads the world in production of gold during 1910, with $170,000,000 worth of its credit. This was an increase over last year of about $4,000,000. The United States came second during 1910 with $96,055,200 produced in gold, compared with $99,673,400 last year. Australasia came third with $65,002,000 in gold, compared with $71,007,900 last year. The total gold production of the world in 1910, the bureau says, was $454,874,000, compared with $454,422,900 in 1905.

In the United States, California resumed first place among the States, which she lost to Colorado in 1897, with $21,146,150 to her credit, compared with $20,703,600 last year. Colorado, in second place, had $20,408,041, compared with $21,846,600 last year. Nevada came third, with $17,941,643, compared with $16,286,200 last year; and Alaska was fourth, with $16,987,990, compared with $20,339,600 last year. Kansas, which last year produced no gold, had to her credit in 1910 $11,163 worth of precious metal.

Joplin, Mo., January 16.—Zinc ores sold as high as $44 for a few lots, $43.50 for a few more, while the major portion of the tonnage brought a $43 base. Small lots sold down as low as $40. The highest price reported paid for any ore was $47.

Calamine ores sold at $20 to $24 for large lots, while small jags sold for less prices. The highest price reported for any lot was $29.

This week marked the first time in the history of the district when heavy tonnages of ore sold on a contract price. Something like 1,200 tons of ore in the Joplin district was contracted for this week on a regular scale of prices based on the spelter market at St. Louis. This movement involves a number of the smelters and a number of the producers, and has attracted the attention of the entire field.

Production is gradually improving again and within another fortnight will be back to its old gait, unless interfered with by bad weather conditions. The surplus ores in the district have been reduced greatly during the shut-down.

A strong demand marked the lead ore market of the past week and ores sold at $57 to $58 per ton of 80 per cent. zinc. Nearly all the large lots received $58, while smaller lots shaded down to $57.

The curtailment in output and increase in demand by the starting of two new smelters has caused the market to respond quickly and the producers are feeling much better over the situation.

Spelter has been steady for the past ten days at $5.40 to 5.45, St. Louis, while the London market has advanced to £24 s. 6d. Lead has been steady at $4.37½, St. Louis.

Goldfield, Nev., January 19.—The resignation of J. R. Finlay as manager of the Goldfield Consolidated Mining Company was announced yesterday, and will, it is stated, take effect next Saturday. Mr. Finlay is returning to New York City, where he will resume practice of his profession as mining engineer. He has been in charge of the Goldfield Consolidated's property for a year, and during that time has brought the affairs of the company to a highly satisfactory stage, achieving remarkable success in production, profits, development and improvement of underground and surface equipment.

No successor to Mr. Finlay has been chosen or at least announced. For the present, operations will continue under the existing organization, with Superintendent J. W. Hutchinson in charge of the mill and Assistant Manager J. F. Thorne in charge of the mines.

Tonopah, Nev., January 12.—The year 1910 closed and 1911 began under the most encouraging conditions as far as the mining industry in Tonopah is concerned. While the latter part of the last month of the year recorded smaller shipments on the part of most mines, it was not due to any fault of the property, but, rather, to the time lost because of the holidays. There is more high grade and milling ore available in the mines now than at the same time last year, if we may judge from general and official report, and it seems certain that if ordinary working conditions prevail during the year, Tonopah mines will score the biggest production in their history.

Coalinga, Cal., Jan. 12.—A 400-barrel gusher has been developed at well No. 1 of the Creme Petroleum Company, which was brought in several weeks ago. Since completion of the well late in November it has been on the pump and making a good production until early last week, when the hole sanded up. In the course of work preparatory to putting the well on the pump again the sand suddenly loosened and the oil commenced flowing in heavy volume.

MEXICO.

Parral, Mexico, January 21.—The future for the Parral district looms up brighter than ever since the Alvarado started to grind, and the Veta Colorado made good its word to buy ore. Fifteen hundred tons in one lump were purchased of P. B. Butler, representing the owners of the Santa Gertrudis property, by the Veta Colorado Company at first, and several more purchases are pending.

COMPANY NOTES

COMPANY NOTES.

Directors of the Wettlaufer mine have put the stock on a dividend basis, declaring a regular quarterly dividend of 2½ per cent. and extra of 2½, payable March 11, to holders of record February 25.

HOLLINGER GOLD MINES, LIMITED.

24 King Street West,
Toronto, Canada, 9th January, 1911.

To the Shareholders,
Hollinger Gold Mines, Limited:

The following general statement of affairs is issued for the information of the shareholders of the company.

The company is incorporated under the Ontario Companies Act with full powers for the mining and treatment of ore and with share capital of $3,000,000, divided into 600,000 shares of five dollars ($5.00) each, of which 100,000 remain in the treasury and 500,000 have been issued as fully paid and non-assessable for transfer of properties, the carrying on of mining operations until the erection of the stamp mill and making provision for milling the ore, etc.

The directors and officers of the company are: N. A. Timmins, of Montreal, President; John McMartin, of Cornwall, Vice-President; L. H. Timmins, of Montreal; Duncan McMartin, of Montreal, and D. A. Dunlap, of Toronto, Secretary-Treasurer. The Toronto General Trusts Corporation has been appointed Transfer Agent and Registrar of stock.

The mining property of the company consists of four mining claims of 40 acres each (160 acres in all), being parts of Lots Nos. 10 and 11 in the Second Concession of the Township of Tisdale, all of them being patented by the Crown in the name of the company as owner. As these claims adjoin each other they form a block of land that can be mined from one centrally located power plant. The present power plant and workings are so situated, being at about the centre of the block of claims.

The buildings consist of a power house and various commodious buildings for the accommodation of the men, office, smithy, storehouse, stables, etc. The power plant which is in good order and working steadily comprises two 60 h.p. boilers, 6-drill compressor, 3 hoists and all working connections.

The mining done up to the present includes 365 feet of sinking and 1,040 feet of drifting at the 100-foot level. The sinking comprises the main three-compartment shaft reaching to the 100-foot level known as No. 1 shaft, No. 3 shaft about 600 feet southerly reaching to the 100-foot level and connected at that level with No. 1, one intermediate shaft of about 65 feet in depth, and the winze about 100 feet northerly from the main shaft and reaching from the first level down 100 feet to the second level where the work of sinking at present ends (being

200 feet from the surface). All the ore raised from these workings is dumped and piled for conveyance to the stamp-mill.

The ore body consists of gold bearing quartz veins described on the Official Geological Maps and which are of varying and somewhat irregular widths. These veins out-crop in places but generally have been defined on the surface by trenching, the surface covering of soil and debris being in some cases several feet deep. Comparatively little, however, has been done in the way of uncovering known veins, or in prospecting for others, much of the territory being untouched. There appear at present to be three systems of veins running northeasterly and southwesterly across the property, and on what appears to be the main system the present workings are located. The width of the vein upon which the sinking and drifting has been done averages about from six to eight feet, and the length so far uncovered upon the surface is about 1,700 feet. The values throughout, according to the tests from sampling, assaying, and milling, have been fairly uniform without any apparent diminution at the depth reached (200 feet) where the vein still continues. Veins have been uncovered upon each of the four claims showing ore similar in character to that already mined and tested.

Consistent assay tests have been made from the commencement by means of a well-equipped assay plant and assayer on the property. In addition to this there have been the returns from the small two-stamp Tremaine mill, installed in the early part of the summer, the ore treated by it having been taken in the course of mining indiscriminately from the sinking and drifting.

The returns from the sampling and assaying have averaged $49.80 in gold per ton, while from the stamp-mill the values have averaged over $50.00 in gold per ton recovered from a saving of about 85 per cent. effected without concentration or effort to treat the sulphides, thus proving the free-milling character of the ore.

Under agreement with the company, mining operations are being vigorously carried on by the former owners and will be so continued free of expense to the company until the completion of the stamp-mill now being erected by the Procupine Gold Milling Company, Limited, in a convenient location on a site, a part of which has been leased from this company. Contracts have been let for the erection and equipment of this mill and it is fully expected that operations will begin by July next with electric power supplied by the power plant now being installed at Sandy Falls on the Mattagami River. Ore from this company's properties has the first claim to treatment up to the full initial capacity of the mill, viz.: thirty stamps. Thus the company, by the time the stamp-mill commences operations, will own, entirely free of cost to it, a fully equipped and efficient mining plant, a large quantity of ore mined and ready for treatment, a further large quantity of ore blocked out, with provision made for milling the ore, as a result of which financial returns should be quickly obtainable.

The Tremaine stamp-mill was installed to ascertain the gold content of the ore and its free milling character. The gold so recovered by this process, which is the property of the company, has not yet been refined and its value therefore cannot be stated, but a full report will be given later.

Mr. P. A. Robbins as General Manager will take charge on February 1st next, and will be assisted by Mr. A. A. Pare under whose superintendency the mining and milling operations have hitherto been conducted with great satisfaction.

N. A. TIMMINS, President.

LA ROSE.

The dividend cheques of La Rose Consolidated mines were mailed on January 21st. A brief statement accompanying the cheques shows that there is $708,470.99 in cash on hand and ore in transit and at smelters, and $303,343.40 in ore sacked at the mine ready for shipment. Since October 1 the available cash assets have been increased over 65 per cent.

January 20, 1911.

Cash in bank, ore in transit and at smelters.....	$708,470.99
Ore sacked at mine ready for shipment.....	303,343.40
	$1,011,814.39

The fact that the cash position has been trebled since April 20, 1910, and that the ore reserves are very much greater, reflects the new order of events at La Rose mining areas and emphasizes the executive capacity of President McGibbon and his co-directors.

STATISTICS AND RETURNS

COBALT BULLION SHIPMENTS.

January 14.

A shipment of bullion consisting of 17 bars and 1 keg silver left Cobalt on Wednesday afternoon through the Dominion Express Company. The 17 bars were billed through to St. John for conveyance by the C.P.R. steamer Empress of Britain to London (Eng.) The keg of silver was consigned to the American Smelting & Refining Company, Perth Amboy, New Jersey.

The details of the shipment are as under:

Temiskaming Mine—12 bars; weight, 13,840 ounces; value, $6,220.

Trethewey Mine—2 bars; weight, 1,952 ounces; value, $865.

Silver Cliff Mine—1 bar; weight, 832 ounces; value, $371.

Waldman Mine—1 bar; weight, 328 ounces; value, $140.

Campbell & Deyell's Sampling Works—1 bar; weight, 160 ounces; value, $66.

Kerr Lake Mine—1 keg silver; weight, 4,384; value, $1,258.

The bullion shipments for this year now read as under:

	Ounces	Value.
O'Brien	18,921	$10,217
Nova Scotia	80,177	40,000
Temiskaming	26,381	12,490
Trethewey	1,952	865
Silver Cliff	832	371
Waldman	328	140
Kerr Lake	4,384	1,258
Campbell & Deyell's Sampling Works	160	66
	135,135	$65,407

COBALT ORE SHIPMENTS.

Shipments from Cobalt camp for the week ended January 14th were 822,598 pounds, or 411 tons divided among eleven mines. Shipments since the year opened are 2,210,858 pounds or 1,105 tons. The details are:

	Jan. 14.	Since Jan. 1
Beaver		6,300
Buffalo	57,590	120,690
Cobalt Lake		131,400
Cobalt Townsite		63,700
Coniagas	61,820	288,620
Crown Reserve	40,200	104,200
La Rose	60,000	122,300
Kerr Lake	120,398	180,728

McKinley-Darragh	125,610	269,070
Nipissing	152,400	433,600
O'Brien	79,200	79,200
Right of Way	60,860	60,860
Silver Cliff	.....	47,920
Temiskaming	64,520	145,820
Trethewey	97,250	97,250

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending January 21, and those from January 1, 1911, to date:

	Jan. 21. Ore in lbs.	Since Jan.1. Ore in lbs.
Beaver	.....	63,500
Buffalo	63,980	184,670
Cobalt Lake	.....	131,400
Cobalt Townsite	.....	65,700
Coniagas	.....	288,620
Crown Reserve	.....	104,200
Chambers-Ferland	64,900	64,900
La Rose	153,310	275,610
Kerr Lake	120,165	300,893
McKinley-Darragh-Savage	110,430	379,500
Nipissing	124,280	557,880
O'Brien	.....	79,200
Right of Way	.....	60,860
Silver Cliff	.....	47,920
Temiskaming	.....	145,820
Trethewey	.....	97,250
Townsite	.....	184,040

The shipments for the week were 821,105 pounds, or 410 tons. The shipments from January 1 to January 21 were 3,031,963 pounds, or 1,515 tons.

BRITISH COLUMBIA ORE SHIPMENTS.

The following are the returns of the ore production and movement for the past week ending January 14th, and for the year to date:

Boundary Shipments.

Granby	19,894	44,553
Mother Lode	8,226	15,524
Snowshoe	2,164	3,715
Rawhide	3,105	7,161
Jack Pot	385	829
Number Seven	98	151
Other mines	.....	240
Total	33,872	72,173

Rossland Shipments.

Centre Star	3,495	7,186
Le Roi No. 2	453	1,004
Le Roi No. 2, milled	300	600
Le Roi	334	442
I. X. L.	7	7
Nickle Plate	45	45
Other mines	.....	22
Total	4,634	9,306

Slocan-Kootenay Shipments.

Sullivan	319	1,099
St. Eugene, milled	2,775	5,550
Richmond Eureka	59	117
Rambler-Cariboo	84	114
Hewitt	23	47
Queen, milled	420	840
Granite-Poorman, milled	250	500
Nugget, milled	110	220
Wilcox, milled	75	150
Emerald	100	100
Standard	63	63
Society Girl	34	34
Maestro	70	70
Eastmont	29	29
Summit	35	35
Hope	56	56
Second Relief	37	37
Idaho	13	13
Other mines	.....	142
Total	4,552	9,216

The total shipments for the week, including the estimated milling, were for the week, 43,058 tons, and for the year to date, 90,695 tons.

British Columbia Copper Co.'s Receipts.

Greenwood, B.C.

Mother Lode	8,226	15,524
Rawhide	8,105	7,161
Jack Pot	385	829
Other mines	.....	240
Total	11,716	23,754

Granby Smelter Receipts.

Grand Forks, B.C.

Granby	19,894	44,553

Consolidated Co.'s Receipts.

Trail, B. C.

Centre Star	3,495	7,186
Snowshoe	2,164	3,715
Sullivan	319	1,099
Le Roi No. 2, part concentrates	453	1,004
Le Roi	334	442
Number Seven	98	151
Richmond-Eureka	59	117
St. Eugene	130	180
Rambler-Cariboo	84	114
Hewitt	23	47
Standard	63	63
Emerald	100	100
Society Girl	34	34
Maestro	70	70
Eastmont	29	29
I. X. L.	7	7
Summit	35	35
Hope	56	56
Nickle Plate	45	45
Second Relief	37	37
Idaho	13	13
Other mines	..	164
Total	7,648	14,708

The total receipts at the smelters, including concentrates, were for the week, 39,258 tons, and for the year to date, 83,015 tons.

TORONTO MARKETS.

Jan. 24.—(Quotations from Canada Metal Co., Toronto.)
Spelter, 5.60 cents per lb.
Lead, 3.65 cents per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 45 cents per lb.
Copper, casting, 13.25 cents per lb.
Electrolytic, 13.25 cents per lb.
Ingot brass, 8 to 12½ cents per lb.

Jan. 24.—Pig Iron.—(Quotations from Drummond, McCall Co., Toronto).
Summerlee No. 1, $23.00 (f.o.b. Toronto).
Summerlee No. 2, $22.50 (f.o.b. Toronto).
Midland No. 1, $20.00 (f.o.b. Toronto).
Midland No. 2, $19.50 (f.o.b. Toronto).
Hamilton No. 1, $18.75 (f.o.b. Hamilton).
Hamilton No. 2, $18.25 (f.o.b. Hamilton).
Clarence, $20.00 (f.o.b. Toronto).
Cleveland, $20.00 (f.o.b. Toronto).

GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.

Coke.

Jan. 20.—Connellsville Coke (f.o.b. ovens).
Furnace coke, prompt, $1.40 to $1.50 per ton.
Foundry coke, prompt, $2.00 to $2.15 per ton.

Jan. 20.—Tin (Straits), 41.55 cents.
Copper, Prime Lake, 12.70 cents.
Electrolytic copper, 12.50 cents.
Copper wire, 14.00 cents.
Lead, 4.50 cents.
Spelter, 5.65 cents.
Sheet zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.25 cents.
Aluminium, 21.75 to 22.00 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $38.50 per ounce.
Platinum, hard, $41.00 per ounce.
Bismuth, $2.00 to $2.10 per lb.
Quicksilver, $42.00 per 75-lb. flask.

SILVER PRICES.

	New York cents.	London pence.
January 10	54¾	25¼
" 11	54¾	24 5/16
" 12	54½	25 3/16
" 13	54½	25 3/16
" 14	54⅛	25
" 16	53¾	24 13/16
" 17	53⅞	24⅞
" 18	53⅝	24¾
" 19	53⅛	24½
" 20	53¼	24⅝

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous—January 24, 1911.

Amalgamated Asbestos	..	14
Black Lake Asbestos	15	16
Dominion Coal	..	..
Dominion Steel	..	..
Dominion Steel Corp.	56¼	56½
Granby	31	33
Consolidated Mining	45	55
Nova Scotia Steel	88	88½
Crow's Nest Pass	..	77

Cobalt Stocks—January 24, 1911.

Amalgamated	.00½	.03
Bailey	.06	.06¼
Beaver Consolidated	.32⅝	.32¾
Buffalo	2.28	2.30
Chambers-Ferland	.12	.12½
City of Cobalt	.16¾	.18
Cobalt Central	.08½	.10
Cobalt Lake	.12⅝	.13
Coniagas	6.52	6.60
Crown Reserve	2.55	2.57
Foster	.05	.07
Gifford	.02	.04
Great Northern	.11⅞	.12
Green Meehan	.01⅞	.02
Hargraves	.22¾	.23½
Hudson Bay	90.00	120.00
John Black	.01	.03
Kerr Lake	7.60	7.70
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Nipissing	10.60	10.85
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Ely Consolidated	.37	.39
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Inspiration Copper	8⅜	8½
Miami Copper	18⅞	19⅜
New Baltic Copper	5	8
Nevada Con. Copper	18¾	18⅞
Ohio Copper	1¾	1⅞
Rawhide Coalition	.03	.03½
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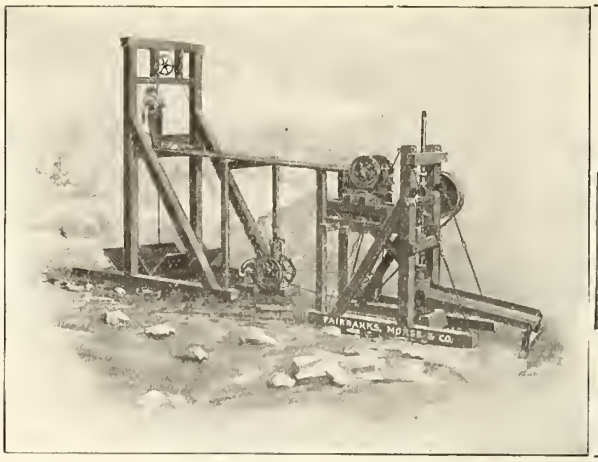

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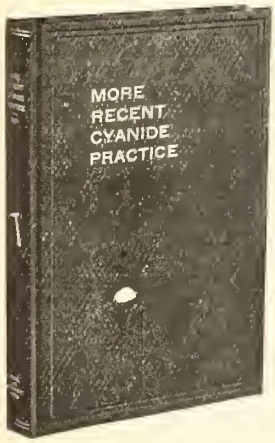

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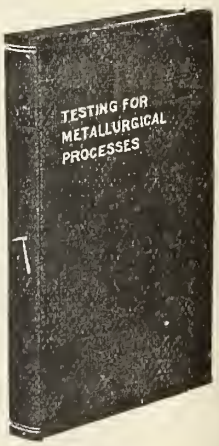

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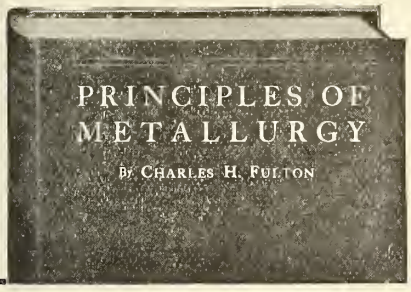

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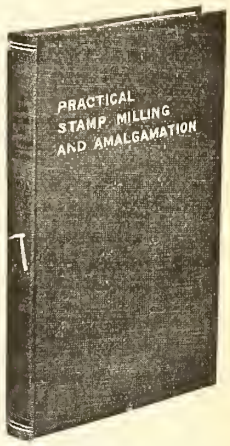

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The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Government of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

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Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minimum being 40 acres in unsurveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

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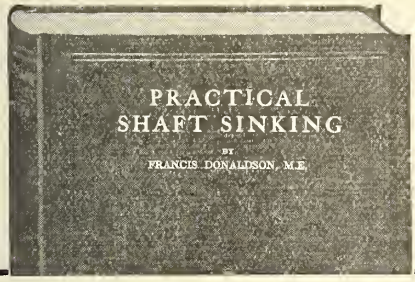

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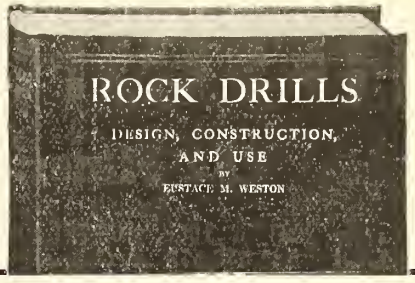

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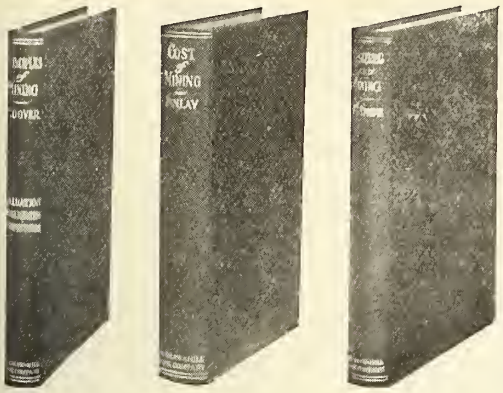

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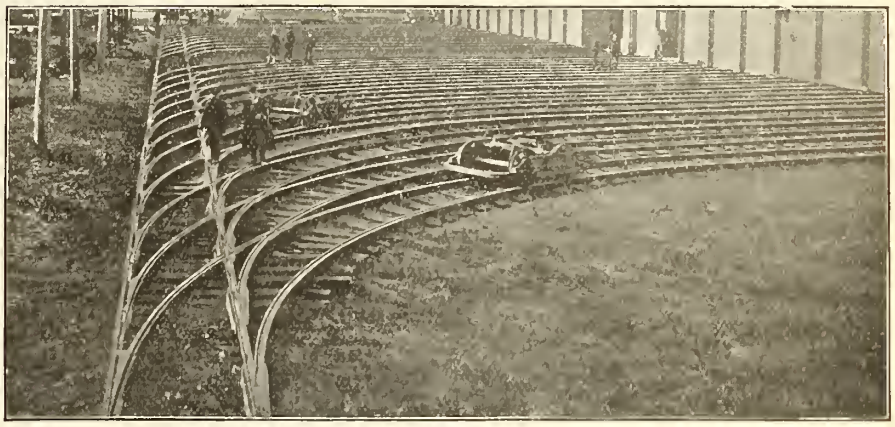

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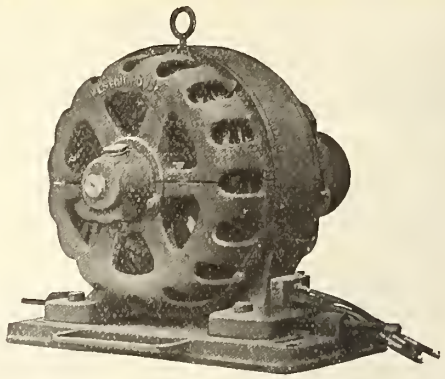

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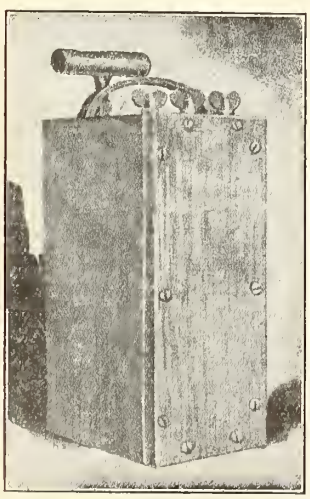

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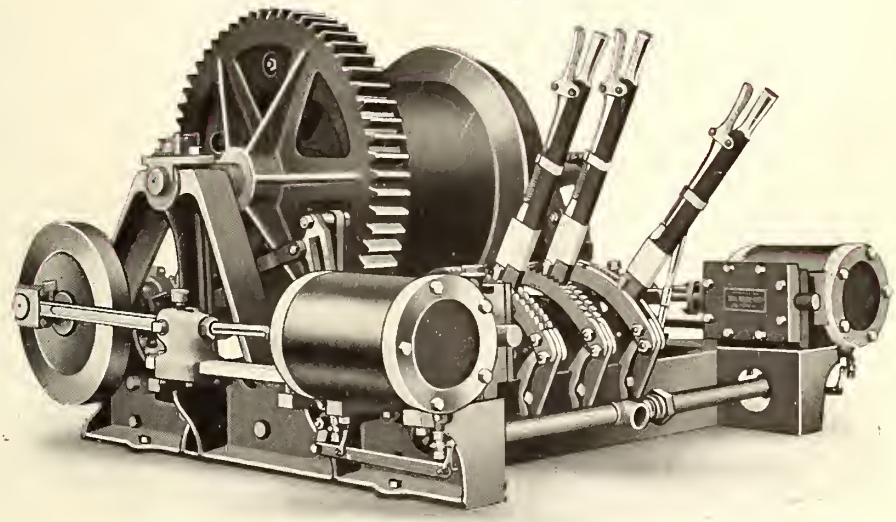

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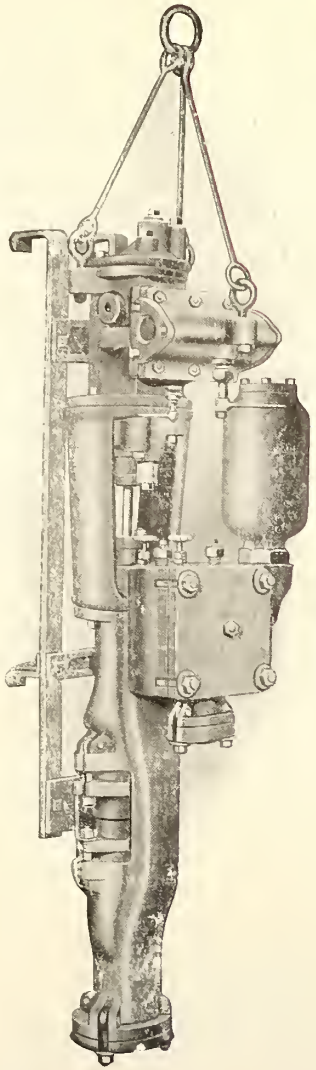

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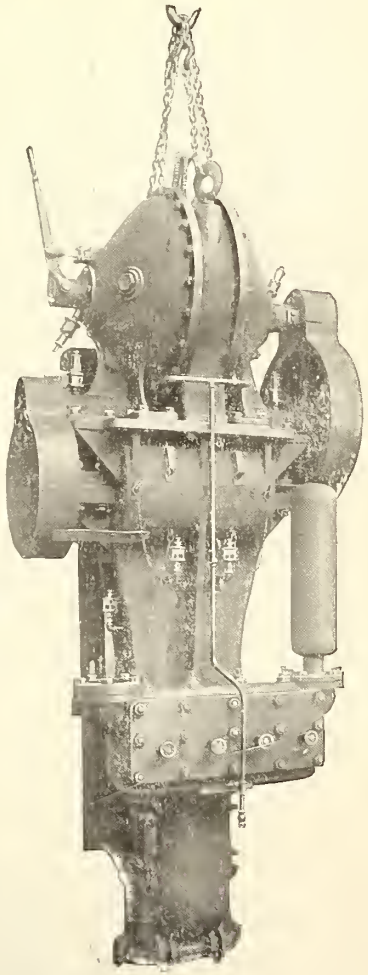

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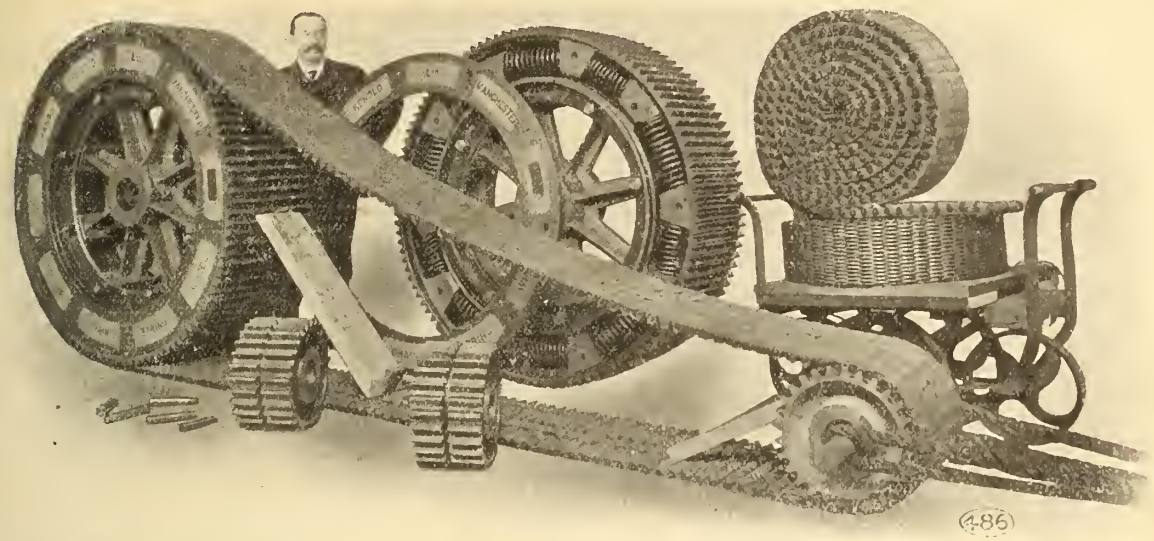

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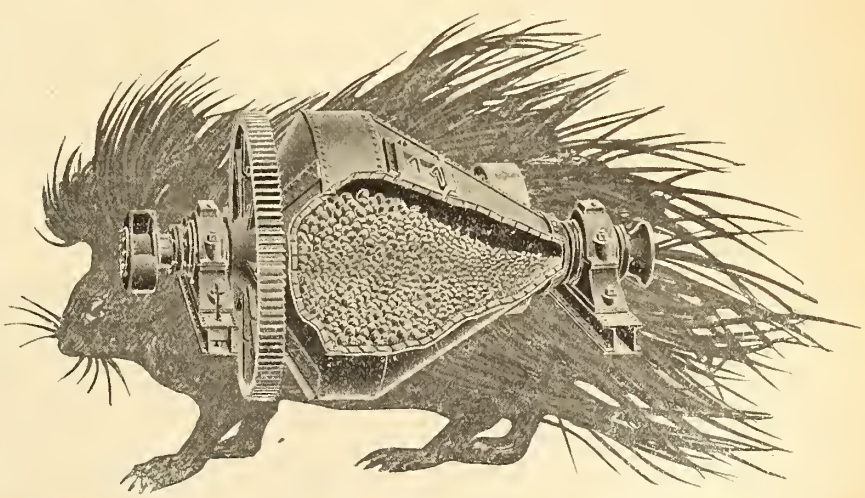

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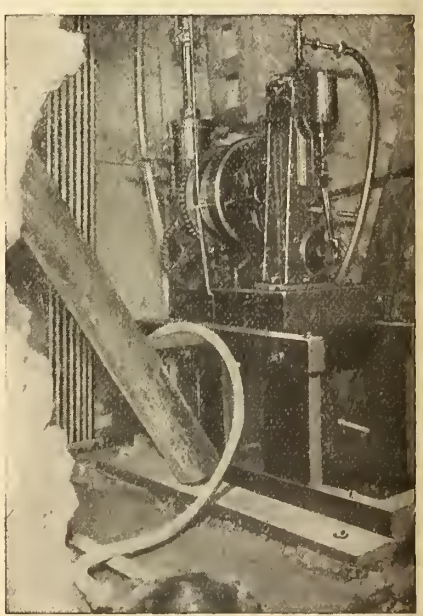

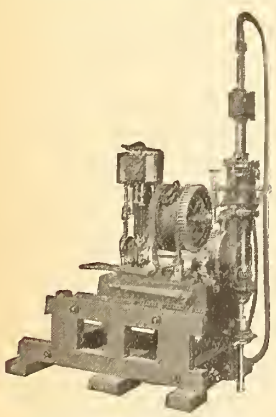

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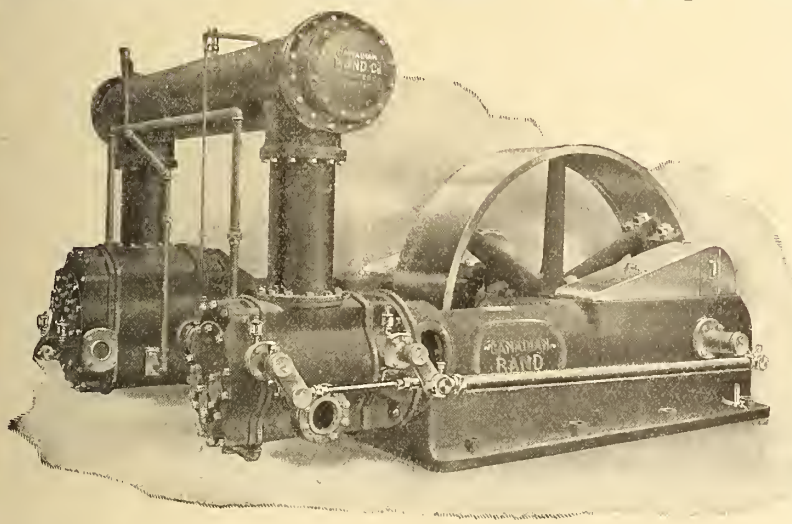

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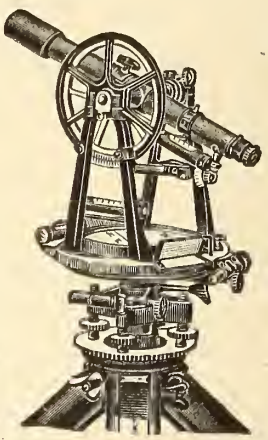

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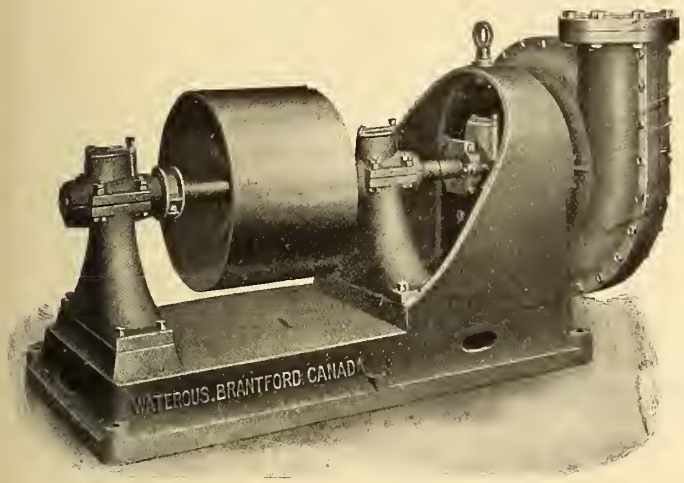

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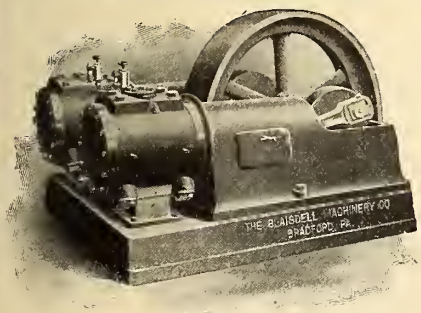

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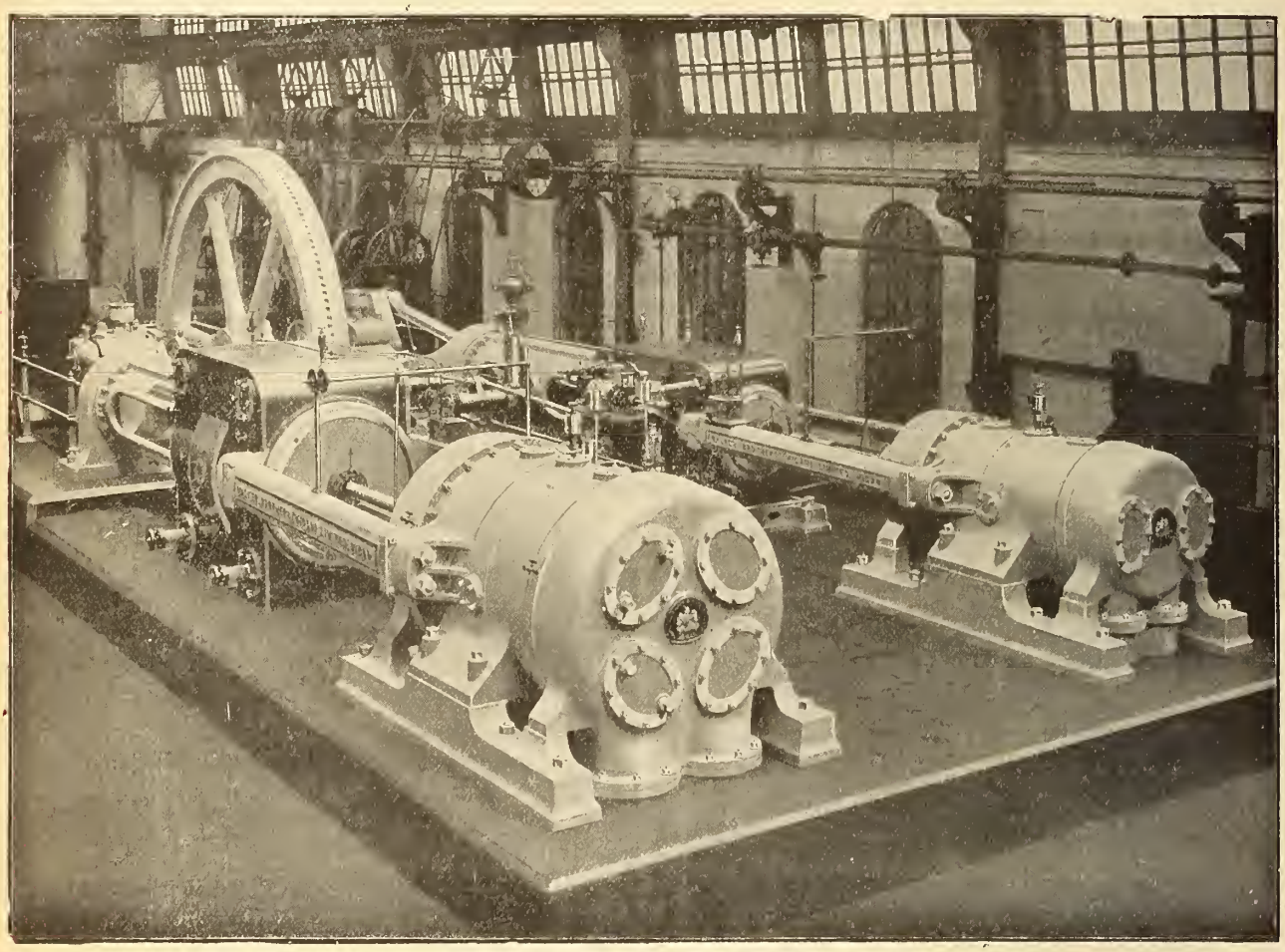

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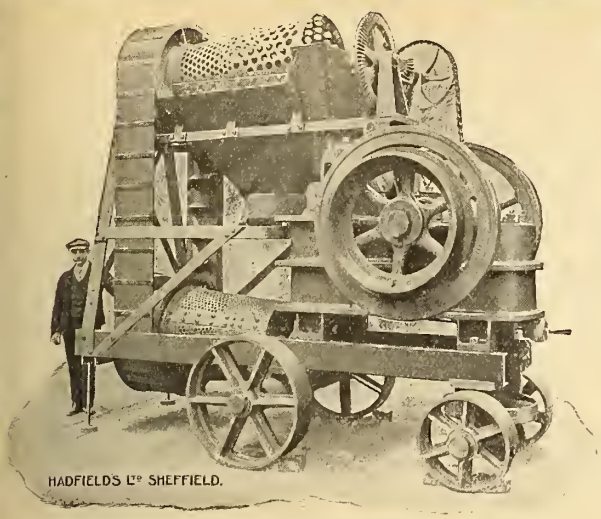

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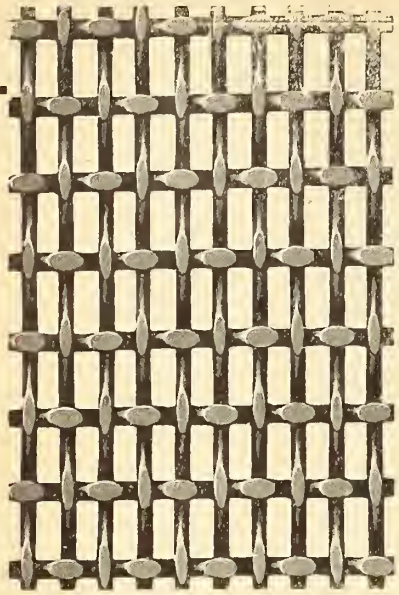

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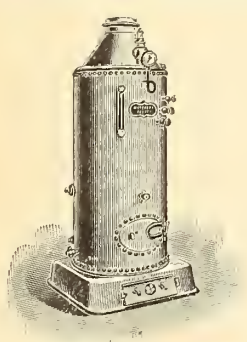

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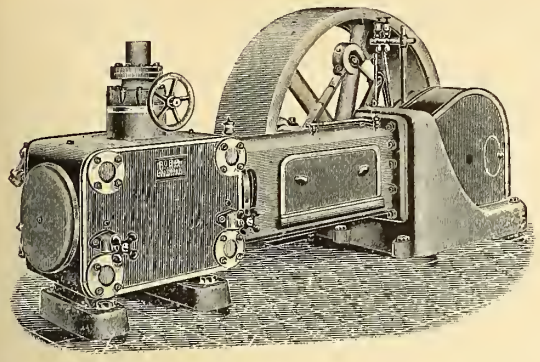

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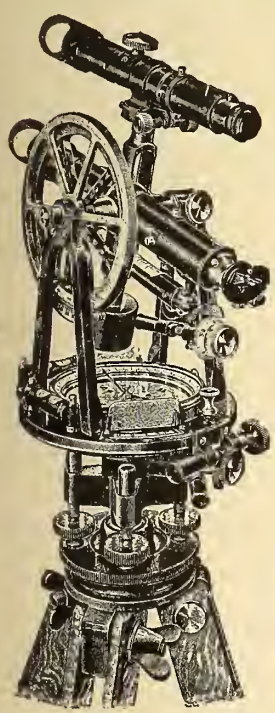

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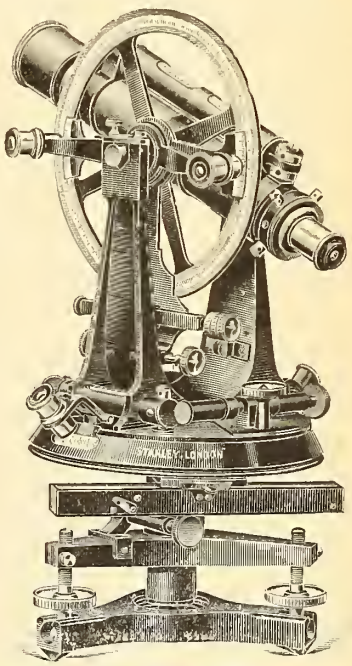

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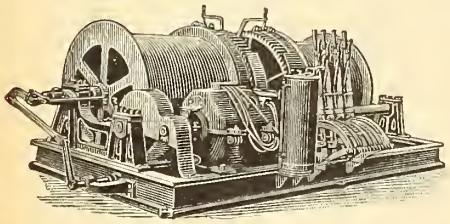

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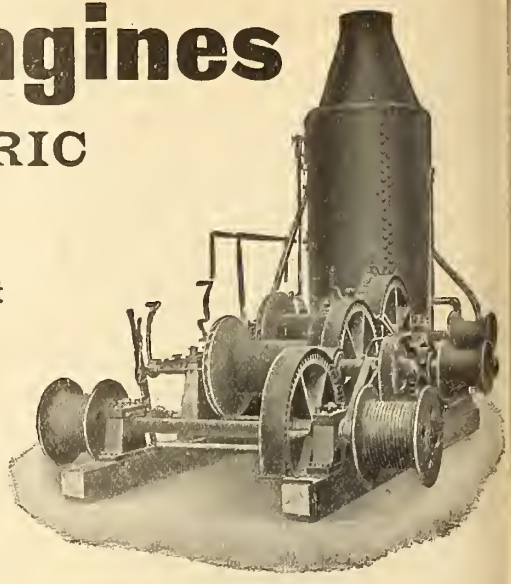

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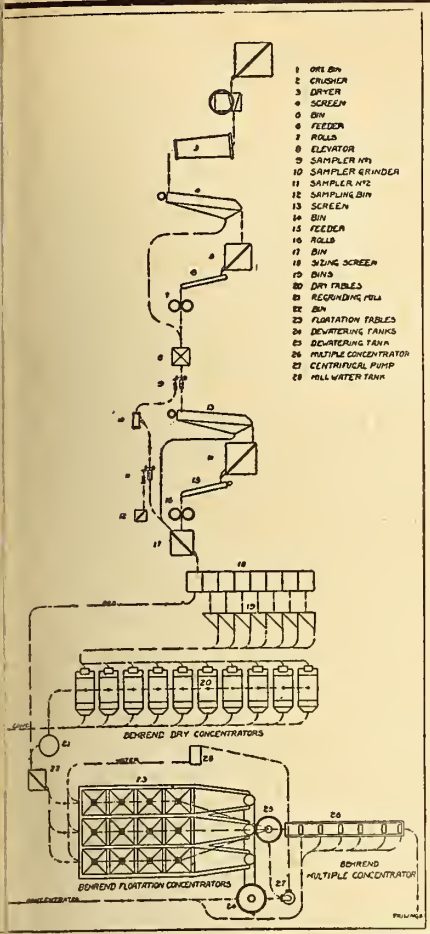

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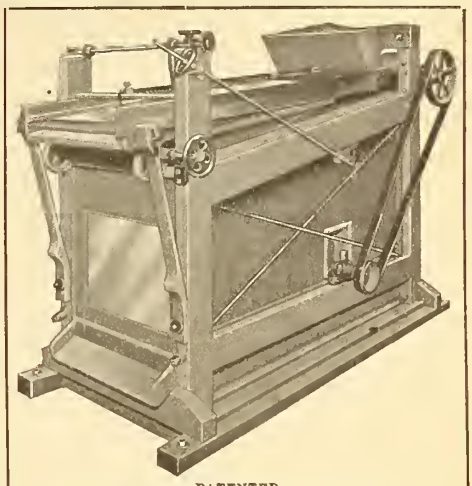

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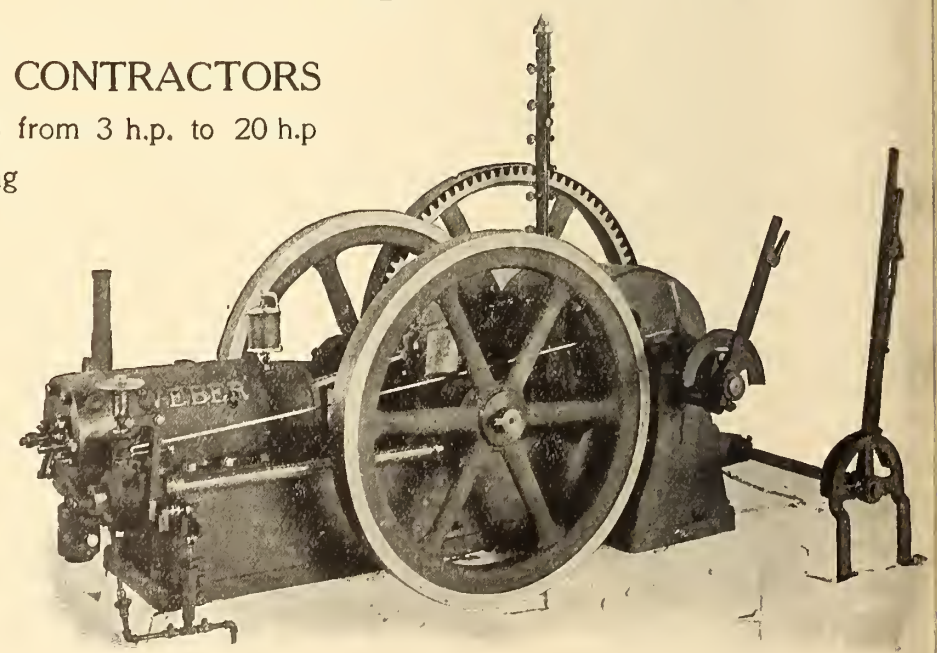

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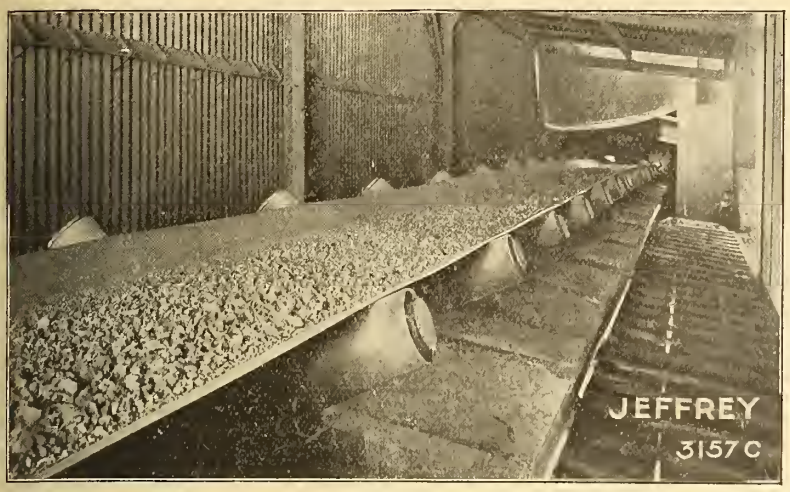

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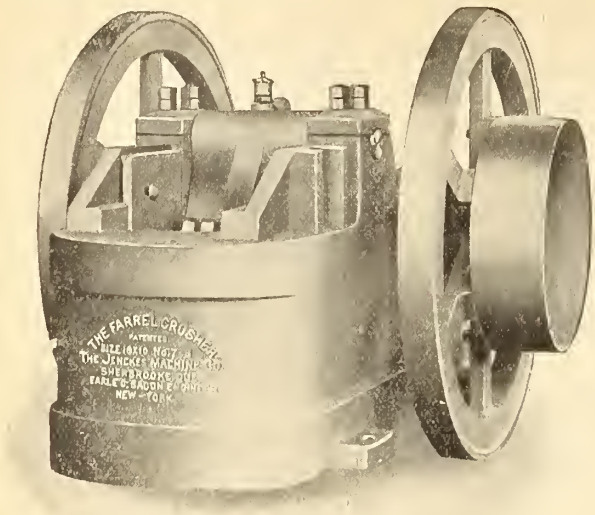

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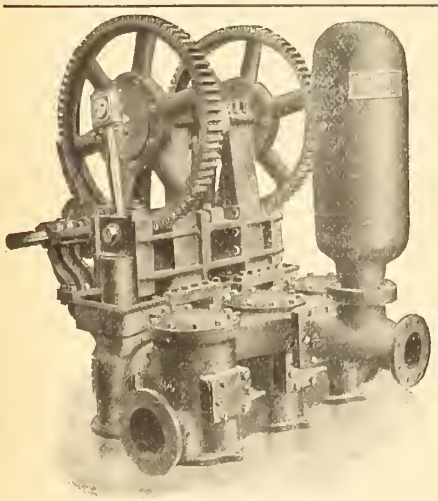

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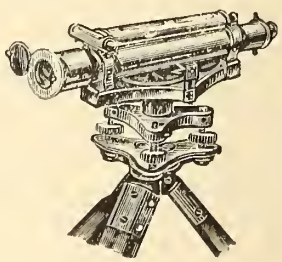

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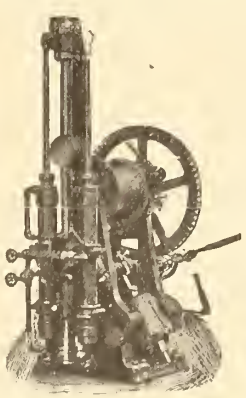

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VOL. XXXII. TORONTO, Feb. 15, 1911 No. 4

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
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PROFESSIONAL ETHICS, WILD-CATTING, AND LEGISLATION.

For some weeks the Toronto branch of the Canadian Mining Institute has been holding special meetings to consider the repression of wild-catting. The aim of the branch has been to suggest the basis of restrictive legislation. Up to the present all attempts to draft a memorial embodying the views of the meeting have failed. Not more than a very few individuals concur in thinking any one specific restriction effective. This divergence is, of course, inevitable. And it signifies that we have been placing the cart before the horse.

In other words, the evil must first be defined, diagnosed, and isolated. Only then can we hope for some degree of unanimity as to the remedy.

What is wild-catting? To our mind wild-catting may best be defined as an attempt to sell mining shares to the public under false pretenses. Usually such attempts imply excessive capitalization, incomplete and exaggerated descriptions of the physical basis of the flotation, undue emphasis laid upon certain incidentals, and the repression of vital facts as to financial arrangements. Briefly, the subornation of the public press makes possible this evil. Paid reading notices, flashy advertisements, and faked despatches are the weapons that the press provides, at a price, for the wild-catter.

Our legislatures also are not blameless. Our legal machinery provides every facility for the wild-catter. He is permitted to foist the most vicious schemes upon the public. Not only is this true, but it is also true that he receives all necessary privileges without question and without a moment's investigation. Dummy directors and other expedients make it easy for anyone, be he bank manager or escaped convict, to call into existence millions of shares in corporations that are commercial nightmares.

Upon the legal luminaries who sell their services as organizers blame also rests. It is surely possible for the lawyer to draw the line somewhere. Precedent and professional habit may justify in some degree the impersonal attitude of the legal adviser; but it is going too far to claim that any professional can so reconcile the evident conflict between morals and business as to feel no compunction in helping to launch companies that are conceived for the express purpose of robbing fellow citizens.

The small investor himself is not clear of blame. Animated by cupidity he eagerly gulps down the baited hook. And when the barb strikes he complains to the world at large of the hard usage that has been accorded him.

But, since wild-catting is done in the name of mining, and since the welfare of the industry and the honour of the profession are affected by it, it assuredly is the first duty of the mining engineer to do all that he can, privately and publicly, to discountenance unsound projects. In the main, the mining engineer is far too diffident in this direction. Often, we regret to say, he is even complaisant. Though his report be put to ill-uses, he contents himself with shrugging his shoulders and maintaining a discreet silence. Here, specifically, professional ethics must be revamped. We have no patience with a negative scheme of ethics. The professional mining engineer, to fulfil his functions as a citizen, to do fairly by the clients who employ him and by the public that trusts and respects him, must be positive, constructive, and aggressive. In season and out of season he must condemn the spurious.

Not all the resolutions in the world can have as strong an influence as the openly expressed opinions of responsible individuals.

Wild-catting is only one manifestation of a prevalent disease. It is not to be cured by patent medicines nor by the knife. But it succumbs readily to open-air treatment.

THE TARIFF.

Although mining interests are not directly concerned with the free exportation of pulp wood, yet indirectly the question is fraught with large meaning for them. The manufacture of sulphite pulp in Canada implies the exploitation of our iron pyrites deposits and the local manufacturing of sulphuric acid. In the mining of iron pyrites there is not a large profit. In the manufacture of sulphuric acid there is a large profit. But the market is limited, and is susceptible of expansion only as our home industries grow. The demand for sulphite-pulp is expanding. If we consent to ship our crude pyrites to the United States, and also to ship our pulp-wood there, we are by way of losing all but nominal profits and of denuding ourselves at a rapid rate of natural assets that are yearly becoming more valuable.

As regards legislative control, it is to be noted that only the Federal Government can prohibit the exportation of pulp-wood from privately owned lands. Provincial Governments can forbid the exportation of pulp-wood from Crown lands only. Thus, whilst the Dominion Government has shown its willingness to remove all barriers, the Provincial Governments are still competent to prevent the wholesale destruction of our pulp-wood forests.

This is but one example of the complicated relations that obtain in mining, milling, and marketing any given mineral. How far Canada is prepared to make concessions is a matter for our plenipotentiaries to determine. Any concession that it is possible to make, so far as mining is concerned, is limited by the volume of trade now existing in one or all of certain specified mine products. Or, rather, these concessions are limited by the probable expansion of trade indicated by the tariff revision.

But since this revision is provisional entirely, and is dependent for effectiveness upon the consent of astute but temporizing politicians, let us rather say that upon the confirmation of this revision rests the expansion of our mineral trade.

Genuine reciprocity, which is to be sharply distinguished from reciprocity as arranged in view of political exigencies, will give certain of our natural products a much better status. For instance, gypsum might be manufactured in Canada for all Canada east, and for the eastern consumers of the United States. But this cannot be unless we are put on absolutely equal terms with United States producers.

It were useless to multiply instances. The basic principle remains. We are bound to retain in Canada the ultimate profit from our products. They must be turned over to our customers in as finished a condition as possible. This is the whole meaning of the tariff to us. Sentiment can be disregarded. We are all British. But, also, we are all merchants. We must sell our commodities, whether they be brains or pork, in the best market. The historic fact remains that heretofore all of our bargains with the United States have been expensive for us. Let us calmly and coolly decide whether this bargain is or is not to our advantage. If it is to our advantage, then we shall be so much the bigger factor in the Imperial Federation.

THE YUKON IN 1910.

In length the past dredging season has exceeded that of any previous year. Beginning in April, dredging was continuously carried on until December 13, a period of 233 days. The output of gold was greater by half a million dollars than in 1909. Operations have been measurably cheapened during the past twelve months both by the installation of larger dredges and by the distribution of electric power.

The output of 1909 was valued at $3,560,000; that of 1910 aggregated $4,100,000. To this enhanced yield the dredges of the Yukon Gold Company on Bonanza and Hunker contributed most. It is confidently expected that the coming season will witness a very much larger growth from this company's dredges and giants.

The Treadgold interests are now prepared for a vigorous campaign on Last Creek, Dominion Creek, parts of Quartz Creek, and possibly other streams. The huge power ditch is practically finished, and distribution lines are in place.

The Canadian-Klondyke Company, on the Boyle concession, below Bear Creek, had a successful season. Other companies are operating on Fortymile, and on Stewart.

All things considered, it looks as if Yukon can fairly look forward to the coming season with a well-grounded expectation of touching the six million mark.

The agitation for good roads in the Yukon should bring relief to many operators. It may be noted, incidentally, that rapid time has already been made in a motor-car between Whitehorse and Yukon Crossing.

In Southern Yukon preparations are being made to provide for the shipment of large quantities of copper ore from Whitehorse to Skagway, thence to the Tacoma smelter. Iniquitously high railroad freights have heretofore paralyzed this enterprise. The action of the Railway Commission in cutting down these rates has relieved an intolerable situation.

Coal-mining has been active. As it reflects directly the condition of the dredging industry, it will almost certainly prosper.

* * * * *

The conviction that the Yukon is no longer a poor man's country may require qualifying. Whilst there is no questioning the fact that the greater part of the country's annual wealth will be won by large and highly organized corporations, yet we are inclined to believe that the enterprising prospector still has a good chance to attain success. The Yukon is fast becoming a stronger factor in our national economy. There will be prizes for more than a few in the successful exploitation of so vast a region.

THE IRON ORE RESOURCES OF THE WORLD.

The eleventh International Geological Congress assumed the task of estimating the present developed and partly developed iron ore resources known to-day. The total aggregate weight of iron ore is estimated by that body as being 22,408,000,000 tons. This quantity is calculated to represent 10,192,000,000 tons of iron.

Despite the magnitude of these figures, it appears to be a fact that at the present rate of output this supply would last for less than two centuries. The present rate of output, of course, will increase almost geometrically, the demand for iron and steel products being a function of our civilization. Therefore the visible supplies of iron ore are all too meagre to meet the requirements of future generations. One evidence of this is the enormous consumption of structural steel in large buildings. Another is the fact that our mercantile marine is almost altogether built of steel.

The total iron ore output of the world in 1908 was 113,000,000 tons. The figure for 1909 was probably much larger, and the returns for 1910 will indicate a corresponding increase. Meanwhile it is interesting to note that the actual resources of the United States are estimated at four and one-half billion tons, those of Germany being calculated at 3,877,000,000 tons. The United States possible yield of metallic iron is calculated at 2,305,000,000 tons; while the German yield is only 1,360,000,000 tons of iron in an almost equivalent amount of ore. Other countries fall far behind the United States and Germany in undeveloped resources; but the United Kingdom is the principal other contributor to the reserves mentioned.

Any estimate of this kind must naturally be based upon scanty knowledge of the undeveloped resources of this continent. There is little room to doubt that we have large unimproved iron deposits. There is even less room to doubt that we have not spent a fraction of the money necessary to develop them. If we take the Lake Superior country as a criterion, then we must spend at least ten to twenty times more in prospecting than we have done. If we do this we have some hope of success. If not, we are immediately relegated to the blank background of failure.

SCOTTISH MINERAL OIL DURING 1910.

In view of probable future developments in New Brunswick, a glance at the present status of the Scottish shale-oil industry is timely. The long and successful struggle of the Scottish operators against the Standard Oil Company, a struggle of pygmies against a titan, strengthened and consolidated the former.

In earlier years the Scottish producers depended solely upon the sale of burning oil. During their fight with the Standard people, the production and marketing of vastly more valuable by-products developed rapidly.

At present the Scottish companies produce about 22,000,000 gallons of lamp oil per annum. In disposing of this large quantity there is, apparently, little difficulty. Of course the price per gallon is exceedingly low. But the strong demand for by-products compensates for this fact. And, although paraffin is being used less and less as an illuminant, as a fuel its use is growing consistently.

Amongst the important by-products, paraffin wax has suffered from competition with the American and Galician products. So also have lubricating oil and gas oil. But sulphate of ammonia, naphtha, and motor spirits have been sources of great profit. The first mentioned by-product, sulphate of ammonia, is produced to the extent of 70,000 tons per annum. When the price per ton exceeds $65, the margin of profit is substantial.

As several of the oil-shale companies pay fifty per cent. annual dividends, and others yield returns almost as large, it will be admitted that the position of the industry is strong. However, there have been numerous failures, and the success of the industry generally is directly attributable to most careful methods, constant search for new markets, and high moral courage.

We believe that the oil-shale deposits of Eastern Canada can be worked successfully. A longer period of probation may be necessary. But in situation, extent, and richness, our own deposits have many marked advantages over those of Scotland.

The tin market stands at about £180. This in itself is a very encouraging feature. But as the visible supply of tin is diminishing, there is room for the Canadian prospector to be almost unduly encouraged. Tin is really worth more than gold if you find it in sufficient quantities.

THE CROWN RESERVE REPORT.

With a total output of nearly ten million ounces of silver to its credit, the Crown Reserve mine of Cobalt has had a singularly prosperous career. During the last calendar year the mine output was 3,248,196 ounces, worth $1,757,821.27.

An analysis of the cost of silver per ounce is particularly interesting. The items of freight, treatment, smelter charges, and marketing, aggregate 3.89 cents per ounce. Head office expenses, depreciation, and insurance amount to 1.52 cents. Mining, development, ore handling and all other expenses total 6.56 cents. Thus the grand total cost per ounce of silver is 11.97 cents. Over the year the net profit per ounce was 42.13 cents, a total mine profit of $1,368,123.79. This amount, as is pointed out in the report, is equivalent to 77.34 per cent. of the value of the dividend paying stock.

The high-grade ore contained on the average 3,611 ounces per ton; the low-grade 103.5 ounces. The average of the two was 1,148.2 ounces, or $621.18.

Whilst the ore reserves are not estimated, enough general information is included to point to satisfactory conditions in the mine. Possibly it is the path of wisdom to omit close estimates; but the gap is one that demands some explanation.

It is evident that the mine will depend to a larger degree in the future upon low-grade ore. The large milling dump is being added to at the rate of 50 tons per day, mostly ore that contains about 20 ounces of silver. But the diminution in output of high-grade will be slow, if we may judge by the past.

Incidentally, the record of the Carson vein at the 100-foot and 200-foot levels is astonishing. About 6,840,000 ounces have been mined from this vein since it was opened.

The probable erection of a mill, or the placing of a milling contract with a customs concentrator, is foreshadowed in the general manager's concluding remarks.

CHANGES IN QUEBEC MINING LAWS.

Two amendments to the Quebec Mining Law are being introduced. The first of these provides that mining lands for which letters patent have been issued are sold after July, 1911, they will remain subject to a tax of ten cents an acre when they are not being worked. This corresponds to the British Columbia tax of 25 cents on unworked Crown-granted claims. It will enable the Crown to take possession anew of abandoned mining claims the owners of which are not to be found.

More important is the second amendment. This provides for a reduction of the yearly rental on mining claims under mining licenses. The present rate of $1 per acre is to be reduced to 50 cents. A qualifying clause demands 25 days' work during the first six months, and the same amount each successive year, dating from the expiry of the first six months.

Both amendments are sound. Both could be made more stringent without doing any harm to the industry. For instance we do not consider excessive a tax of one dollar an acre on unworked claims. Neither would 50 days' work annually be oppressive.

EDITORIAL NOTES.

The annual report of the Trethewey Silver-Cobalt Mine, Limited, appears just as we are going to press. We note that the net revenue for 1910 is $237,800.42 an increase of $37,992.78 over 1909. Of high-grade ore there were 155 tons produced, the average silver content ranging from 2,096 ounces per ton to 3,070 ounces. Low-grade ore to the amount of 164 tons was produced. The silver tenor of this material was 168 ounces per ton. High-grade concentrates, of which 254 tons were put out, carried an average of 1,630 ounces per ton. The average mill extraction was 86 per cent. on ore carrying 27 ounces per ton, a fine record for a new mill.

It is a remarkable fact, one that should have commercial significance, that throughout the gold mining regions of Nova Scotia, there is not a district wherein sufficient available water power does not exist to operate adequate mining work. This condition has been very largely overlooked.

OBITUARY.

George C. Tunstall died recently at Kamloops, British Columbia, after a residence in that Canadian Province of nearly half a century. He has born in New Jersey on December 5, 1836, and was educated at Sparkman's Academy, Sorel, and Lower Canada College, Montreal. When but 25 years of age he travelled west across the Canadian prairies, in company with others, now well known and honoured pioneers, arriving in British Columbia in 1862. In 1863 he proceeded to Cariboo, where for a number of years he was engaged in placer mining. In 1879 he was appointed Provincial Government agent at Kamloops, Yale district, and in 1885 received the appointment of Gold Commissioner for Granite Creek, Similkameen, where a discovery that year of coarse gold resulted in the biggest rush that district has ever seen. Five years later—in 1890—Mr. Tunstall was removed to West Kootenay district, with headquarters at Revelstoke, on the Columbia River. Subsequently he was retransferred to Kamloops, where, until 1909, he was Gold Commissioner for the northeastern portion of Yale district. Since his retirement from office his precarious health necessitated his seeking relief in change of climate, and it was only about a fortnight before his death that he returned from California. Although in his 75th year, the news of his death came as a shock to many of the friends his sterling good qualities and genial disposition had won for him during his long residence in the Kamloops district.

Microscopic Examination of some Typical Specimens of Porcupine Rocks and Vein Matter.

(Written for the CANADIAN MINING JOURNAL by JOHN STANSFIELD, Department of Geology, McGill University, Montreal.)

[Editor's Note: The following article was prepared for the CANADIAN MINING JOURNAL by Mr. John Stansfield, of the Department of Geology, McGill University. The hand specimens from which the slices were prepared were selected by the Editor, under the guidance of Mr. Myles Flynn, through whose kindness it was possible to secure a representative lot. All the specimens were taken from the Vipond mine, largely for the reason that on this claim nearly all the characteristic types of ore and country rock are to be found within small compass.

Whilst each microphotograph has its own particular significance, the general conclusions adduced by Mr. Stansfield are noteworthy. That the carbonates are older than the quartz is demonstrated. That the quartz is of igneous origin is indicated. The presence of feldspar shows a relation of the vein matter to aplite, and, as Mr. Stansfield points out, the presence of tourmaline tends to confirm the idea of the igneous origin of the vein matter.

Another fact adduced may be of decided moment. The gold and pyrites were evidently of contemporaneous origin, although some of the gold was deposited at a period later than the pyrites.

We hope that the article will arouse discussion, and that our Porcupine readers will send in comments freely. The co-ordination of facts observed in the field and in practical work, with conclusions drawn from laboratory research, is of the highest importance. Therefore we particularly request comment upon the material presented herewith.]

Pure Ankerite, No. 2 Vein.

A dark, bluish gray quartz band, bearing pyrites, cutting a dark brown carbonate, stained by limonite. The carbonate is siderite, bearing traces of calcium and magnesium. By weathering it is partly altered to limonite. The quartz vein is accompanied by a vein of ankerite. A slice of the quartz-ankerite vein shows dirty carbonate—the ankerite cut by thin veins of clear carbonate, and also by veins of coarsely and finely granular quartz, which has liquid inclusions containing gas bubbles. The carbonate is also found scattered through the quartz veins, but especially at their edges. A few crystals of pyrites occur in the ankerite and often have a little quartz in contact with them.

A slice of the dark brown carbonate shows yellow siderite cut by a vein of quartz. The quartz is usually coarse in grain and full of liquid inclusions, which have gas bubbles, some of them being in motion. The quartz contains some of the siderite in a clouded condition. Some of the quartz grains have a slight chloritic film round them. The siderite is finely granular and towards the quartz vein becomes more and more clouded with a fine dark brown dust, becoming almost opaque at the edge of the vein. The clouding is due to the production of limonite, which appears to be directly connected with the introduction of the quartz vein. Some small quartz grains are found distributed through the siderite.

No. 3 Footwall Pay Streak—Pit 300 Feet East of Ward Pit.

See Fig. I.

White quartz with dark green richly pyritic bands, some narrow bands rusted and showing free gold. Some surfaces show chlorite-sericite schist development.

The mass of the rock is quartz which is shot through in all directions by carbonates and fine-grained quartz and also by more definite veins characterized by fine-grained quartz, pyrites, chlorite and sericite. The

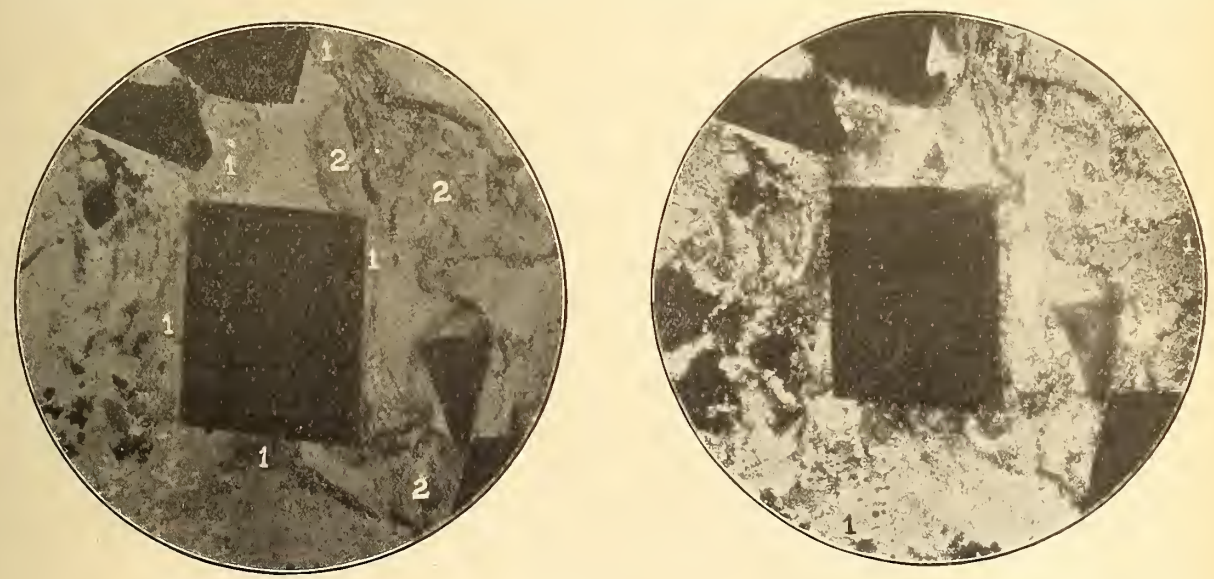


Fig. I.

1. Chlorite. 2. Sericite. Nicols. 1. Quartz.

Shows films of chlorite wrapping round pyrites crystals in a rim of sericite in quartz.

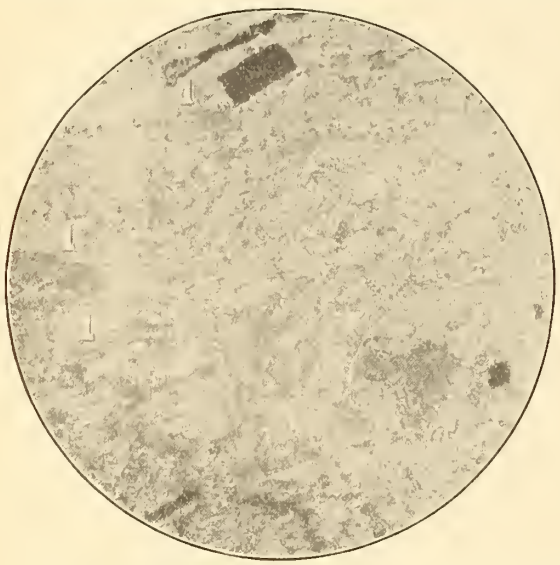
sericite and chlorite are usually seen wrapped round the pyrites crystals, which are large and well-shaped. The carbonates are dirty and are often iron-stained. The quartz grains sometimes have films of chlorite between them and chlorite is seen through the slice outside the veins, but in small amount only.

Vein Matter—Green is Characteristic of Whole District, Only Associated With Carbonates.

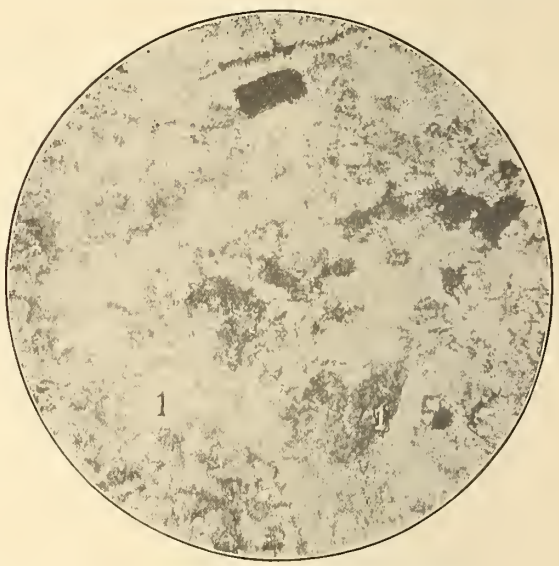
See Fig. II.

Gray banded rock, bands of bright green often associated with pyrites, bands of yellow carbonate and bands of quartz. Some surfaces are slimy, suggesting sericite.

The rock is rich in carbonate and in quartz. Pyrites in large irregular masses is developed along bands. The



1. Sericite Bands.



Nicols. 1 Twinned Feldspar

Fig. II.

Shows development of sericite bands in quartz. Two feldspar crystals (oligoclase) are shown. The dark line shows its upper boundary.

green matter is chlorite which is developed along bands and always associated with sericite in greater or less quantity. The chlorite shows a slight pleochroism, from green to yellow. A considerable quantity of feldspar occurs, including both orthoclase, with twinning on the Carlsbad law, but more frequently plagioclase, twinned according to the albite law, and some laths untwinned. The plagioclase is of a basic oliogoclase variety. (Extinction angle 16 deg.)

The rock appears to be an altered igneous rock which has been impregnated in all directions by carbonate and quartz. It would appear to have been originally of the nature of an aplite. There is nothing to indicate what was the original mineral from which the chlorite is formed. The sericite, at any rate in part, is derived from feldspar.

Green for Identification.

White quartz with green patches. The pyrites occurs in small amount in the green patches. It is now much altered, giving rise to brown iron-staining. A little free gold seen at one point on one of the green veins.

The rock consists of quartz in coarse grains showing strain shadows and very many liquid and gas inclusions. Five grains occur only in very small amount. Carbonates occur as interstitial patches and as thin films between quartz grains. Chlorite occurs interstitially usually associated with carbonates. It has a faint greenish colour with very faint pleochroism and is nearly isotropic.

Tourmaline needles of a bluish gray or brownish gray colour are found with arrangement in strings parallel to their length.

A few small patches of gold occur in association with interstitial carbonate and one small crystal of pyrites with interstitial carbonate, chlorite, iron oxide, the latter produced by weathering.

The green is chlorite and tourmaline with a predominance of the former.

No. 3 Vein—Banded Smoky Quartz—Ward Pit West.

See Fig. III.

Quartz rock with darker and lighter bands and thin bands rich in pyrites, with some softer talcose bands. The hand-specimen shows considerable free gold, which always occurs in connection with the pyrites bands, but just outside them.

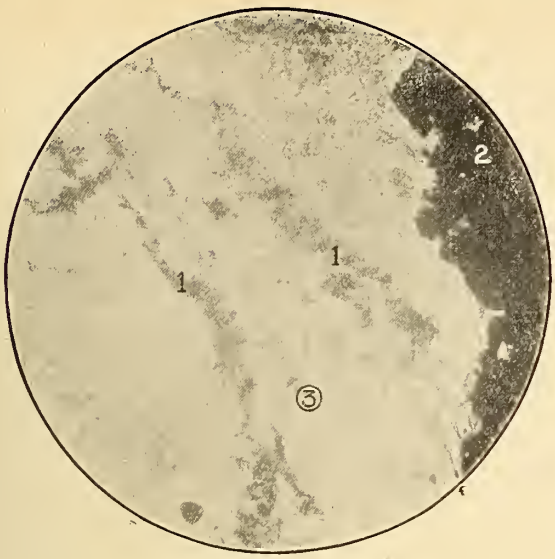
The rock is made up of quartz for the main part, which occurs in coarse and fine grains, chiefly the latter. Some of the grains are elongated and placed with their lengths perpendicular to the faces of pyrite crystals, which often exhibit this phenomenon on all four faces, which are seen in the slice. The quartz is full of liquid inclusions, usually with a gas bubble inside the liqnid. The larger grains show strain shadows. Pyrites in large irregular masses is developed along bands, as are also sericite, carbonate and tourmaline. The tourmaline occurs in small pleochroic needles and is only small in amount. Sericite is more important in amount and forms streaks through the quartz often with no other mineral in it, in other places associated with quartz and carbonates. Carbonate is found scattered throughout the rock.

No. 2 Vein—Banded Quartz and Schist With Sulphides —Fairly Rich in Gold.

See Fig. IV.

A dark-coloured banded quartz-chlorite schist, the quartz and chloritic bands being very distinct. Contains a little pyrites. A fresh fracture shows the greenish colour of the chlorite.

Section shows banded structure and consists of quartz, carbonate, chlorite, sericite, pyrites, and a little tourmaline, in that order of importance. The minerals are arranged in bands and various associations are



1. Tourmaline Bank. 2. Pyrites. 3. Sericite Bank.

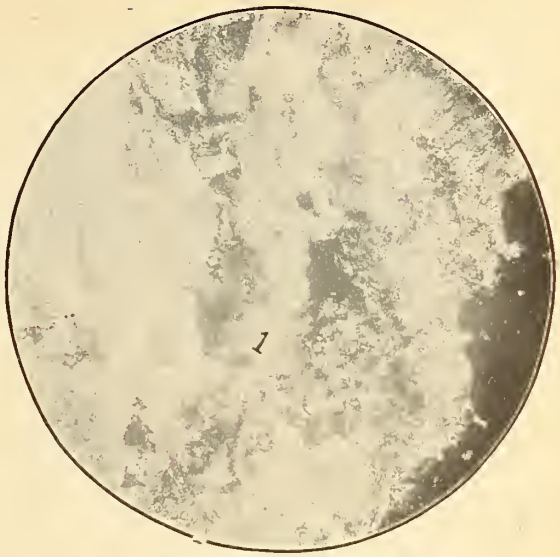


Fig. III. Nicols. 1. Sericite.
Shows parallel development tourmaline bands on each side of a sericite band, and of pyrites.

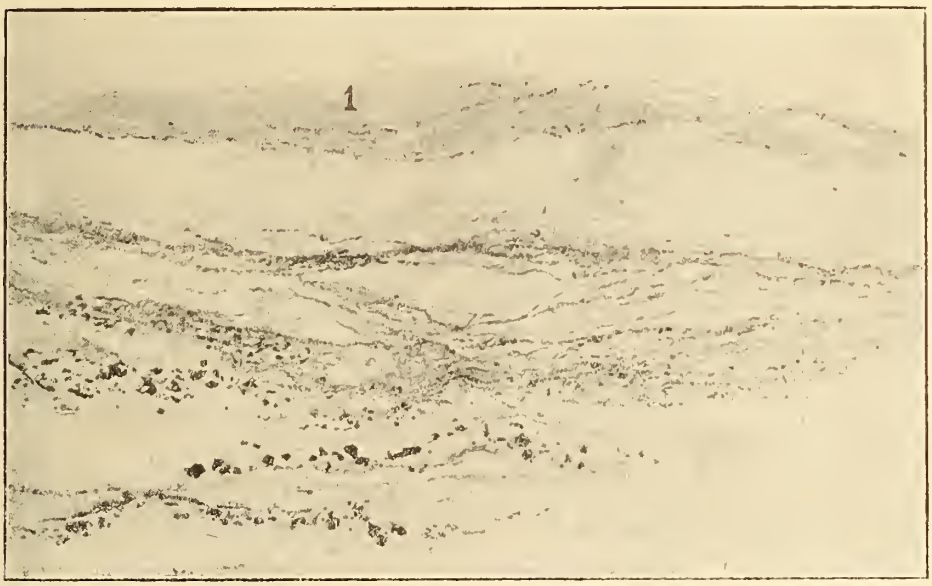


Fig. IV. 1. Carbonate Band. Shows Banded schistose structure with pyrites in bands. The dark streaks are rich in chlorite, the lighter ones in carbonate.

found, e.g., bands of sericite with tourmaline, of chlorite and sericite, with or without pyrites, of quartz with no other mineral, and so on. The quartz occurs as eyes and is finely granular. Carbonate is found scattered throughout the rock in addition to its parallel arrangement in bands.

The chlorite is in places of a deep green colour for chlorite, and at the same time with more marked pleochroism, from green to yellow, with low birefringence and extinction parallel to the lengths of the fibres.

Mixed Sulphide and Ankerite From No. 3 Vein—Gold-Bearing.

See Fig. V.

A gray carbonate rock with much quartz and very rich in pyrites. In some parts it has bands of a talcose schist.

The rock is composed of dirty carbonate in which pyrites is very richly disseminated. It is usually accompanied by quartz which is also scattered through the carbonate. There are quartz veins cutting the carbonate. The pyrites often has good crystal outlines, but also ragged outlines. The quartz veins are not rich in pyrites, but the largest crystals occur there. The quartz crystallized in contact with pyrites often shows elongated shapes, the grains being set with their length perpendicular to the faces of the pyrites crystal. The quartz is rich in liquid inclusions, which often have a gas inclusion in them. A small quantity of sericite occurs and is generally found in association with the quartz-pyrites nests, often in direct contact with the pyrites. One small piece of green chlorite occurs surrounding a small crystal of pyrites.

No free gold occurs in the slice.

One or two crystals of the feldspar occur in the calcite. It is an oligoclase showing an extension angle of 12 deg.

Fig. V.
Veins of quartz cutting carbonate, with rich development of pyrites in carbonate. Largest pyrites crystals are in quartz vein.

and chlorite indifferently, most often as a dirty dust.

Black Dolomite From No. 2 Vein Footwall.

A black carbonate rock with siliceous appearance. It has small bands with development of sericite schist.

The rock is composed of carbonate with a very little quartz in small interstitial grains.

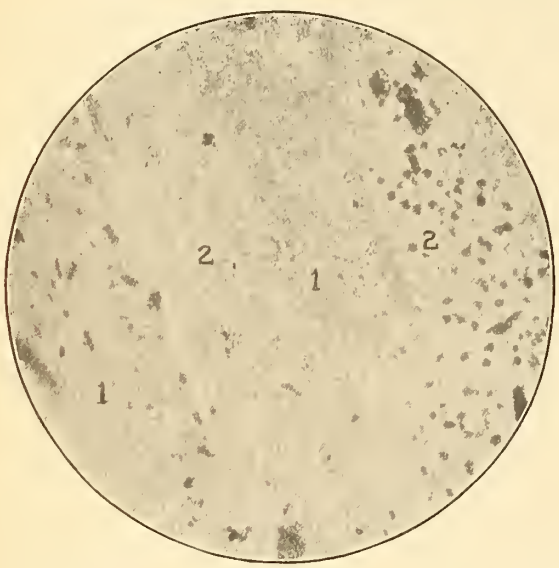
The carbonate is for the most part finely granular, some bands showing very coarse grain. The whole rock shows banded structure which is marked by small bands of fine opaque dust, or by difference in the size of the grains.

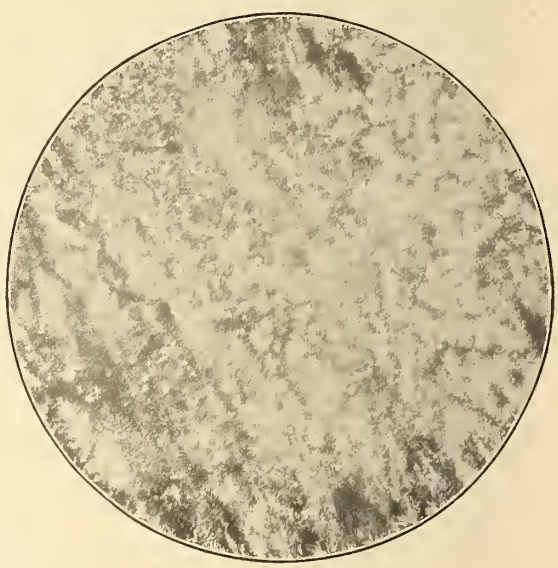
The structure indicates considerable movement since the formation of the carbonate. The occurrence of coarse-grained patches along one of the bands confirms this. At one part this shows intense crumpling and folding on a small scale with granulation of large crystals of carbonate.

Characteristic of No. 3 Vein—Constitutes From One-third to One-quarter of Vein Matter.

See Fig. VII.

A banded rock rich in quartz consisting of pure quartz bands and other bands containing sericite, some of which are very rich in pyrites. It consists for the most part of granular quartz, the grains being of two sizes, coarse and fine grains. Strain-shadows in the larger grains indicate strains due to differential pressure subsequent to the formation of the veins. All the





1. Green Chlorite. 2. Colorless chlorite. Fig. VI. Nicols
Shows banding of chlorite schist and occurance of opaque dirty patches.

Fine and Coarse Amygdaloidal Basalt.

See Fig. VI.

A dark green rock approaching a chlorite schist. It has well-marked parallel structure and has elongated amygdales which are filled with carbonates.

The rock is composed of chlorite and carbonate. The carbonate fills up the elongated amygdales, passing into bands. The chlorite is banded and of two varieties, one almost colourless and the other deep green with strong pleochroism (olive green to greenish yellow), and with higher birefringence than is usual in chlorite. It corresponds in characters to clinochlore. The bands are characterized by varying amounts of the two varieties of chlorite and also by sericite, which is also found in bands, but in subordinate amount.

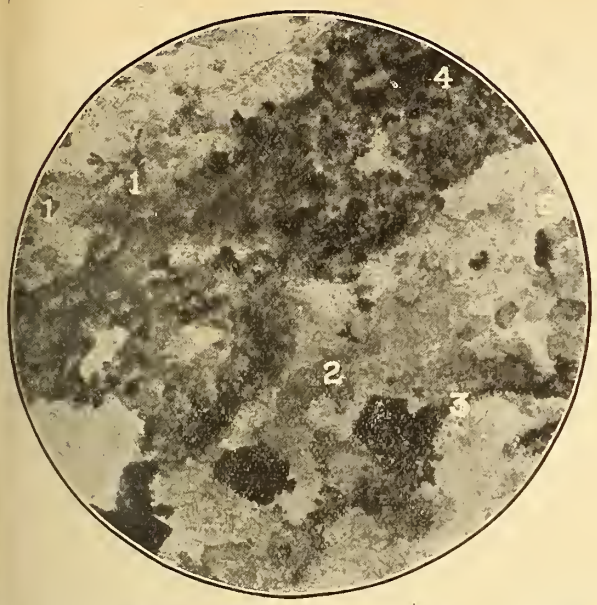
The rock is rich in dark patches of indeterminable matter, in some cases quite opaque, by white or reflected light. It has rough shapes and occurs in the calcite quartz is rich in liquid inclusions, which usually have a gas bubble inside them. Carbonate is distributed through the slice in considerable amount. The work has a banded structure, the bands being marked by the development of tourmaline, pyrites, carbonate and sericite, sometimes some of the components being absent. The tourmaline occurs in small needles, colourless or greenish-brown, with a distinct pleochroism.

The needles have parallel arrangement along the direction of the banding.

The pyrites occurs in small crystals and less often in large patches with irregular shapes, in the veins.

Sericite is found in certain of the bands being associated with tourmaline.

A very little green chlorite occurs in the veins and just outside them. There is also a certain amount of opaque indeterminable matter in the bands.



ig. VII. 1. Carbonate in quartz. 2. Chlorate. 3. Tourmaline· 4. Tourmaline with pyrites. 5. Quartz with carbonate. Shows a tourmaline band rich in pyrites with large crystals along parallel band.

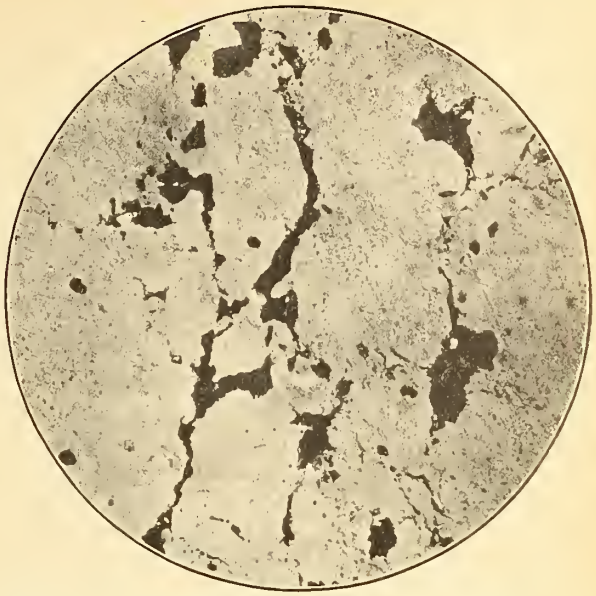
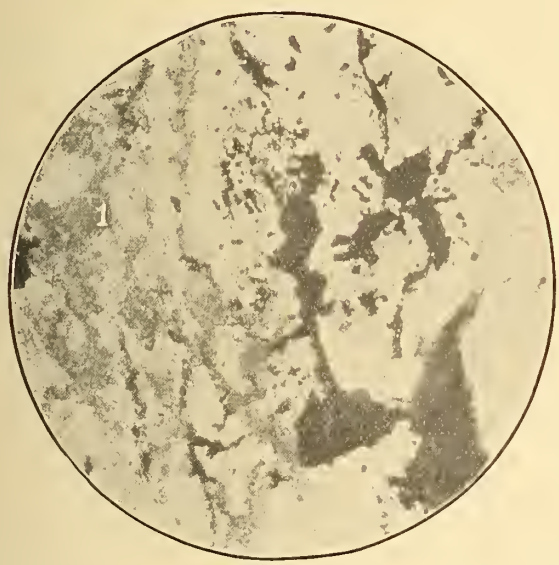


Fig. VIII. Stringers of gold in coarsely crystalline quartz.



Nicols

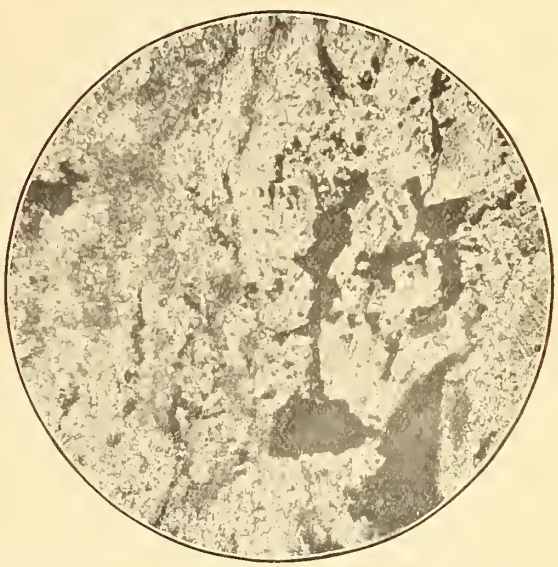


Fig. IX. 1. Carbonate.
Pyrites and gold in quartz carbonate vein, Pyrites wrapped round by gold. Quartz finely granular.

urface No. 3—300 Feet East of Ward—(Deep Pit). See Fig. VIII.

A brown stained, honey-combed quartz gossan with a onsiderable amount of free gold showing.

The rock is an almost pure quartz of very coarse rain, but with small interstitial granules. The quartz s full of liquid-gas inclusions. Brown stains of iron xide are common between adjacent grains.

A little interstitial chalybite or iron-stained carbonate ccurs and is often very dirty.

Gold occurs in considerable quantity either in string- rs in the quartz or in specks and stringers with dirty arbonate in the quartz. Only a very few crystals of yrites occur with dirty carbonate. One such crystal as gold partly wrapped round it.

One small patch of chlorite occurs.

A few crystals of feldspar are scattered through the ock. They are of a basic oligoclase (extension angle 16 degrees and optically negative) and show albite twinning.

The occurrence of feldspar suggests affinities to an aplite vein.

No. 3—Smoky Streak—on Footwall at Pit 200 Feet E. See Fig. IX.

Banded quartz with dark bands rich in pyrites. Free gold, chiefly in the clear quartz just outside the dark bands.

The rock consists of quartz and carbonate, the former predominating. The quartz occurs as coarse and fine grains, chiefly the latter. The large grains show strain shadows. Inclusions of liquid and gas are very numerous.

Veins of pyrites associated with tourmaline quartz and carbonate run through the rock, the tourmaline in parallel needles and the pyrites in good crystals, but chiefly in irregular bunches of crystals, is present in large amount. A little sericite is found along with

tourmaline in some of the veins, but is not important in amount. Still less abundant is green chlorite.

Gold is associated with the pyrites in some of the veins and its relation to the pyrites is brought out by examination by reflected light. The gold occurs in stringers and small specks in the vein and in addition is found in contact with pyrites, being always deposited on a crystal face of the pyrites, or partly wrapped round the crystal.

Most of the gold occurs in irregular bunches and only a few individuals show crystal shape.

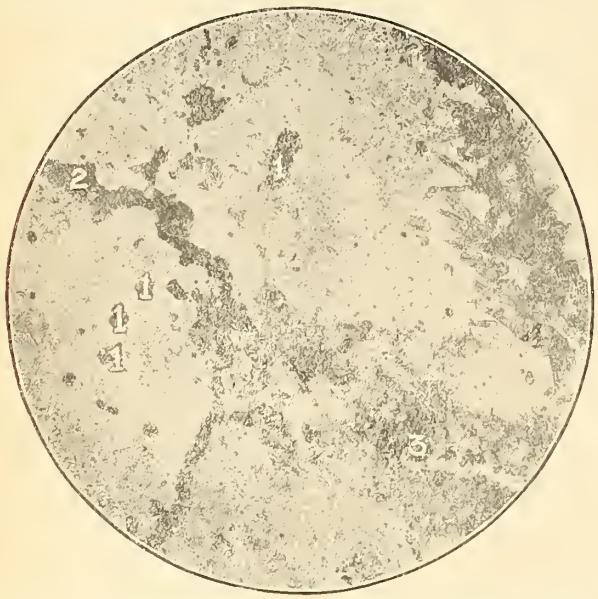


Fig. X 1. Pyrites. 2. Gold Stringer. 3. Opaque calcite. 4. Tourmaline needles. Parallel band of Tourmaline needles and stringer of gold in quartz. Crystals of pyrites.

A little distance from the vein at one point small pyrites crystals and small gold particles occur along parallel cracks, their appearance suggesting contemporaneous deposition.

Opaque indeterminable matter occurs in some bands.

No. 3 Centre of Vein—Deep Pit at Bottom—Green to be Identified.

See Fix. X.

A white quartz with green bunches and streaks rich in pyrites and with free gold showing at the edges o the patches and outside the edges of the veins.

A quartz vein with a fair amount of interstitial ca bonate. The quartz grains are both coarse and fin chiefly the former, and showing strain shadows an very many liquid inclusions with gas bubbles. Th carbonate, in addition to forming a cement, in man parts of the rock is seen running in straight and na row veins straight through quartz grains. A litt sericite is found associated with the interstitial ca bonate.

Pyrites, carbonate, and a few small tourmalin needles of a greenish-gray colour are developed t gether, occasionally with a very little sericite and chlo ite. Tourmaline needles are seen penetrating quart grains.

A little gold occurs as ragged patches, stringers, an wires just outside the tourmaline bearing veins, roughly parallel arrangement of gold and tourmalin bands being seen at one point.

No. 3.—Centre.

See Fig. XI.

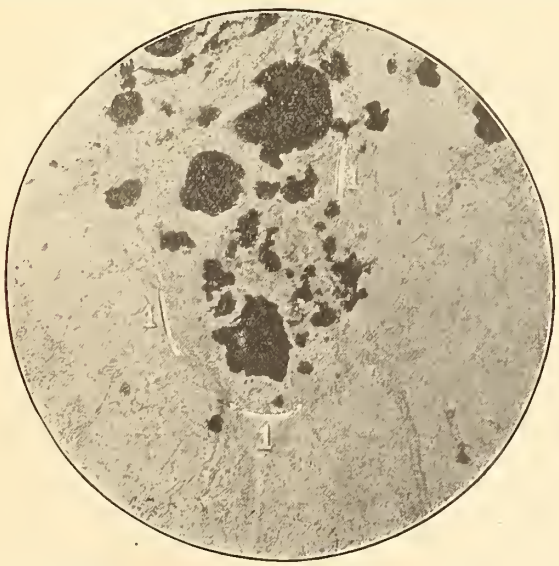
A white quartz with green bunches and streaks ric in pyrites and with free gold showing at the edges c the green patches, or just outside and closely associate with the streaks.

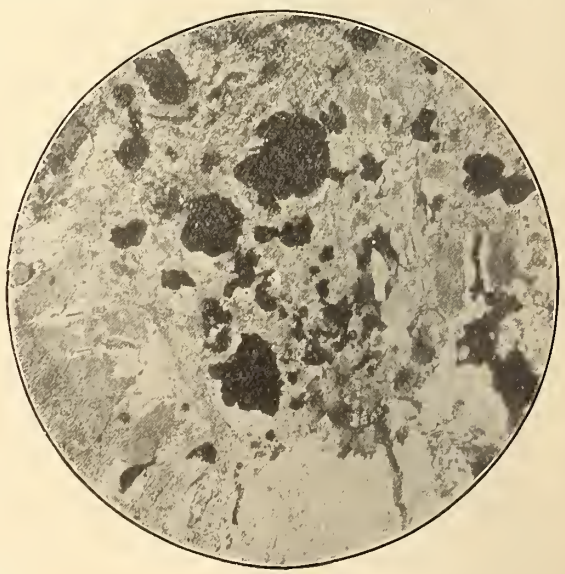
The rock is composed of quartz and a large amou of silicate, and some carbonate. The quartz is of bot coarse and fine grain, the former showing strain sh dows, and liquid inclusions containing gas bubbles a found in both. The sericite is developed in bands whic are very rich in pyrites. Tourmaline is found alon with the sericite, but only in small amount. It has th usual development in small needles. Chlorite occurs i the sericite bands and the carbonate is found in th bands too.

The pyrites is usually in large crystals and aggr gates, sometimes in small crystals. It is very abundan A little free gold is seen distributed in little speck through the veins, among the pyrites, and at one poi it is seen wrapping round pyrites.

Conclusions.

The general relations of the quartz veins and carbo ate veins point to the greater age of the latter. For th most part the quartz veins cut the carbonate veins, th being excellently shown by the microscope and only i





1. Boundaries of sericite Patch or tongue. Fig. XI. Nicols.
Shows very rich development of pyrites in sericite vein cutting quartz.

rare cases there are small veinlets of carbonate cutting through several quartz grains and hence formed after the quartz. The general distribution of the carbonate through the quartz rocks is to be accounted for by solvent action of the waters which caused the deposition of the quartz giving rise to contemporaneous formation of quartz and the carbonate found with it, and in part to solvent action of percolating waters and deposition subsequent to the formation of the quartz.

The nature of the quartz, its granular form and richness in liquid and gas inclusions, point to an igneous origin, or, at any rate, to deposition from hot solutions rich in gases. Conditions requisite for the formation of quartz with these characters are such as exist in the final stages of intrusive activity. The existence of feldspar in some of the slices shows a relation of the vein matter to aplite, and the presence of tourmaline adds weight to the idea of an igneous origin of the vein matter.

The later stages of intrusion of a granitic magma are characterized by the injection of pegmatite and aplite veins, with a progressively increasing acidity. The final stage of such an increasing acidity would be quartz and the more volatile and more soluble constituents of the original magma would be concentrated in this residual quartz.

The products of these final stages are quartz veins characterized by such volatile and more soluble constituents as well as those of a low melting point, which are immiscible with the general magma. Such constituents are gases, water, boron-rich and fluorine-rich minerals, tinstone, pyrites, gold, and so on.

Of these, gases, water, tourmaline, pyrites, and gold are widely distributed in these rocks from the Porcupine district, and afford evidence sufficient for the conclusion to be arrived at that these rocks are connected with an intrusion, probably of a granitic character, without having direct field evidence of the same.

The problem of the relation of the gold to the pyrites and the time of deposition of the gold does not receive very clear solution from examination of rock slices. But such evidence as is obtainable points to the fact that the pyrites and gold were roughly contemporaneous in deposition and that the gold to some extent was deposited at a slightly later time than the pyrites round which it wraps itself. Some slices show specks of gold scattered through a vein rich in pyrites, of which the appearance is that of being formed wholly at one time.

Subsequent enrichment in the gossan and oxidation of pyrites leaving a quartz rock rich in gold is similar to that found in very many cases of mineral veins.

The character of the quartz indicates considerable movement in the district, or at any rate earth-pressure of some magnitude, giving rise to "strain-shadows" in the large grains of quartz and to fine granulation of the same along junction planes between adjacent grains. Granulation may affect whole bands in some instances. The same evidence of earth-stresses is afforded by the country-rock, the chloritic schists, and by the dolomitic vein filling, by its banded and granulated structure, some large crystals showing progressive stages of granulation. Folding, also, of bands of the dolomite indicate the same origin.

That there has been considerable movement in these rocks cannot be doubted, but the condition of the quartz indicates that some part of it took place subsequent to the formation and filling of the veins.

ABSTRACT OF PRELIMINARY REPORT ON THE MINERAL RESOURCES OF THE CHIBOUGAMOU REGION.

(Continued From Last Issue.)

GENERAL PHYSICAL FEATURES:

The expression "Chibougamou Mining District," or preferably "Region," was applied as a term of convenient reference soon after the more recent discoveries of mineral in 1903 to designate that particular tract of country immediately surrounding Lake Chibougamou. The term "region" is the better in order to avoid the confusion with other areas in Northern Quebec, to which the term "district" has been applied, and which have thus been set apart officially to denote some of the larger land subdivisions of the province.

Strictly speaking, it is confined to the area shown on the map, which accompanies this preliminary report. It thus reaches from the Bay of Islands, the eastern extension of Lake Chibougamou, to Assinitchibastat on the West; while a line drawn from east to west about a mile north of McKenzie Bay, would mark the northern limit and a similar line cutting through Long Point (the termination of Devlin Peninsula), would constitute the southern boundary. Such an area would embrace 253 square miles.

As the region under description is situated immediately north of the height of land near the summit of the Hudson Bay slope, it has a certain general flatness of topography which is characteristic of most of our hinterland similarly situated. The general character of the country may, perhaps, be best described as that of an uneven or undulating rocky tableland with a gentle slope toward the west and northwest. The average general elevation varies from 1,100 to 1,500 feet above the sea. Few of the rounded rocky hills have more of an elevation than about 50 feet, while the complementary valleys are occupied by swamps and lakes and rivers. Low swampy shore lines are very extensive and characteristic.

Perhaps the most striking features in the landscape are the hills (or mountains) which characterize a strip of very rugged country varying in width from 5 to 6 miles and which extends across the whole of the region covered by the present map from north of Island Bay to Assinitchibastat Lake. In this direction the hills become more isolated, especially to the west of Assinitchibastat Lake, although they seem to extend as far as Opemiska and Mikwasach Lakes.

These hills have a general elevation varying from 300 to 600 feet. The highest is Cumming Mountain to the west of McKenzie Bay, which rises to a height of 625 feet above Chibougamou Lake. Juggler Mountain has

a height of 560 feet, while Sorcerer Mountain rises 575 feet above Chibougamou Lake.

In agreement with the lower ridges they have a general trend from east-northeast to west-southwest and are usually sharply conical in outline.

Near the outlet of Wakonichi Lake the Lower Huronian conglomerate forms a series of steeply scarped hills, which generally, with flat tops, rise from 300 to 625 feet above the lake, the last mentioned elevation being that of the highest, Wako Mountain. To the southwest, in the granite area, other hills were noticed, but they are somewhat lower and more regular, being for the most part separated from one another by wider stretches of level country. Bouleau Mountain, 485 feet on the west side of the lake, is the highest.

Drainage:

The greater part of the region under description is drained by the Chibougamou River and its tributaries, which, flowing in a general westerly direction, empties into the Waswanipi branch of the Nottaway River at its junction with the Obatogamau River, finally reaching Rupert Bay, the southeastern extremity of James Bay. The Chibougamou forms the outlet of Chibougamou, Dore, David, Cache, Bourbeau, Assinitchibastat and Gwillim Lakes. The waters of the northeastern part of the sheet drain into Wakonichi Lake, which also finds its way into Rupert Bay by way of Mistassini Lake and the Rupert River, the mouths of the Nottaway and Rupert Rivers being within a few miles of one another. With the exception of the Chibougamou River towards the northwestern corner of the map, none of the streams are large, but they are almost without exception easily navigable for canoes practically to their sources. They all form portions of canoe routes, which without any great length of portages reach almost any part of the district.

Lakes:

In common with other regions characterized by the presence of Archæan rocks, the region is remarkable for the number of lakes, both large and small, which are scattered over its surface. These are noteworthy for the intricacy of their shore lines, while some of them, as Lakes Simon and David and the central portion of Lakes Dore and Chibougamou, contain a great number of islands varying in size from mere rocks to some which are several square miles in extent and complex in form.

The following are the principal lakes with their areas:

Lake Chibougamou, 87.35 square miles.
Lake Wakonichi, 31.54 square miles.
Lake aux Dores, 16.89 square miles.
Lake Assinitchibastat, 5.32 square miles.
Lake David, 4.76 square miles.
Lake Simon, 4.60 square miles.
Lake Bourbeau, 2.73 square miles.
Lake Gwillim, 2.48 square miles.
Lake Cache, 1.41 square miles.

Soil:

As a rule there is a very scanty covering of soil, and over large areas the glaciated rocks are directly overlaid by the peat and moss. In places, however, there is a considerable covering of glacial till mixed with boulders. The till is decidedly sandy in its composition with very little clay admixture. It has very little fertility as a rule. Along the sides of the river valleys this unmodified drift has been re-arranged and is much fined and considerably more fertile, but even such areas are by no means desirable as farming lands, even if the climatic conditions were more favourable.

Climate:

The climate of the Chibougamou region cannot be very different from that of Mistassini. For many years, until his superannuation about five years ago, Mr. William Miller, the officer-in-charge, took certain meteorological observations, mainly as to the temperature, his observations being taken thrice daily, at 8 a.m., 2 p.m. and 8 p.m. He also made notes as to the days on which snow and rain fell and also at times made mention as to the amounts of cloud present in the sky in the usual comparative terms adopted, 10 denoting fully overcast, while 0 denotes clear. These observations have, no doubt, been forwarded to the meteorological office at Toronto, but Mr. Bateman made copies of some of them, which have been left by Mr. Miller, and from these the following generalized table has been prepared. Although incomplete, it will serve to give a good idea of the prevailing temperature at Mistassini, which is very little different from that prevailing at Chibougamou (about 40 miles S. S.W..).

Temperature at Hudson's Bay Co.'s Post.

Lake Mistassini, Quebec.

(By W. Miller, Officer-in-Charge till 1905).

	1901 Jan.	1889 Jan.	1901 Feb.	Feb.	Mch.	Apr.	May
Mean Temperatnre—	12.6	2.43	—12.3	2.07	20.5	32.2	44.3
Highest Temperature—	20	37	40	30	40	55	77
Lowest Temperature—	—41	—35	—33	—41	—09	—08	—25

	June 1889	July 1889	Aug. 1885	Sept.	Oct. 1900	Nov. 1900	Dec. 1900
Mean Temperature—	54.6	61.4	56.7		35.7	12.5	—02
Highest Temperature—	85	87	81		57	45	14
Lowest Temperature—	30	41	31		15	—22	—40

In comparison with these we may cite the mean temperatures of Ottawa, Montreal and Quebec for the twelve months of 1885, as shown in the following tables taken from Mr. O'Sullivan's report on exploration of country between Lake St. John and James Bay. These are given on the authority of the Government Meteorological Office, Toronto:

	Jan.	Feb.	Mch.	April	May	June
Quebec	7.8	6.6	11.8	35.9	51.9	59.8
Montreal	12.1	5.9	13.2	37.7	55.4	62.1
Ottawa	12.0	4.4	12.3	36.2	55.3	63.1

	July	Aug.	Sept.	Oct.	Nov.	Dec.
Quebec	66.5	51.6	52.9	42.3	31.0	16.2
Montreal	69.2	63.0	55.4	44.1	32.8	19.4
Ottawa	69.4	62.4	54.9	43.9	32.8	17.5

It was reported to us that the ice takes firmly on the lake near Mistassini Post about the end of the first week in November, and does not break up until the end of the first week in June.

During the month of June, while on the way to Chibougamou, we experienced frost on several nights, the last one occurring on June 29th, at the height of land between Obatogamou and Chibougamou Lakes, after which date until the night of August 14th (at Mistassini Post) no frost was noted. At this time the frost was only a light one and did not injure the potatoes, but a heavy frost during the night of August 18th must have completely frozen the tops.

The rapid changes in the season seem most remarkable. There is practically no spring and very little autumn weather as we understand it in the vicinity of Montreal. Thus, up to the end of the first week in September, the leaves of the deciduous trees were remarkably green, but at this period and in two days' time they had completely changed colour, assuming their

full autumn tints. The advent of spring is equally rapid, for usually the end of the first week in June sees the disappearance of the snow from the ground and the ice from the lakes while the trees burst into full foliage in the space of only a few days. On fine days when not fouled by smoke from forest fires, the atmosphere is remarkably clear and one is enabled to see mountains quite distinctly which are from 30 to 40 miles distant. This remarkable clearness of the atmosphere is shown in many of the photographs taken from the tops of the various mountains.

It is to be regretted that no measurements were made of the rainfall, and although it may not, perhaps, be extreme, it is very constant and hardly one whole day a week passes without either a continual drizzle or showers. Thunderstorms were not very frequent, but they occurred at intervals even during very cool weather. That the climate is usually moist during the summer months is evidenced by the rank growths of moss and Labrador tea. The temperature is dependent on the wind and a calm day was very rare during our sojourn at the lake. Steady rain usually came with southeast, south or even southwest winds. The west and northwest winds brought decidedly cool, but clear weather; north and northwest winds usually bring heavy winds and showery weather, while an east wind very often was a sign of fine weather until it turned towards the southeast, when rain almost invariably followed.

At Mistassini Post they seemed to experience great difficulty in raising a comparatively small crop of potatoes and so no other vegetable is attempted. At the time of our visit (August 14), the potatoes were in flower with a luxuriant growth above ground, but the large potatoes themselves were only from 3 to 4 inches in their longer diameter.

The average temperature for the three summer months is probably a little less than 58 degrees F., and the heavy frosts, even late in June and about the middle of August, retard the growth, so that the tops are blackened and killed before the potatoes ripen. It is, however, beginning to be recognized that climate is extremely local and is dependent on a great many factors for a long time not fully understood or appreciated. One authority has stated that it is almost as easy to regulate the climate within certain limitations in a given district as it is to control the temperature of any residence. Thus it would seem entirely reasonable that the clearing up of a much larger area in the vicinity of Mistassini post would doubtless help to ameliorate the present severe conditions. The soil appears to be sufficiently fertile, so that in an additional two or three weeks without severe frosts, the potatoes would ripen so fully as to enable them to be kept through the greater part of the winter at least.

An abundant supply of this vegetable would greatly improve the present condition of the Indians who choose to make the interior of Labrador their home, and who, without any knowledge or wish of bettering their lot, will still continue it as their place of residence.

There can, however, be no doubt that the settlement of even the comparatively fertile slopes of Mistassini for purposes of agriculture is by no means encouraging when there are such wide areas elsewhere in Northern Quebec far more suitable for such purposes.

The Native Inhabitants:

The Indians who hunt in this district belong chiefly to the Mistassini band, although occasionally some of those residing at Waswanipi to the west or some of the Montagnais from Pointe Bleue on Lake St. John pay a visit to this district for hunting purposes. The Mistassini band belong to the Nascaupee tribe, who are a branch of the Swampy Crees. They have been converted by the missionaries of the Church of England. A lay reader, a brother of the Hudson Bay Company's agent, is their spiritual adviser. There are about thirty heads of families and the whole band numbers about 160.

Animals:

There were no signs of any of the larger animals belonging of the deer tribe, although five moose were reported as having been shot two years ago to the southeast by the Hudson Bay Company's Post at Lake Mistassini. The chief fur-bearing animals are the otter, mink, marten, beaver and muskrat. The Chibougamou region seems especially suitable as a place of residence for these valuable animals and with a little care and protection they could be greatly increased in numbers. Of the larger animals the Black Bear is very abundant especially in the region surrounding Sorcerer Mountain, but signs of his presence were noticed almost anywhere while travelling through the woods.

Ducks are, as a rule, comparatively scarce throughout the region, although there are very notable exceptions to this rule as on Rush Lake where they are very abundant (especially the black duck).

The merganser or saw-bill and a species of diver are also commonly met with. The great northern diver or loon is a usual inhabitant of the lakes and very large and beautiful specimens were seen, but they are by no means as abundant as further south. Both large and small gulls were seen, two of their favourite nesting places being on rocky islets in the large western bay of Lac Dore, and among the islands in the centre of Chibougamou Lake.

The osprey or fish hawk was also very often seen making its nest not far from the water and on the top of some of the larger white spruces. Partridges were by no means abundant during the past summer.

Fisheries:

The fishing in all of the larger lakes is remarkably good and on account of the prevailing cold water even in midsummer most of the species are firm and palatable.

The most desirable food fishes are lake trout, brook trout, whitefish and pickerel, with an occasional maskinonge. Sturgeon occurs on the Obatogamau River and its tributaries, but has not been found in the lakes immediately surrounding Chibougamou. The lake trout grows to a very large size in Chibougamou and Wakonichi Lakes, being especially plentiful and of excellent quality in the latter lake. Brook trout is especially plentiful and of large size (4-6 lbs.) in Chibougamou, Wakonichi and on the Rapid River. Whitefish from 4 to 6 lbs. in weight and of good quality are found in almost all the lakes. Pike and pickerel often from 8 to 10 lbs. in weight abound in all of the lakes, but especially in Dore Lake. Suckers of two or three varieties and often of very large size are abundant in all of the waters.

Trees:

The black spruce is by far the most abundant of this sub-arctic forest and constitutes probably more than three-fourths of the forest growth. It is most abundant in the valleys and lower levels and often forms a very dense growth of small trees. Along the side of hills and even on the summits of the mountains where the boulder clay is found, the growth is considerably larger and many of the trees in this situation would cut into logs eight or ten inches in diameter and occasionally

even this size is slightly exceeded. It is stated that even trees of four inches in diameter are suitable for pulp wood, so that in this case there would be a large supply for this purpose, especially from the mouth of Nikabau northwards. The proportion of logs suitable for lumber seems to us too insignificant to receive very serious attention.

White spruce was noticed but is by no means abundant, but it is very often met with on the sides and summits of ridges where the boulder clay is present. Some of them growing near Bourbeau and Dufault Lakes varied from 16-22 inches in diameter. Such areas, however, are limited to the rough country extending from north of Island Bay to Assinitchibastat Lakes (25 miles, with a width of about 5 miles. In such favourable situations there would be in certain places probably enough for lumbering purposes if the district were not so remote.

Cedar was not observed on the Ashuapmuchuan River, nor even on the Chigobiche until within a comparatively short distance of Chigobiche Lake. In the Chibougamou region, however, it is abundant along the edges of the lakes and streams. Although sometimes of comparatively large diameter near the base it is stunted in its growth and is of little use. The biggest tree noticed (outlet of Lake Bourbeau) measured 9 feet in circumference at the base, and was only about 30 feet high. (The Indians at Mistassini used balsam for the ribs of their canoes as they cannot get suitable cedar). Aspen is abundant on the drier hillsides, especially over recently burnt areas, and some of the trees are of good size. White birch is very abundant, and probably shares with the Banksian pine the honour of second place in point of numbers. One white birch near the west end of Lake Dufault measured 6.5 feet in circumference, while another on the Baie du Grand Peuche measured 5.6 in circumference. In spite of the comparative abundance in places of these large birch trees, the Indians of Mistassini seemed to prefer canvas in the manufacture of their canoes.

Balsam poplar is a comparatively rare tree, as the soil is in general too poor and shallow to support this tree.

Banksian Pine is perhaps next to the black spruce the most abundant, it grows in both wet and dry places, but reaches its best growth in dry, sandy or gravelly flats or hillsides. The variety growing alongside of certain of the streams has often very beautiful branches extending to the ground. The Larch (tamarac) formerly was abundant alongside of certain of the swampy streams, but with few exceptions these were all killed in 1893-94 by the larch sawfly or larch worm (Nematus erichsonii). Some of the new larches now growing are from 25 to 30 feet high.

The undergrowth in the woods is chiefly Labrador Tea (Ledum latifolium) and laurel (Kalmia glauca) which, especially the former, grow, in very thick masses generally from three to five feet in thickness. On the northern side of the height of land and especially on the northern slopes the ground is covered to a considerable depth (generally from two to three feet but sometimes more) with the bog moss "Sphagnum" with here and there small patches of the true "reindeer" moss (Cladonia).

A section of this, which has in many places been exposed, from the top downwards shows:

1. A layer of the living bog moss sphagnum; (2) a layer of pale brownish dead moss with partially decayed branches and trunks of bushes and trees; (3) a layer of much deeper coloured (brown) moss with some decayed fragments of trees, which in turn shows a gradual transition downwards into; (4) a layer of well matured peat, brownish to almost black in the lowest portions of the layer. In the lowest part of this layer the vegetable structure is often quite indistinct and much of the material in the hollows and fissures shows a distinct passage to lignite.

This moss and its lower layers of decomposition form a deep and wondrously soft carpet which on account of its soft yielding nature and thickly disseminated remnants of fallen branches and trees renders travelling exceedingly difficult and tiresome.

At the same time it forms a very effectual and complete mantle, completely concealing the underlying rocks even on some of the steepest slopes and declivities. Prevalence and depth of this moss in most cases presents an almost insuperable barrier to economical prospecting, the thick, tough and tangled mass being removed only with great difficulty and labour. This moss and Labrador tea grow luxuriantly on certain portions of the lakes' shores, especially gravel points, with here and there a black spruce, the whole producing a beautiful open park-like effect which is very pleasing after the thick sombre foliage of the dense black spruce forest.

Forest Fires:

In the region covered by our examination there are only occasional areas which have been recently burnt. The largest of these was burnt in the beginning of July of the present year. It extended from the northwestern shores of Dore Lake northeastward to Wakonichi Lake, passing the east end of Bourbeau Lake and burning most of the country between Cumming Mountain and Lac Vert. In all, the trees over an area of about 25 square miles were destroyed. During 1907 when prospecting seems to have been active in this district, many areas were burnt, the largest being to the west and southwest of Assinitchibastat Lake, where at least about 20 square miles were burnt over. There is also considerable burnt area on the Chibougamau River immediately south of the town line between Blaiklock and McKenzie while still another area was noticed extending along and on both sides of the Barlow River above the Kawasachuan River.

The causes of such fires have often been mentioned but in most of these cases they appear to have been caused by the negligence of the prospectors. Some of the fires may have been started by amateur prospectors in order to facilitate prospecting, but the areas over which these fires have passed are now almost impassable. It is difficult except after a very long dry spell, which sometimes (as during last spring) occurs, to set fire to the bush, but the fire once started during such a time is soon beyond control, and the depth of the moss and undergrowth requires from a week to ten days almost continual rain to effectually quench it.

SUMMARY OF CONCLUSIONS.

1. From a geological standpoint the Chibougamou Region, in common with other Archæan areas, promises a rich reward to diligent and intelligent prospecting, but the remoteness of the district and the almost universal thick covering of moss and peat renders the search for economic minerals both difficult and undue expensive. In addition, while large areas probably of equal economic importance from a mining standpoint still remain unprospected in much more accessible portions in Northern Quebec, it would be unwise to devote further attention to detailed prospecting in the Chibougamou District.

2. Gold. The ore bodies which have gold as their chief value do not contain this metal in a free milling state in sufficient quantity to make stamp-milling feasible.

melting ores, the values and apparent tonnage do not fer much encouragement even with railway facilities.

Copper. While some of the assays of the specimens for is metal run to a good percentage, these are special or cked samples and by no means representative of the rious deposits.

Assays which represent a commercial tonnage are rely above 2 per cent., which is not at present market-le.

Nickel. Although there is a close analogy in miner-ogical composition and origin of the chalcopyrite and rrhotite occurring at Copper Point to the famous ckel and copper deposits of Sudbury, the deposits emselves as well as the nickel contents as shown by e assays are too small to render them commercially luable at least for their nickel values.

Asbestos. The asbestos noticed in the working faces the various open cuts as well as in the dumps is in-gnificant in amount and altogether insufficient for eir successful development as mines.

Iron. While some of the occurrences of magnetite are large deposits, they are usually very low in iron, less an 20 per cent., with only very minor segregations places of high grade ore. Such ores will only become commercial possibilities at some uncertain time in the future.

Sulphur. Iron pyrites occurs thickly disseminated through the green schists and schistose diabases at Paint and Sorcerer Mountains, and also in a vein with specular iron ore at Hematite Point, but no large deposit of sufficient purity to mine for sulphur was found.

Pulp. If the greatly increased use and demand for wood pulp continues so as to permit of the use of the smaller black spruce and jack pines, the area immediately surrounding Lake Chibougamou shows a very abundant supply of these trees.

Agriculture. The district is altogether unsuitable for agriculture both by reason of the general sterility of the soil, when present at all, as well as the extreme rigour of the climate.

Railway. Your Commissioners regret that after carefully weighing the evidence which has accumulated as a result of their examination and study of the district, they cannot find that the mineral deposits so far discovered are of sufficient merit to justify the spending of public money in the building of a railway as proposed from Lake St. John to Lake Chibougamou.

A GEOLOGICAL TRIP IN SCOTLAND

Written for the Canadian Mining Journal by Willet G. Miller, Provincial Geologist of Ontario.

Scotland has been a great mother of geologists. At e end of the eighteenth century Hutton (1726-1797) ith his "Theory of the Earth," and his disciple Play-ir with the "Illustrations," placed the science on e road which it has since followed. The heroic ruggle between the plutonists, as Hutton and his dinburgh school were called, and the neptunists, or ose who sided with the great Freiberg professor, Verner, was a memorable one. Among Scottish geol-gists who were connected with this controversy may be entioned James Hall (1761-1832), to whom is due e establishment of experimental research as a branch geological investigation, and Robert Jameson (1774-854), who upheld the Wernerian system. Of this eriod were John Macculloch (1773-1835), an eminent oneer worker on the pre-Cambrian and author of markable maps, and William Nicol (about 1768-1851), whom the petrographical branch of the science is uch indebted. William Maclure (1763-1840), born at yr, has been called the "Father of American Geol-gy."

Then onward through the years there always have en eminent leaders of geological thought among cotchmen, e.g., Murchison (1792-1871), the founder the Silurian system, and Hugh Miller (1802-1856), hose writings did so much to popularize geology. To is list may be added the name of the Canadian, Logan 798-1875), of Scottish ancestry and educated in Edin-rgh. Among Scottish geologists still living may be entioned the brothers Geikie, Sir Archibald and James, e former of whom by his text-books and other writ-gs, has had a greater influence on students of the ience than has any other author. Then there are ach, Horne and other investigators, who have added uch to our knowledge of the history of the earth. ost Scottish geologists have resided in Edinburgh and have doubtless received much of their inspiration from the surroundings of the city. Edinburgh is probably unsurpassed in the facilities it offers to beginners in the study of geology. "On every side of us are incentives to study. Crag and hill rise around us, each eloquent of ancient revolutions, and each a silent witness of the revolution in progress now. At our very gates tower on one side the picturesque memorials of long silent volcanoes, with their crumbling lavas and ashes. On the other lies the buried vegetation of an ancient land, with the corals and shells of a former ocean." *

A cynic might say that Scotchmen take to geology for the same reason that they do to theology. In both sciences it is difficult at times to prove that the other fellow is absolutely wrong. This gives opportunity for argument. But whatever be the explanation of the mental attitude of the people towards other sciences, the character of the country has doubtless had much to do with the popularity of geology:—

" O Caledonia! stern and wild,
Meet nurse for a poetic child!"

or, let us add, for a geologist.

The Pre-Cambrian.

While Scotland offers classic localities to students of most branches of geology, its pre-Cambrian rocks will appeal strongly to the majority of Canadian students of the science. Our country has a greater expanse of these rocks than has any other land—approximately half of it, or 1,900,000 square miles, being underlain by rocks of this age.

North-West Highlands.

Owing to the importance of a close study of the pre-Cambrian rocks in this country, it is of great value

* Sir A. Geikie, "Geological Sketches."

Culag Hotel, Lochinver. Lewisian Gneiss in foreground Mts. Canisp and Suliven in background.

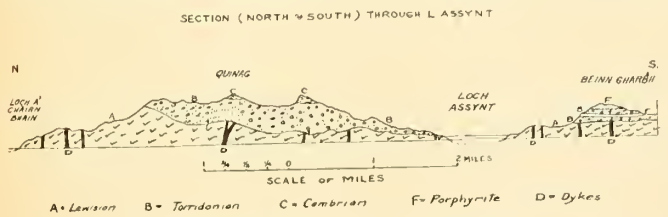
to workers here to have an opportunity of visiting areas of rocks of like age in other countries, especially where they have been studied and mapped in detail. For this reason the wrtier, while on a trip to Europe during the past summer, spent as much time as possible in the Northwestern Highlands of Scotland, a region which has been studied closely by three or four generations of geologists. It has been mapped in greater detail than has any other pre-Cambrian region in the world, and it exhibits some of the most striking illustrations of pre-Cambrian stratigraphy and structure to be found anywhere.

The success of my visit to the Highlands was due chiefly to Dr. John Horne, F.R.S., of the Geological Survey, who, while I was in Edinburgh, kindly drew up a daily programme for me so that I might see typical localities of the pre-Cambrian rocks and of their structural relations in the all too brief time I had to devote to the trip.

Itinerary.

From Edinburg I proceeded to Inverness, thence northwestward to Lairg. Here motor stage was taken to Loch Inver, on the northwest coast, where there are striking exposures of the Lewisian, reminding one forcibly of the typical Laurentian gneiss of Canada.

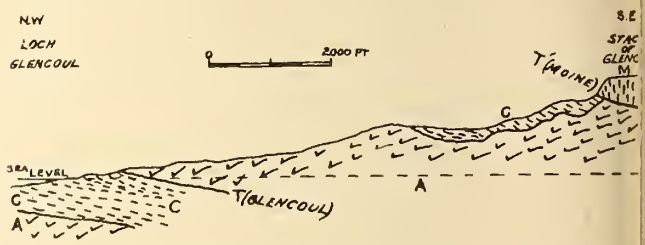
Having examined exposures of the basement rocks at Loch Inver the route was retraced eastward to Inchnadamff and Loch Assynt. Immediately north of Assynt is the mountain Quinag, extreme summit 2,653 feet. At its base is the Lewisian gneiss which is overlain by Torridon (pre-Cambrian) sandstones. The summit is capped by a small outlier of Cambrian quartzite.



(After Geological Survey of Scotland.)

On the west side the mountain is flanked by precipitous cliffs 500 to 700 feet in height. For a long distance the rocks of the three ages can be distinguished from one another by their colour.

From Inchnadamff a trip was made to Kylesku and Loch Glencoul where the famous "thrust planes" are to be seen in striking exposures. The character of the thrusts will be gathered from the following:** "The most important feature in the geology of the Nort west Highlands, which renders this region of surpa ing interest to the geologist, is the evidence relati to the terrestrial movements that took place in po Cambrian time. From a detailed examination of t structures in the field and from certain experimen researches . . . . it can be seen that under t influence of horizontal compression, or earth-creep, t rocks in that area behaved like brittle rigid bodies, a were folded over each other, snapped across, piled and driven westward in successive slices . . . . The most easterly and perhaps the most powerful these disruptions, to which the name of "Moine Thrus has been given, differs from all those to the west in tw important points. First, the materials overlying th plane comprise the Eastern Schists — the fourth the great rock groups referred to . . . . secondl in some instances the strata overlying this (thrus plane have been driven so far west—for ten miles least in the Durness area—that they rest almost direct on the undisturbed Cambrian rocks. Hence arise tho deceptive sections where there seems to be a norm sequence from the fossiliferous Cambrian zones in the Eastern Schists." The "belt of complication" e tends for 120 miles from the north coast of Sutherla to the southern promontory of the Isle of Skye. T following map of the area adjacent to Lo Glencoul illustrates the character of the thrust plan The point separating Loch Glencoul from Loch Gle dhu is composed of Lewisian gneiss, the basement roc overlain by Cambrian strata. Above the Cambrian a thrust plane, the Glencoul thrust, and overlying th thrust plane the Lewisian gneiss and Cambrian stra are repeated. Above the latter strata is another thru plane, known as the Moine thrust, and overlying th thrust plane are the Moine, or Eastern, schists. The are minor thrusts in this section to which we need n refer. The following diagram of the Glencoul secti is a slightly modified copy of one in the memoir of t Geological Survey.



Leaving Inchnadamff, I proceeded southward to Lo Maree, one of the most beautiful lakes in Scotland. order to examine especially exposures of crystalli limestones with their associated rocks and their re tion to the Lewisian. The limestones with their companying schists were found to be much like th of the Grenville series of southeastern Ontario.

From Loch Maree I travelled southward to Glene where crystalline limestone and other rocks were amined in Glen Beg.

From Glenelg a steamer was taken to Mallig, ther by railway to Fort William to see the rocks of B Nevis. This finished the programme arranged for and I returned to Edinburgh via Glasgow.

In Scotland, a Canadian is constantly struck with t difference between doing geological work there and Canada. In the Highlands, on a clear day, the vario rock groups on the treeless hills can be recogniz from a long way off, while in forest-covered Ontar

** See "The Geological Structure of the North-West Highlands of Scotland." Memoir of the Geological Survey of Great Britain, for this and following quotations concerning geology in this paper.

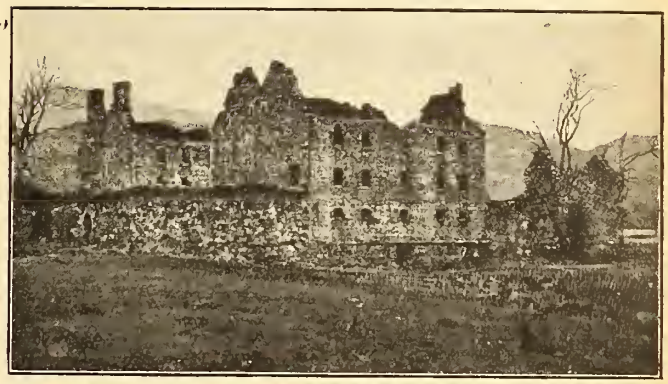
or instance, a geologist often cannot see more than a undred yards ahead, and has to search for outcrops lmost yard by yard. Again, in Scotland, even in esolate areas, one frequently has his attention dis-acted from the rocks to something of historical or ntiquarian interest. For instance, in a lonely glen ear Lochinver a circular opening in the cliffs was ointed out as having been used as a pulpit. "It was rand to hear them singing the Gaelic hymns." On he north side of Loch Assynt are two ruins, in one of vhich Montrose is said to have been betrayed. Loch Alsh, near Glenelg, was the scene of some of Prince Charlie's exploits, and at the latter place is the ruins f a barracks erected about 1715 to keep the wild High-anders in subjugation. It is fortunate, probably, that previous to the trip I had time to look up only the eological literature, otherwise I might have had my ttention still more distracted from the rocks. More-ver, to discover things for oneself added to the charm f the trip in some ways. Thus, on going to see the imestones in Glen Beg, than which "there are not nany Highland glens more attractive," I came unex-pectedly on the Pictish towers. It was almost like ex-ploring an undescribed region. "The valley is ren-dered still more interesting by these remains of Pictish towers which it contains, and which, if not perfect, are still sufficiently entire to explain the structure of these

Inchnadamff on a misty morning, showing part of Loch Assynt and Torridon Rocks in the background.

singular buildings. In an antiquarian view they are even more interesting, not only on account of their singularity, antiquity and obscurity, but because they are by much the most perfect, as well as the most accessible, specimens" of the earliest native architectural remains. Whether these Pictish towers, or burghs, are of Danish or purely native origin, has been disputed. These large circular structures are built of unhewn stone and entirely without cement. Many remains of the towers can still be traced in the Highlands. The masonry is remarkably well laid and the lines of the curvature are beautifully preserved, the form being that of a truncated cone.

Outline of the Geology.

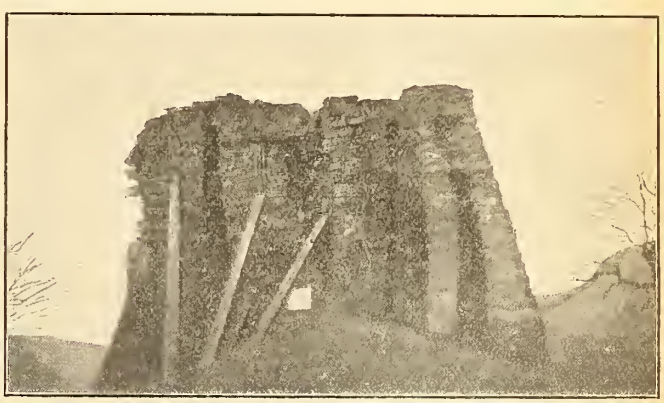
In the opening paragraph of the introduction to the great memoir on the "Geological Structure of the Northwest Highlands," Dr. John Horne so briefly and interestingly summarizes the present knowledge of the geology and the history of the work of unravelling the relationships of the rocks, that we may be permitted to quote his words: "In the North-West Highlands of Scotland four great rock-groups are remarkably developed, each characterized by a peculiar type of scenery and illustrating in a vivid manner the intimate relation that exists between geological structure and the evolution of mountain-forms. Each group has impressed its own individuality on the landscape in such a manner as to arrest the attention not merely of the geologists, but even of the casual and unscientific traveller. These four groups are in consecutive order from west to east: 1st, the Lewisian or Fundamental



Barnera Barracks, Glenelg.

Gneiss; 2nd, the Torridon sandstone; 3rd, the Cambrian formation; and, 4th, the Eastern schists. Ever since the time of Macculloch, at the beginning of the last century, the stratigraphical position and relative age of these rocks have been a subject of animated discussion and, for a time, of keen controversy. Relying on the apparent order of superposition, the earlier observers naturally inferred from the magnificent sections laid bare along the western fjords and on the grand escarpments and dip-slopes of the mountains, that the Eastern Schists follow the Cambrian strata in conformable sequence. But the geological structure which seems at first sight so simple, has proved, on later detailed examination, to be extremely complicated. The apparent succession has been found to be deceptive, and the superposition, which is undeniable, is now ascertained to be due to great terrestrial displacements, which have no parallel elsewhere in Britain."

Owing to the marked contrast in the lithological character between the three great series of rocks—the grey or pink Fundamental gneiss, the red Torridon sandstone, and the white Cambrian quartzites with the limestones and dolomites—it was possible for the officers of the Geological Survey to trace the several portions of these formations even through extremely complicated structures.



Lower Picts Tower, Glenbeg, Glenelg.

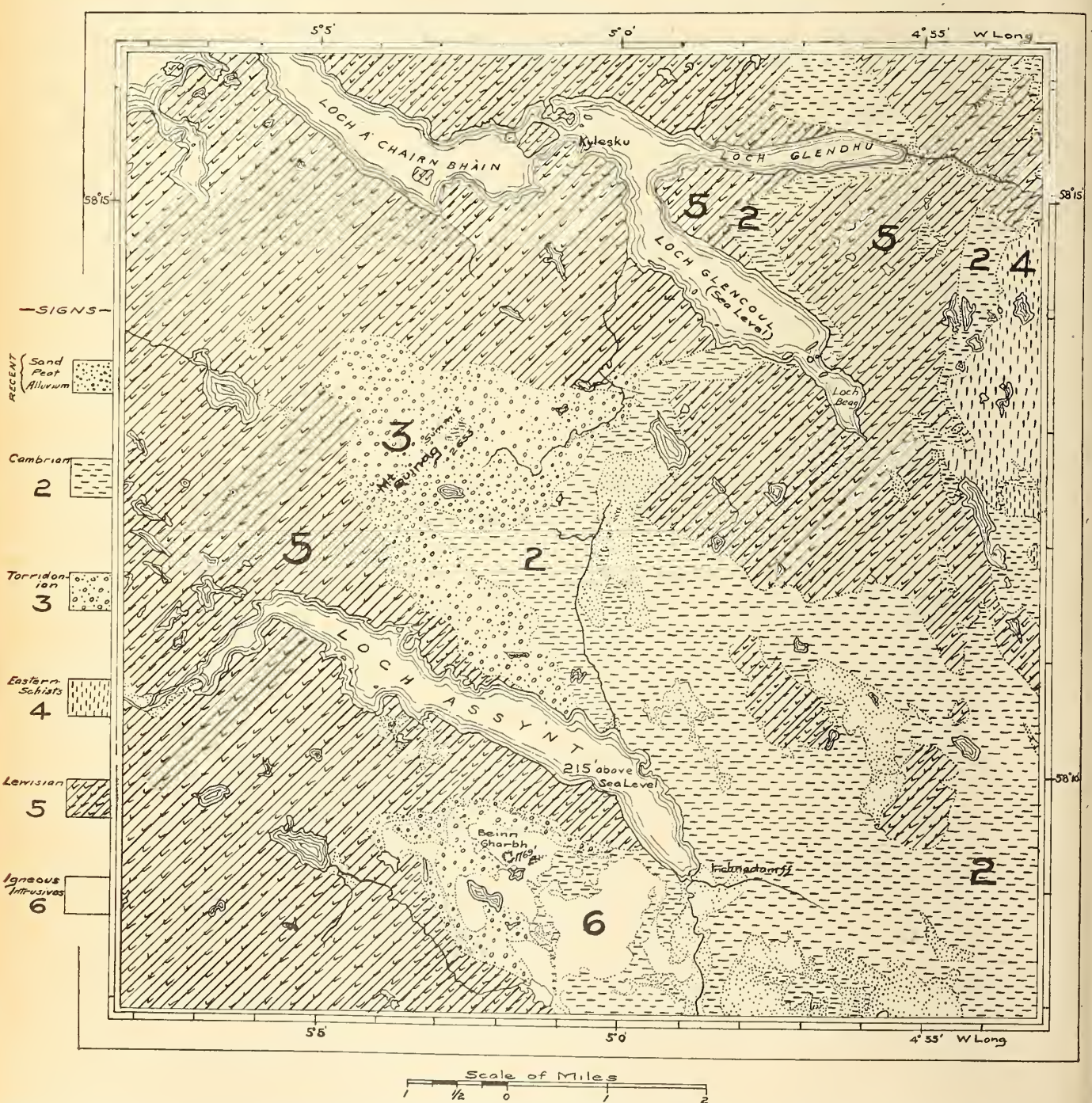
Early Work in Scotland and Canada.

Between 1814 and 1824 Macculloch proved the true relationship between the two great series, the Lewisian and the Torridonian. This relationship is like that which exists between the Huronian and the Laurentian

Culag Hotel, Lochinver, with exposures of Lewisian Gneiss.

of Canada, where work did not begin on the pre-Cambrian till nearly twenty years later. In 1827 Murchison and Sedgwick visited northwest Sutherland. From this time on, during the thirty years or so that Logan and his assistants were working out the structural and age relations of the pre-Cambrian rocks of Canada, the ancient rocks of the Northwest Highlands received much attention, notably from Murchison and J. Nicol. By 1860 the latter had worked out the relationships of the rocks so completely that he is admitted to have "displayed the qualities of a great stratigraphist in grappling with the tectonics of one of the most complicated districts of Europe."

The papers published on the Highland rocks and the controversies concerning them, during the period to which reference has been made, must have been of



Geological Map of the area in the vicinity of Lochs Assynt and Glencoul, Sutherlandshire. The map shows the area distribution of the pre-Cambrian (Lewisian and Torridonian) and the Cambrian together with the two thrust planes at Loch Glencoul. (After colored may of the Geological Survey of Scotland.)

much interest, and doubtless acted as an inspiration, to Logan and his associates engaged with similar problems.

The Lewisian.

The Lewisian or Fundamental Gneiss stretches as an interrupted belt from Cape Wrath to Loch Torridon. Like much of the territory occupied by the Laurentian of Canada, this belt of country is remarkably bare and sterile. Rounded domes and bare ridges, with intervening hollows, follow one another.

The Lewisian system occupies a position in relation to the sandstones and conglomerates of the Torridonian similar to that which the Laurentian and Keewatin do to the fragmental Huronian and Keweenawan series of Canada. In other words the Torridonian rests on the Lewisian with strong unconformability. Moreover, like the typical Laurentian, the Lewisian rocks are characterized by banded and foliated structures.

The Geological Survey of Scotland has arranged the Lewisian in two groups: (1) a Fundamental Complex, composed mainly of gneisses that have affinities with plutonic rocks, and, to a small extent, of crystalline schists and limestones which are probably of sedimentary origin; (2) a great series of igneous rocks intrusive in the Fundamental Complex in the form of dikes and sills.

Group (1) is very similar to that which was embraced under the name Laurentian by Logan, whose classification has been used up to comparatively recent times in Canada. The gneisses of Scotland correspond to the typical banded gneiss of Logan's Laurentian, while the crystalline limestones can be compared with his Grenville series, which was placed by him in the Laurentian system. During recent years in Canada the name Laurentian has been used in a more restricted sense.

Sediments in Lewisian.

In the memoir to which reference has been made, Dr. Horne says: "If the stratigraphical relation of the altered sediments of the Lewisian gneiss to the gneisses that have affinities with plutonic rocks could be definitely ascertained, it would possess much geological interest, in view of the antiquity of these sediments and the relative ages of the original types of gneiss. There is no clear evidence that these types are intrusive in the former, but, in certain places, the two are so intimately associated as to suggest that the rocks of igneous origin may have been injected into those of sedimentary origin. On the other hand, there is undoubted proof that, north of Loch Maree, the altered sediments rest on a platform of gneiss and are locally overlain by gneiss with basic dykes, the superposition of the gneiss on the sediments being there due to folding and thrusting."

The sediments, consisting of the crystalline limestones and associated rocks, are much like the sediments in the Keewatin-Laurentian complex of southeastern Ontario. Mr. Cyril W. Knight and the writer have expressed the opinion that the older crystalline limestones here represent marine precipitates which have been deposited on the surface of the Keewatin lava flows. Then the rocks having been subjected to stresses, in many localities, a complexity has been produced which is difficult to unravel. In so far as the writer could see, a similar relationship may exist between the crystalline limestones and some of the other Lewisian rocks of Scotland.

The igneous gneisses of the Fundamental Complex of Scotland represent plutonic types, while the Keewatin rocks of Canada, our oldest rocks, are volcanic. This difference may be accounted for by the fact that the period of denudation prior to the deposition of the Torridonian sediments was more prolonged than was the period of denudation in Canada prior to the deposition of the Huronian sediments, which do not seem to be represented in the Northwest Highlands. In this Scottish region the surface igneous rocks have been eroded and the underlying plutonic types have been exposed, while in Canada denudation did not go far enough to remove the surface material, now represented by the Keewatin. "It is remarkable that their (Torridon sandstones), enclosed pebbles include pieces of quartzite, which show contact alteration, spherulitic jaspers that have been formed by the silicification of liparites, and spherulitic felsites which closely resemble those of Uriconian age in Shropshire. As these fragments have all been derived from formations that are now not visible anywhere in the western part of the Counties of Sutherland and Ross, they furnish further evidence of the denudation of the Archean plateau in the pre-Torridonian time."

In other words, the quartzite pebbles show that pre-Torridonian fragmental series, probably to be correlated with the Huronian of Canada, and the liparites and felsites show that a series of volcanic rocks have been removed by denudation, bringing to the pre-Torridonian surface the plutonic types of the Fundamental gneiss. The felsites and other volcanic types may represent a series comparable in age with the Canadian Keewatin.

(to be continued.)

THE POSSIBILITIES OF CANADIAN PEAT

An Address delivered by Dr. Eugene Haanel, Director Mines Branch, Ottawa, Ont., before the Toronto Canadian Club.

On a former occasion I had the honour of addressing the members of this Club on the subject of electric smelting. I am happy to be able to state that the production of pig iron by the electric process has been solved both technically and commercially. When the projects now under way in Sweden are realized it will mean the annual production of 250,000 tons of electrically produced pig iron—nearly one-half of the whole output of Sweden at the present day.

I regard it as a special privilege to be permitted again to address you on a subject of importance to the business interests and the domestic happiness of the inhabitants of Canada.

In a country such as ours, where, in addition to the increasing amount of fuel required for industrial purposes, we are, during the long winters, dependent upon artificial heat in our homes, the item of cheap fuel and its economic use becomes one of the most important factors in the comfort and prosperity of the nation. I have, therefore, chosen as the subject of my address: "The fuel supply of the central provinces and its economic use."

I confine my remarks to the central provinces, because these provinces are almost wholly dependent upon outside sources for their fuel. The other provinces are sufficiently near the immense coal deposits of the ex-

treme east and west to render them available as sources of fuel, without increasing the price unduly by the cost of long haulage.

The fuel resources of the central provinces are represented by:

1. The wood still standing.
2. Our oil deposits.
3. The oil contained in the oil shales of New Brunswick.
4. The lignite of Manitoba.
5. Water powers—the houille blanche—or white coal of the French.
6. And lastly, the peat deposits of these provinces.

With the exception of the lignite of Manitoba and the peat deposits and, to a continually decreasing extent, the wood of our forests, the other classes of fuel named play an insignificant part as sources of fuel for domestic use and, with the exception of the utilization of our waterfalls for the production of power, imported coal is the staple fuel for these provinces.

For the year 1909 we imported coal to the amount of nearly 10,000,000 tons, valued at $26,831,859.

The current prices of coal and wood, as per "Labour Gazette," September, 1910, are:

a

	Coal.	
	Anthracite. per ton.	Bituminous. per ton.
Toronto	$ 6.75	$5.00
Montreal	6.00	5.00
Ottawa	7.50	5.50
Winnipeg	10.50	9.00
Vancouver	....	7.50

	Wood.	
	Hard. per cord.	Soft. per cord.
Toronto	$7.50—$8.00	$5.00
Montreal	8.00	6.00
Ottawa	6.50	3.50
Winnipeg	6.00	5.00
Vancouver	4.00	....

The increase in the cost of living and the price of our manufactures, consequent upon the high prices for this absolutely necessary material, might be counterbalanced by increased energy, activity, and business ability as long as we are assured of a constant supply. Conditions, however, as they exist to-day may not continue, but change, and change suddenly, and we may find ourselves deprived of fuel from the United States, without warning. For such an event we have made no provision, we have accumulated no extra store to meet such an emergency, but import only what is needed annually. A few years ago the strike in the coal mines of the United States demonstrated that such an event must be reckoned among the possibilities. I need not point out that other causes than strikes might deprive us for long periods of this outside source of fuel. It is, therefore, wise and statesmanlike to make provision for any emergency and seek within our own territory the means of supplying this all-important necessity.

Fortunately, nature has provided a substitute for coal and wood in the peat bogs scattered in abundance throughout the central provinces. It has been estimated that the known peat bogs of Manitoba, Ontario, Quebec, and New Brunswick cover in the more settled portions of these provinces an area of 12,000 square miles, with an average depth of 6 feet. This is probably but a small fraction of the actual amount of this valuable fuel asset in existence in these provinces.

One square mile of peat bog with an average depth of 6 feet will produce 774,400 tons of peat fuel, containing 25 per cent. of moisture. The 12,000 square miles will, therefore, contain 9,292,800,000 tons of peat, having a fuel value equivalent to 5,306,074,000 tons of good coal. Such an amount of peat would supply fuel to 5,306,076 families for 100 years, assuming each family to consume an amount of fuel per annum equivalent in heating value to 10 tons of the best anthracite.

To ascertain more accurately our peat resources, the Mines Branch began, three years ago, an investigation of the more important peat deposits favourably situated as regards transportation.

Since the quality of the peat contained differs greatly for different bogs, some being suitable for the manufacture of moss litter, while others contain peat sufficiently humified for the manufacture of peat fuel, instructions were given to ascertain not only the extent and depth of the peat bogs, but also the quantity and quality of the peat contained. So far, some 14 bogs have been investigated and mapped, and it is hoped that the information contained in our reports will prevent the exploitation of bogs for purposes for which the peat contained is unsuitable.

Many attempts have been made in Canada to utilize these peat resources for the manufacture of fuel, but up to within recent times unfortunately with little success, and with the waste of large capital. The reason for these failures is largely due to lack of knowledge of the nature of peat and the processes employed for the commercial manufacture of peat in the peat-using countries of Europe.

To furnish this necessary information to prospective manufacturers of peat fuel, the Department sent a member of the staff of the Mines Branch to Europe to investigate and report upon the manufacture of peat for fuel and other purposes in the peat producing countries of Europe. A few months after the appearance of this report, the Iron and Steel Institute of Sweden offered its writer the position of peat expert of the Institute, which he accepted.

Further to encourage the peat industry of Canada, it was deemed essential to furnish actual demonstration of a successful commercial process of the manufacture of fuel from peat as practised in Europe, by the erection and operation of a plant in Canada. To carry out this idea the Department purchased 300 acres of peat bog with an average depth of 8 feet, near Alfred, Ontario, and erected a peat fuel plant, such as is used in Sweden and Russia for the manufacture of air-dried machine peat. There are 1,300 such plants in operation in Russia, which in 1902 produced 4,000,000 tons of peat fuel, with a yearly increase since then of nearly 200,000 tons. Many private plants exist in Russia in connection with cotton mills, producing annually 200,000 tons of peat fuel.

The process is an exceedingly simple one. The peat is dug by hand and transferred by an elevator into a pulping mill. The pulp resulting is conveyed by cable cars to the drying field, rolled out into a sheet of some 4 inches in thickness by a field press, which also divides the sheet into longitudinal strips, which are further divided transversely by means of 3-bladed roller knives, operated by a labourer. The pulp is thus divided into blocks, which are left to dry on the field. Turning and stacking for more complete drying is done by boys. The pulp mill, cable cars and field press are operated by a steam engine. The capacity of the plant is from 25 to 30 tons per 10-hour day. During last season, operating

for 50 days, 1,500 tons of peat fuel were manufactured. The weather conditions of the season were very unfavourable, the men employed new to their work, and changes required in a new plant involved a number of stoppages. Under this severe test, the amount of fuel produced must be regarded as thoroughly satisfactory. The plant was visited by the members of the American Peat Society during their recent meeting in Ottawa in July last. Many other parties interested in peat have taken the opportunity to examine the plant and witness its operation.

In my address before the American Peat Society, which met at Ottawa last summer, I stated that, allowing 140 days for a season's operation, the cost per ton of fuel, including interest on capital invested, amortization, oil, and repairs, is as follows:

Cost of fuel on the field ..... $1.40 per ton.
Cost of fuel stored in shed ..... 1.65 per ton.

I have since then, however, come to the conclusion, that probably 110 working days will, considering our climatical conditions, be a fairer estimate of the period during which peat can be manufactured. This shorter period of production will increase the cost of manufacture to about $1.50 per ton on the field with our plant.

Some 600 tons of this peat fuel were sold in Ottawa and the vicinity of Alfred, and it has given great satisfaction. Constant application is made to the Department for additional supplies and telegrams received from outlying towns asking for carloads of it. These demands could, unfortunately, not be met, as the remaining amount of peat fuel is required for our fuel testing plant at Ottawa.

The fuel manufactured is specially adapted for grates, cooking stoves, and wood stoves. In fact, for the grate this fuel is far superior to cannel coal. Its advantages over cannel coal are:

1. It burns with a clear, luminous flame, without poking.
2. It does not eject into the room burning particles, does not, therefore, require a wire netting to protect the floor.
3. It leaves no unburnt material. The ash left is a soft flocculent powder.
4. It does not soil the hands.
5. It does not, as cannel coal, cover the back of the grate with a thick layer of soot.

Its disadvantage is its greater bulk.

The Government peat plant at Alfred serves the purpose of demonstrating the manufacture of air-dried machine peat and is suitable to be operated on bogs near villages or by groups of farmers who own peat lands and who are desirous of making their own fuel, as a cheap and excellent substitute for the high priced coal which they are now obliged to purchase. This is successfully done in Europe. The cost of the plant amounts to $7,600.00, including duty and freight on engine, peat machine, cars, and rails.

For the manufacture of peat fuel on a large scale, say 20,000 to 30,000 tons annually, mechanical excavators, spreaders, and cutters should replace the manual labour employed at our plant. On account of roots and stumps which are found in most bogs, the mechanical excavators brought on the market have not hitherto proven successful. It is only within the last two years that the problem of the construction of a successful excavator has been solved by Lieutenant Ekelund, of Sweden. By the employment of his machinery the cost per ton on an annual output of 30,000 tons is reduced to 92 cents in the shed.* This figure includes interest and amortization of the bog and machinery, transportation to shed, interest and amortization of the sheds, management, taxes, etc. Both Mr. Hystrom, the peat expert of the Iron and Steel Institute of Sweden, and Mr. Wallgren, the peat expert of the Swedish Government, who each investigated the Ekelund plant for three weeks, have verified this astonishingly low figure of the cost of production of the peat fuel as 92 cents per ton. By the adoption of the Ekelund machinery the problem of economically producing air-dried machine peat may be regarded as solved and the successful inauguration of a peat fuel industry looked forward to with confidence.

Ekelund, however, starting from air-dried machine peat, with 40 to 50 per cent. of moisture, carries his process further to obtain a product in the form of powder with 10 per cent. of moisture, the heating effect of which is stated to be equivalent, pound for pound, to the best English bituminous coal. This peat powder is admirably adapted for industrial purposes. Blown under a boiler, it burns with a long hot, smokeless flame, leaving no unburnt particles. The flame is readily regulated, extinguished and relighted at pleasure. The firing is automatic. The powder is a magnificent fuel for steam raising. As it gasifies instantly and completely, it deposits no soot on the tubes or other surfaces and avoids the smoke nuisance consequent upon firing with soft coal. There are no clinkers; the ash is a soft, friable powder, which is conveniently removed by a suction fan. Professor Odelstierna reports that the powder is not liable to spontaneous combustion, is admirably adapted to metallurgical operations, the flame being easily changed from an oxidizing to a reducing flame and vice versa. The combustion of the powder produces the highest temperature which the structural material of our furnaces can stand. Furnaces using peat powder are more cheaply constructed than furnaces using soft coal or generator gas.

This fuel is specially adapted to the cement, glass, and clay industries.

The Ekelund process has, moreover, the advantage of being independent of weather conditions, since the partially air-dried peat harvested during the summer months may be worked up into peat powder during the winter months.

The cost of manufacture of one ton of peat powder made from air-dried peat, including power, wages, interest, amortization, management, taxes, insurance, wear of bags, etc., is in Sweden $2.30 per ton.

Cost of plant, including the necessary machinery, furnaces, buildings, all complete for the manufacture of 20,000 tons annually, is $86,000.

The interesting statement has come to hand, that as a result of instructions received by the Railroad Commission of Sweden from the King, to investigate the feasibility of using peat fuel in locomotives, the Commission recently recommended the construction of freight engines using peat fuel. Designs for two engines have been submitted by the Commission; one larger, requiring two firemen, to have the same traction power as the regular type E of the Government railways, the other smaller, requiring but one fireman.

Whatever fuel, however, we use, be it imported coal or peat fuel, it is in the interests both of economy and the conservation of our fuel resources, that for manufacturing purposes we employ methods which will convert the largest number of heat units stored in the fuel

*The cost of common labour in Sweden is from $1.08 to $1.22 per day of 10 hours.

into useful work, or, to state this in another way, convert the heat energy of the fuel into useful work with the least possible loss.

The general practice pursued in our manufactories of converting the energy stored up in the fuel used into useful work, by burning it under a boiler and utilizing the expansive power of the resulting steam in a steam engine, is a wasteful and inefficient method.

Using a coal of 12,500 B.T.U. per pound, at $4 per ton, an ordinary 250 h.p. steam plant requires a minimum of 5 pounds per B.H.P.H. This amounts to 15 tons, costing $60 per h.p. year of 6,000 hours.

Contrast this with a h.p. year developed in a modern gas producer power plant, which consumes only 1½ pounds of coal per B.H.P.H., that is, 4½ tons for a h.p. year of 6,000 hours, costing $18. For peat containing 25 per cent. of moisture and 6,750 B.T.U. per pound, burnt in a producer, 2½ pounds are required for a B.H.P.H., assuming the power station to be erected on the bog and cost of manufacturing peat $1 by the Ekelund process, (Ekelund's figure is 92 cents), the figures are as follows: for a h.p. year of 6,000 hours, 7½ tons are required, costing $7.50.

Compare these figures:

Cost of coal for steam plant for one h.p. year of 6,000 hours	$60.00
Cost of coal for gas producer power plants	18.00
Cost of peat, 25 per cent. moisture, for peat gas-producer power plant	7.50

These figures relate to plants of small capacity.

For larger plants, both steam and producer gas plants, the relative consumption of fuel will be proportionately less.

The great economy effected by a gas power plant over that of a steam plant will be manifest when it is stated that the most perfect and skilfully operated steam plant probably in existence to-day, namely, the power plant of the Interborough Rapid Transit Company of New York City, requires 2 pounds of coal per B.H.P.H., while an ordinary producer plant requires only 1¼ pounds. The saving effected by a producer plant in cost of fuel, over that of the most perfect steam plant, calculating coal at $4 per ton, is $6 per h.p. year of 6,000 hours.

Suppose that 5,000,000 tons of the coal imported into Canada are employed for the production of power by ordinary steam plants, it is evident from our figures that for the production of the same power in a gas producer power plant only 1,500,000 tons need to be imported. This not alone cuts down our coal bill for power to less than one-third of what we are now spending and sending in cash out of the country, but we are saving also to some extent labour charges in handling at the plants two-thirds of the coal now used in steam power plants.

The economical results to be achieved by the introduction of peat gas power plants are so promising that the Mines Branch installed last year at our fuel testing station at Ottawa, for purposes of investigation and demonstration, a Korting peat gas-power plant, consisting of a producer, gas engine, and dynamo, each of 60 h.p. capacity. Several tests have already been made, and the plant is now regularly used for running the machinery of our concentrating laboratory, requiring about 40 h.p. The amount of peat fuel consumption is about 2½ pounds of peat with 30 per cent. of moisture for one B.H.P.H.

At present we are installing a 100 h.p. producer for lignite and soft coal, which we confidently expect can be operated successfully with peat. When this peat gas producer investigation is complete and we are assured that the operation of these producers is uniform and will present no difficulty in practice, we will be prepared to recommend their installation at suitable peat bogs for the production of power, either for industrial purposes at the bog, or for conversion of the power into electricity to be transmitted to neighbouring towns and villages for power and lighting purposes, exactly as in the case of water power.

If this is to be achieved, the present method of working peat bogs for only 10-hour days of the short season of 110 working days must be abandoned in favour of 20-hour days. With peat gas power plants erected on suitable bogs, suitable as regards extent and depth of the bog and quality of the peat contained, the electricity generated at the power station may then be employed for operating the machinery and the transport of the manufactured peat to sheds, while electric lights will illuminate the field for the night shifts.

When this plan, which has been realized in Sweden, has also been put into practical operation in Canada, we will then have rendered ourselves independent to a large extent of outside sources for our fuel; we will have gained another cheap source of electrical energy, where water-power is not available but peat is in abundance, and we will then be prepared, at least to some extent, for any emergency that may threaten a fuel famine.

Proposed Reduction Plant of the Dome Mines Syndicate, Porcupine, Ontario.

(Written for the Canadian Mining Journal by a Special Contributor.)

So much has been written concerning the formation and ore deposits of the Porcupine district that a few points regarding the milling properties of the ore, so far as we know them, may be of interest. A discussion of the probable metallurgy in detail would be somewhat premature, so an attempt will be made to bring out only some of the more important results of experiment and give a general outline of the plant which is being installed on the Dome.

During the spring of 1910, a small mill was erected consisting of 1,500-pound Nissen stamp, a 4 ft. by 8 ft. amalgamating plate, and a Deister concentrating table. Weighed quantities of average ore were milled and the work supplemented by laboratory tests to determine a process suitable to the ore.

The ore, which is essentially quartz and greenstone schist, carrying free gold and iron pyrite, was at first considered to be an ideal concentrating ore. The gold was closely associated with the iron pyrite and a high-grade concentrate could be obtained. The tailings, however, were sufficiently valuable to warrant cyaniding. By regrinding the concentrate, it was found that a large percentage of the gold could be recovered by amalgamation. The idea of concentration was then abandoned and experimental work was confined to sliming the whole product by two stage crushing, amalgamating after each and cyaniding the tailings. By grinding to 90 per cent. through a 200-mesh screen, 84 per cent. of the gold was recovered by amalgamation. The ore was particularly free from cyanicides, the only difficulty arising from the presence of a small amount of carbonaceous material which caused a secondary pre-

cipitation. This was overcome by lengthening the period of agitation.

By the middle of August, 1910, sufficient ore had been developed to justify the building of a mill. The stamp mill and cyanide practice of the Western United States was investigated and typical mills were visited. A shipment of ore was made to the Merrill Metallurgical Company, of San Francisco, Cal., as the Merrill system had been decided upon for the secondary treatment. Mill runs were made at their experimental plant and the milling properties of the ore thoroughly tested. The results were so encouraging and the ore so amenable to the treatment that it was decided to take advantage of the winter roads and ship the plant in during the present winter. The Merrill Metallurgical Company was retained to design it.

The mill, which is to be electrically driven, will be built in units of ten stamps each, four units being installed at once. A gravity plant will be obtained by making four drops from crusher to tailings discharge.

Preliminary crushing will be done in two stages, using No. 7½ and No. 5 Kennedy gyratory crushers. Belt conveyors will carry the ore to the stamp feed bins. Chalmers & Williams 1,250-pound gravity stamps will be used with straight back rapid discharge type mortars, screen 18-mesh or coarser. The foundations will be reinforced concrete. Outside amalgamation will be adopted. Superimposed Dorr drag classifiers will be installed over tube mills of the El Oro type, which will be followed by a second set of amalgamating plates. Hydraulic cone classifiers will discharge back to tube mills and overflow to Dorr thickeners. Agitation will be accomplished in a series of continuous Pachucas. Combined thickeners and press tanks will feed to Merrill slime presses which will discharge through automatic tailing samplers.

The gold will be precipitated by the Merrill zinc-dust process. The zinc-dust will be fed to a short conveyor belt, operated by means of floats and counter-weights, at a rate proportional to the volume of solution pumped from the tank. The zinc-dust will be discharged into a mixing cone and the emulsion agitated by a jet of air. A small stream of barren solution will provide a constant overflow which will carry the emulsion down a pipe to the suction of the pump. The solution will be pumped to triangular precipitating presses, precipitation taking place entirely during the passage of the solution through the pump, pump-column, and presses. The precipitates will be acid treated, fluxed, and smelted. A fully equipped assay office, machine shop, and storehouse will be built near the mill.

Nothing has been spared in the investigation and design, and nothing will be spared in the construction and equipment to make the plant a model in every respect.

Some Notes on the Appraisement of Gold Prospects.

(Written for the CANADIAN MINING JOURNAL by R. B. LAMB.)

It is probable that the engineer is called upon for no work requiring more mature judgment and skill than the task of passing upon an undeveloped or partly developed gold prospect. Properly to perform this he must utilize an experience covering varied conditions in many camps; he must bring a ripe technical training to bear; he requires to measure his problem as a manager; and, lastly, he must have the commercial sense developed to a high degree.

It is essential first to investigate the general geological conditions of the mineralized area, and the geology of the particular property. This should be as thoroughly investigated as snow and other obscuring elements will permit. It is not essential, nor is it possible, to make every observation required; but it is necessary to obtain as large an amount of data as circumstances permit. The more thoroughly this work is carried on, and the more completely the facts can be ascertained, the less the liability for error and misconception. A surface showing will necessarily have some stripping or some exposures made; or even a small amount of development work may have been performed. But however much or little this may be, some conclusion on the following points should be sought.

Nature of Vein.—Gangue matter, minerals of the deposit—prevailing country rock—dikes cutting the country, if any—do these dikes influence veins of the camp? Is the ore in continuous veins, lenses, flat sheets, or crushed zones of country, or disseminated through the rock? Are the deposits on contacts, or do they cut formations? What are the probable strike and dip and pitch of the ore shoot? What the physical and chemical characteristics of vein matter and wall rock? Are faults noticeable? Careful observations should be made for minerals that may interfere with treatment, or make chemical treatment difficult and costly. On a gold prospect the ore shoot is usually indefinitely indicated on the surface, but even so, it is imperative to determine accurately the average value of the outcrop or the exposure made, whether it be merely a part of the ore shoot or only a pit on the vein, or a part of the vein not even on or in the ore shoot at all.

In sampling and assaying for this purpose it must be borne in mind that sampling and assaying are methods employed to obtain an average of the ore faces exposed. The work, if done properly, is truly representative of the average value of the exposure. Frequency and system make for correct sampling. It is as glaring an error to shun visible gold as to seek barren spots. You are after an average. An engineer should not tremble at a speck of free gold, nor should barren spots depress him. Time is the essence of intelligent prospect appraisement. No value in terms of money can be placed on an unimproved gold prospect. It is, therefore, in many cases essential to have some certain privileges to permit of carefully determining the speculative risk involved.

Time may be demanded for diamond drilling, test pit work, stripping outcrops, or even for a small measure of development on the ore-body. Such work should only be directed towards determining invisible factors of a technical nature, and not with a view to placing the prospect in condition for valuation. Hence the work is to be carried on at the very minimum of expense, and very rapidly. In all gold appraisements no excuse can possibly be offered for the engineer's neglect to pan very frequently and to sample in many manners. Amalgamation assays are usually advisable, and check fire assays (not neglecting visible gold showings) are imperative for thorough work. The most careful sampling only gives an average value of the exposure. Other factors enter into the probable commercial importance of the deposit. A poor average will not necessarily damn the prospect, and a good average will not necessarily commend it. It is always to be remembered that

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*Mining Engineer, Traders Bank Building, Toronto, Ont.

large low grade deposits may take considerable development, some times even years, to determine their commercial possibilities. Remembering always that the speculative risk of an unimproved prospect is greatest, so also are its potentialities largest. It is, therefore, the whole aim of prospect appraisement to arrive at judgments that tend to reduce the speculative risk to the lowest point, and to raise to the highest probability the value of the accident of location.

The one thing that governs this more than all others, after correct observations on the factors above indicated have been reached, is the experience of the past in other localities. Nothing can outweigh ripe experience in many camps, and the utilization of this knowledge in similar or approximately similar conditions elsewhere.

The history of the development of adjoining properties is a source of valuable information for the guidance of the observer. This is so self-evident that nothing further need be said regarding it.

After the appraiser has reached a conclusion on the expectations of the metal possibilities of the ore deposit itself, he must then bring a full knowledge of mining, milling, and metallurgical processes to bear on his problem. He must figure the ore extraction, reduction of ore, and the probable total cost of his speculation. Managerial risk must not be omitted. His commercial sense must be called into requisition for problems such as transportation, loss of time through weather, labour, and other ever-varying conditions. And all these observations and calculations must be balanced against the probable production of the prospect. The appraiser is then in a position to advise upon these points. How much money, if any, should be paid for determining whether a mine can be proved? How much money, if any, should be spent in development to prove or disprove the observable conditions? Over what time should the expenditure extend? How should this money be spent? In answering the above questions with intelligence the appraisement has been made—and well made.

No money valuation can be placed on undeveloped prospects. It is, therefore, impossible for an engineer to pass on the purchase price as an engineer. If the price of a mine is asked for a prospect, time and terms must be adjusted to develop reasonably a mine with prospective ore reserves. In this case the real work of appraisement is not complete until such a stage of development has been reached as will justify the payment of the purchase price. Development on an approved prospect necessitates frequent observations during the progress of the work. These observations will tend to annul, modify, or amplify the original inspection. In all cases the speculative chance diminishes with development, rejection or acceptance being the inexorable verdict.

Finally the appraiser should be cognizant of the fact that the goodwill, so to speak, of a mine is greatest when it is not a mine—merely a prospect. Hence the allurement.

The C. M. I. National Anthem.

[EDITOR'S NOTE.—We have decided to publish the only authorized edition of the Institute Anthem. As this has suffered much harmful change, and, in the versions current, contains grievous superfluities, we rejoice to be able to print it in its pristine purity. No less an authority than Col. A. M. Hay vouches for every word of the following verses. In fact, Col. Hay has been responsible for the much-needed textual emendations. A single glance reveals the beauty of form and colour, the directness of appeal, the restrained vigour, and, withal, the Homeric simplicity of these restored lines. For thus recovering a gem that was in a fair way to oblivion, principally through dilution, the Institute owes Colonel Hay a colossal debt of gratitude.]

DRILL, YE TARRIERS, DRILL.

Sure every morn at seven o'clock,
There are twenty tarriers on the rock;
All hard at work on the right of way
On Section B of the big railway.
Then drill, ye tarriers, drill.

CHORUS—

Drill, ye tarriers, drill,
For we work all day, without sugar in our tay
While we work beyant on the big railway
Then drill, ye tarriers, drill,
And shtrike and shtrike and turn the drill,
And drill, ye tarriers, drill.

Monologue, finishing with "Are you all ready, then
Blast. Fire. Noise.

English, Irish, Welsh, and Scotch,
French and Germans, Swedes and Dutch,
Poles, Italians, Greeks, begob;
Every country's on the job.
Then drill, ye tarriers, drill.

CHORUS—Drill, ye tarriers, drill.

Monologue, etc.

We go to work in gangs of three
Red-haired Mike and Bill and me;
There's no mistake, we're husky lads
That swing the sleds and hold the gads.
Then drill, ye tarriers, drill.

CHORUS—Drill, ye tarriers, drill.

Monologue, etc.

When the boss come along, says Bill to Mike:
Put all your power on the drill when you shtrike;
Mike winks at me, I wink at Bill,
While we gently shtrike and turn the drill.
Then drill, ye tarriers, drill.

CHORUS—Drill, ye tarriers, drill.

Monologue, etc.

But when the foreman comes in sight
We shtrike and shtrike with all our might.
You can't fool him, because he knows
The kind of shwing and shtrike that goes.
Then drill, ye tarriers, drill.

CHORUS—Drill, ye tarriers, drill.

Monologue, etc.

he cook is a fine man all around,
nd his wife is a great big fat fardown.
ne bakes good bread, and she bakes it well;
ie bakes it harder than the hobs of Hell.
Then drill, ye tarriers, drill.

HORUS—Drill, ye tarriers, drill.

Monologue, etc.

he foreman's name is Dan McCann,
nd I tell you what, he's a damned mean man.
ne day a premature blast went off,
nd a mile in the air went big Jim Gough.
Then drill, ye tarriers, drill.

HORUS—Drill, ye tarriers, drill.
Monologue, etc.

Next month when payday came around,
A dollar short in his pay he found.
What for, says Jim; came Dan's reply,
You were docked for the time you were up in the sky.
Then drill, ye tarriers, drill.

Monologue, finishing with "Are you all ready? Then
Blast. Fire. Noise.
Repeat Chorus: Drill, ye tarriers, drill, etc.

ALL OVER.

PERSONAL AND GENERAL.

Mr. Henry Timmins is in New York.

Sir Henry Pellatt recently visited Sydney, where he was accorded a warm public welcome.

Mr. George E. Drummond has returned from Europe.

Mr. John Hays Hammond has returned from Russia.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Dominion Coal Output.—The outpit of the mines for January as 293,000 tons. The individual production of the collieries was follows:

	Tons.
No. 1.....	51,060
No. 2.....	52,190
No. 3.....	14,630
No. 4.....	32,420
No. 5.....	27,080
No. 6.....	18,960
No. 7.....	16,870
No. 8.....	12,730
No. 9.....	26,270
No. 10.....	14,730
No. 12.....	19,200
No. 14.....	5,930
No. 15.....	930
	293,000

This production for the month of January has only once been ceeded, 314,000 tons having been obtained in January, 1908. he Dominion Steel Company is accumulating a large storage bank coal at its works in Sydney, and this is rendering it possible give the mines fairly steady work throughout the slack time the winter, and will relieve the mines to a corresponding ex- nt in the summer, when shipping is active. This mutual accom- odation is one of the good results arising out of the common ntrol of the two companies.

The Dominion Coal Company has in preparation plans for the ilding of a new coal-loading pier near the present International iers at Sydney. Accommodation will be provided for very large eighters. The smaller of the present piers was built a long me ago and has grown inadequate for the increased shipments, d the modern type of coal freighting steamer. Work will be mmenced on the new pier in the spring.

A contract has also been given to the Simon-Carves Company, Manchester, England, for the erection of a Baum coal washer. he machinery will be delivered about July next, and it is pped to have the washer in operation by the end of the year. he washer will have a capacity of 120 tons per hour, and the akers have given very satisfactory guarantees of performance. one of the Cape Breton coals are organically dirty, and any impurities which may be present in the unwashed product are principally foreign admixture, and are very easily removed by the process of washing. Dominion slack after treatment in this washer should be a very nice product and command a good sale.

Mine Managers' Certificates.—It is announced that changes are to be made in the method of examinations for colliery managers' certificates of competency in Britain. A Central Examination Board is to be appointed for the whole kingdom, in place of the District Examining Boards which have had the granting of certificates hitherto. Commenting on the change the "Iron and Coal Trades Review" remarks editorially as follows:

"The existing system of examination is open to criticism upon a number of points. The Boards have conducted their examinations on more or less independent lines, and consequently there has been a lack of uniformity both in the standard of examination, and in the practical qualifications of the candidate . . . . and it is well known that candidates who have failed at one centre can, and do, pass at another."

In another paragraph of the same editorial it is intimated that "when the Coal Mines Regulation Act comes to be revised again, power will be given the secretary of state to grant certificates without examination to persons possessing such foreign or Colonial certificates as may be approved by him from time to time. The report fully recognized the importance of accepting only such certificates as are equivalent to certificates granted in the United Kingdom, both as regards the length and character of the experience, and the standard of the examination, so that there is no reason to anticipate other than satisfactory results from the changes which are now impending."

The matter of mine managers' certificates is one which greatly concerns the growing mining industry of Canada. One of the most vulnerable points is the arrangement which requires the Nova Scotian manager who moves to Alberta, British Columbia, or some other portion of the Dominion to sit again for a certificate in every province of Canada to which circumstances may call him. Surely the coal miners of the West are not so jealous of their brethren in the East as to desire to place barriers in the way, neither are the differences between coal mining in the East and coal mining in the West such as to necessitate two, or maybe three, distinct examinations. It is time that this useless hindrance were removed, and similar steps taken by the mining profession as have already been taken by other professions, such enced and competent men.

A matter which possibly the Canadian Mining Institute could consider profitably would be the institution of a Federal certificato of competency which would be so granted as to be acceptable to all the Provinces.

Another, and a broader suggestion, which grows out of the intimation in reference to Colonial certificates just quoted, is that arrangements might be made with the Imperial Government and other parts of the British realm for a certificate of competency for mine managers which would be accepted in any part of the Empire. Such a certificate would naturally be granted only under conditions which would ensure it being held by experienced and competent men only.

But to confine tho matter to Canada alone it seems absurd that the free exchange of experienced managers should be hindered by useless and actually absurd restrictions arising out of the provincial mining laws.

ONTARIO.

Cobalt.—The production of the camp for the first and second month of the year will run much lower than usual as a consequence of the accident to the Cobalt Hydraulic's plant at Ragged Chutes. Some of the smaller mines have had to shut down altogether, while the larger consumers have been running with their own compressor plants, which are not now adequate to their power needs. It is hoped that normal pressure will be resumed by the middle of this month.

At the annual meeting of the Silver Five Mining Company, it was stated that the receipts during the year amounted to $1,707.12 and that there was a balance on hand of $210.97.

On the 200-foot level of the Crown Reserve an ore shoot twice as long and almost as rich as on the 100-foot level, has been opened up. The vein is two and a half inches of 4,000 ounce ore. It is wholly in the Keewatin formation.

According to the statement sent out with the last dividend paid by La Rose Consolidated, that company is now in a better position than ever before, since its inception. The statement reads: Cash in bank, ore in transit, and at smelters, $708,470.99; ore sacked at mine ready for shipment, $303,343.40; total, $1,011,-814.39. Since October, the cash assets have been increased by over 65 per cent.

During the first six months of its existence the Campbell and Deyell sampling plant has milled and treated 3,406.86 tons of ore, the record reading green ore milled and sampled, 2,573.75; ore graded, 833.11; total, 3,406.86. As there were many adjustments to make to the plant at first, this record will be greatly exceeded now that the plant is running well.

Mr. Roy Finucane, son of Mr. T. W. Finucane, vice-president of the McKinley-Darragh-Savage, and Mr. R. W. Robbins, brother of the late manager, have been appointed as manager and superintendent, respectively, of the McKinley-Darragh-Savage.

According to a report from a Boston source, there are 10,000,000 ounces of ore blocked out in the Kerr Lake mine to-day, and favourable ground that has not yet been prospected.. There has been a change in the management of the Kerr Lake, Mr. John Seward being appointed manager temporarily in place of Mr. S. R. Heakes, whose health has broken down.

Owing to the favourable results obtained from sinking on the Hargrave vein in its own territory, the Drummond is now pushing work with better hope of finding more ore than for several years. What appeared to be the top of an ore shoot was cut at the 75-foot level and a shaft is being sunk to cut a more continuous ore body at the lowest level.

The Crown Reserve annual report was more satisfactory than was generally anticipated could be the case a few months ago. The production for the past year was 3,248,196 ounces and to date 9,048,196, while there was a comfortable cash surplus. During the year only 250,000 ounces had been taken from the 100-foot level of the Carson, the remainder being left as a reserve; and altogether the Carson produced a little more than half of the year's output. The mine will either build a mill this year or first company to get into Porcupine, has made the second pay make a contract with a customs concentrator, which is ahead proposed.

It is reported that now the Kerry Mining Company has reo ganized that it will recommence operations on the Cart Lake leas as soon as it can get air from the Cobalt Hydraulic.

The Crown Reserve has declared its intention of payin monthly dividends. Instead of 15 per cent. per quarter, it wi be 2 regular and 3 extra per month.

Before he left to take charge of the Timmins interests in Po cupine, Mr. P. A. Robbins was presented with a very handsom clock by the staff of the McKinley-Darragh-Savage, with whic company he has been over two years.

For December the Buffalo mill made a record. It milled 4,15 tons; 125,220 ounces were recovered, with an average head c 36.4 ounces per ton. For the three last months of 1910, 1,303,55 ounces of silver were recovered from 10,484 tons, with an averag assay of 36 ounces to the ton.

While Mr. Thomsen, who has the lease on the Green-Meeha has no definite ore body, yet the drift on the vein at the 100 fo level is looking promising with small flakes of native in the sma tite ore.

On what is known as No. 5 vein, the Beaver has opened up nice body on a very rich and wide lead. The vein cut at the 2(foot level has been struck again on the 250 foot, and there are no good prospects of blocking out reserves there. The Beaver now making regular shipments of high grade and seconds.

Thirty feet below the 500-foot level, the Temiskaming h opened up high grade ore in the winze on the No. 3 vein. T vein when sunk on was barren calcite; it changed to smaltite a now shows four or five inches of high grade ore. The cycle change is exactly the same as at the 300 and 400 foot levels, that apparently the problem of ore going below t 500 foot level has been solved so far as the Temiskaming is co cerned.

It is now definitely announced that arrangements have be made whereby the Black Mines will work the two Coleman pr perties again in an endeavour to find silver in the big cobalt vei

South Lorrain, Elk Lake and Gowganda.—The fire that swe Gowganda has destroyed at least half of the town, including ma of the hotels and stores. It is not likely that they will build again.

There is a determined effort on foot to convince the Ontar Government that a railroad should be built into Elk Lake a Gowganda. A deputation representing not only Gowganda a Elk Lake, but investors in the Montreal River country from over the province, will make a strong plea on February 15.

The Keeley mine has resumed work underground in Sou Lorrain, 22 men having been obtained from Cobalt to fill the pla of the 32 strikers who went out because the management decid to pay on the Cobalt scale.

Having paid off all their indebtedness, the Lucky Godfrey h now resumed operations at Elk Lake. Mr. G. C. Bateman is charge.

At the annual meeting of the Wettlaufer mines the stateme was given out that there was on hand $122,000 cash, a ore reserves of between 3,500,000 and 4,000,000 ounces.

The annual report of the Bellellen Mines shows that the co pany is in good financial standing and that work is proceedi well. The 7½ tons of high grade shipped netted the compa $11,000. Two shafts are being sunk, one on the Little Kee vein, where there is a solid vein of smaltite and niccolite, and t other at the main shaft.

It is now understood that the shareholders of the Farm Bank have a claim on the Welsh property at Gowganda, wh was sold to the company by ex-Manager W. R. Travers.

The Bartlett has shipped five tons of high grade ore, and ot properties in Gowganda are expected to send out further c signments shortly.

Porcupine and Other Gold Areas.—The Scottish Ontario, the ment of $25,000 to the Bannerman syndicate. The vein cut at he 100 foot level shows very uneven assay and Mr. McLaren is ow busy making a thorough sampling of the vein.

It is stated that the Porcupine Imperial Mining Company will ush in machinery before the break up of the winter roads.

There are 600 men now staking in what has come to be called he Cripple Creek camp in the Townships of Keefer, Carscallen, nd Denton. There is less blanketing going on, but it is almost mpossible to prospect with any results with six feet of snow on he ground. There is little free gold, but assays brought down un even and fairly high.

It is stated that the core drill on the Rea Mines at a depth of 0 feet is in $40 ore. The ore body had been stripped for 270 eet before the snow fell.

The Porcupine Gold Mines from its Vipond holding has arned out its first gold bar and it is on exhibition in Porcupine.

Mr. Ben Richards, who did such good work as underground oss at La Rose and Cobalt Lake, has been appointed to the same osition for the Hollinger mines at Porcupine.

It is announced that the big mining firm of Bewick, Moreing & Co. will invade the Porcupine field in a few days. Their fore-unners have already many claims under option for their engi-neers to examine when they arrive in the camp.

The past month has been a record one for sales of claims from $5,000 upwards. Buyers are much more eager in canvassing, and sellers are more reasonable. It is stated that never in the best days of Gowganda or Cobalt have payments been made so promptly nd unfailingly.

Augustus Heinze has bought the Foster, or rather taken an option on it, and Thompson P. Chester has taken over the Dome Extension for some New York interests. The McIntyre has also been sold, but to whom has not yet been stated.

The T. & H. B. Company has thrown up its option on the Foster-Ellis properties because not enough has been found to justify it in making a further payment. This is about the only case of an important option being thrown up recently.

In North Whitney the finds on the Smith veteran and the Hughes properties have attracted considerable attention.

Excellent progress is being made with the work of getting in machinery and generally preparing for the installation of the machinery at the Porcupine Power Company's site on the Mattagami. One generator has already arrived.

The Pearl Lake Gold Mines, controlled by the Cartwrights, of the Temiskaming Mining Company, has commenced work on the claims.

There now appears little doubt that the Porcupine Railway will be in to the lake by June. The right of way has been cut through, and as there is no rock work the cuts and fills can soon be negotiated by the steam shovel. The line has been definitely located by the Commission on the east side of the lake on a five-mile tangent. There will be a station at Golden City and another at the south end. The townsites on the west side are very disappointed.

Owing to the discoveries on the Day and Hughes properties the Bannerman vein has been definitely located for over two miles, with free gold showings at either end.

That the Porcupine field offers good prospects for the diamond drilling companies is shown by the number that are already operating. The Crown Chartered, the Tisdale, and the Rea Mines are all employing drills to prospect.

The Crown Reserve interests in Porcupine are now employing a good force of men to open up the McEnany claim near the Timmins. Mr. Joe Houston is in charge.

A Duluth syndicate, represented by Mr. A. M. Chisolm, has taken options on properties aggregating 1800 acres in the camp.

Union Abitibi, in the Opasatika region, where there is now a small sized rush, has a stamp mill already on the ground and will set it up this summer and commence operations. The Quebec Government has issued a report that there is telluride in the veins in this section.

The Foley-O'Brian is working three drills on the property now. The main vein shows 18 to 20 feet wide in the crosscut and the assay is said to be good.

Kenora.—The Eagle Lake district is getting a considerable amount of notice, three iron claims on Detour Point are being worked, as well as the claims to be known and incorporated under the name of the Nash Bay Mining Company, upon which work has already been done to the extent of several thousand dollars, and a small mill is on its way there now and will begin operating in the spring.

A contract has been let for $20,000 for diamond drilling over an area in which some very good surface indications have been found, giving hopes of a strong copper lead at some small depth.

The Scovil copper property on Alley Island, the patent for which has been granted and which on the surface gives values of from one to two per cent. native copper, is reported to be on the market now and there are rumours afloat of the absorption of this property by an American syndicate. Nothing definite, however, has as yet been announced.

The Kenora Mines, Limited, which is operating the Mikado Mine on Shoal Lake, is about to increase its capital stock to $1,000,000.

The Secretary-Treasurer's Report of the Prospectors' and Mine Owners' Association of the Kenora Mining Division, given at their third general annual meeting in January, 1911, shows a most successful year for that association. The members appreciated the advantages of belonging to this association so highly that they undertook to double the membership during 1911.

ALBERTA.

Blairmore, Alta., Feb. 1, 1911.—Two fatalities occurred during the month of January at the mine of the Davenport Coal Co. at Burmis. On Jan. 11th Tom Lhink, a driver, was killed by falling between the pit-cars and the rib while rounding a curve. On Jan. 21st Edwin Smith, a miner, was killed by a fall of rock. Smith and his partner were examining their room after a shot when a portion of the hanging wall fell and knocked Smith down the chute. He died a few minutes later.

The Canadian Coal Consolidated, Ltd., is installing a gasoline haulage motor in its mine at Frank, and will test it with a view to equipping the mine throughout with these motors if they prove satisfactory. The system of haulage heretofore used has been a main-and-tail rope in the tunnel and horses in the shaft workings. Gasoline motors have been used with considerable success in some mines in Europe, and operators in this country will watch with much interest to see if they are adapted to local conditions.

BRITISH COLUMBIA.

A number of managers of coal mines being operated in the province recently visited Victoria to make representations to the Government relative to the new Coal Mines Act, which was introduced into the Provincial Legislature late in January. Among them were Messrs. L. Stockett, Hosmer mines; and James Ashworth, Crow's Nest Pass Coal Company's mines, all in southeast Kootenay; W. H. Armstrong, managing director of the Nicola Valley Coal & Coke Company; and representatives of all the producing coal mines on Vancouver Island.

The British Columbia Copper Company is the latest of the metal mining companies operating in British Columbia to declare a dividend. This distribution of profits will be at the rate of ten per cent. per annum if it prove to be a quarterly dividend. Other companies that have lately paid dividends are the Granby Con. M. S. & P. Co., Le Roi No. 2, the Hedley Gold Mining Co., and the Hastings (B. C.) Exploration Syndicate.

The ninth general meeting of the Western Branch of the Canadian Mining Institute, called for February 16th, at Nanaimo, Vancouver Island, will deal chiefly with matters relating to coal mining. A comprehensive paper has been prepared by Mr. C. F. J.

Galloway, B.Sc., on "Coal Mining in British Columbia." This is a carefully made compilation of the main features of numerous official and other reports, and will be an acceptable addition to the available sources of information concerning the coal resources of British Columbia. Another valuable contribution to the proceedings at the meeting will be an address, illustrated by lantern slide views, by Mr. F. Napier Denison, F.R.M.S., of the Meteorological Office, Victoria, on "Earthquake Strains and Stresses in Relation to Coal Mine Explosions." Mr. Denison has for years been making enquiry and observations along lines that point to a connection between the occurrence of earthquakes and explosions in coal mines, and his conclusions are of much interest. There will also be a number of other addresses and papers on coal mining subjects, beside which there will be a demonstration, in a chamber filled with noxious fumes, of men at work wearing Draeger oxygen breathing helmets, designed for mine-rescue purposes.

Nelson.—The company known as the Kootenay Gold Mines, Limited, organized to acquire and operate the Granite-Poorman group of mineral claims is stated to have completed its arrangements for obtaining enough capital to admit of its objects being carried out. The more extensive development of the mines and the enlargement and better equipment of the stamp mill may be expected to be undertaken before long. The early resumption of ore-production at the Molly Gibson mine is looked for, the Consolidated Mining & Smelting Company having had a number of men at work for some time in preparing for this. It is about two years since the shipment of ore from this mine was suspended. The first-class ore will be shipped crude to Trail; later the concentration of the second-class ore at the mill near the mine will be undertaken.

Rossland.—Development and production is being continued at the Consolidated Mining & Smelting Company's Centre Star group on a comparatively large scale. The Le Roi No. 2 Company is also working up to full average capacity of the past two or three years, and the orebodies in its mines promise an output this year probably somewhat larger than that heretofore made. Trail. Nearly 70 tons of ore was shipped from the Niekle Plate Trail. Nearly 70 tons of ore was shipped fro mthe Nickle Plate during January. The Granby Company has commenced to ship to its smeltery at Grand Forks, ore from the Cliff-St. Elmo group, which it is exploring under option of purchase. The Mayflower and Blue Bird, both in the south belt, are reported to be looking well and to give promise of producing a fair quantity of ore this year. It is understood that there is a probability of the Spitzee being operated again ere long, but no definite information in this connection has yet been made public.

Similkameen.—The Hedley Gold Mining Company's operations are the most profitable of any gold mining company in the province. Profits are more than enough to allow of payment of a three per cent. dividend every three months, so an additional distribution of two per cent. has been authorized. The opening of coal mines in the Similkameen country about Princeton, and at Granite Creek, Tulameen, is in progress, and about half a dozen properties may be expected to later become produeers. Railway transportation facilities have been provided for part of the district, the V. V. & E. Railway being in operation, giving regular communieation with the Boundary country and thence, by the Great Northern Railway, to Spokane. A contributor to the Toronto Monetary Times lately made it appear that Princeton has railway connection (which is a fact) and suggested that extension to Hedley is required. The position is that the railway was first constructed from Osoyoos, near the International Boundary line, to Hedley, and afterwards extended thence to Princeton. A further extension now in progress is from Princeton to Otter flat, in the Tulameen district.

Coast.—While it is not practicable to do effective prospecting work in the Portland Canal district during the winter, excepting on properties where underground workings have been sufficiently advanced to admit of exploration being carried on, notwithstanding that weather conditions are unfavourable for surface work, operations are being continued on three or four of the best known properties. Some disappointment has resulted from the non-realization of expectations that concentrates would be shipped from the Portland Canal Mining Company's mill throughout the winter, but it has lately been announced that no output will be made until steel shall have been laid on the railway from Stewart up BearRiver Valley. The enlargement of the concentrating plant is, meanwhile, being proceeded with. Work is still being done on the Red Cliff copper property, and the Stewart silver gold group, respectively. On Observatory Inlet, the Granby Company has already done about 5,000 feet of diamond drill work, and reports are to the effect that this prospecting has proved encouraging, but it is unlikely any decision will be arrived at relative to the purchase of the Hidden Creek Company's mine, held under option, until next summer. During the four or five months that shall intervene, much additional exploration of the property will be carried out, so that the extent of the orebodies may be further determined and more information as to their value be obtained.

On Texada Island, the Tyee Copper Company is doing development work in the Cornell mine, the lease of which has been transferred to this company by the Northern Texada Mining Company. The Marble Bay mine is being opened at the 1250 foot level, 100 feet deeper than the last level, from which a considerable output of bornite ore, containing gold and silver as well as copper, has been made. The expected re-opening of the copper and iron mines on the property of the Puget Sound Iron Company has not yet taken place, but there is some probability of a move being made next spring.

Coal mining continues active, the producing mines of Vancouver Island are gradually increasing their output of coal. The prospects are that the tonnage for 1911 will be considerably larger than that of any other year since coal mining assumed important proportions on Vancouver Island.

GENERAL MINING NEWS.

NOVA SCOTIA.

Stellarton, February 3.—William Newcombe, a native of Halifax, was killed at Albion Mines this morning while unloading a car of pit props.

Sydney, February 6.—Sir Henry Pellatt and C. Hugh Brown are here. Sir Henry is paying his first visit to the Dominion Steel & Coal plants, in which he is financially interested. Mr. Brown has been the confidential adviser of some of the greatest financial corporations in the United States. Both are very free in their expression of opinion about the certainty of industrial development here.

ONTARIO.

Ottawa, February 1.—Mr. M. J. Butler, of the Steel Corporation, is here to urge the renewal of the bounty on rods, which expires in June.

"We have had a most successful year," said Mr. Butler. "At the present time we are turning out 800 tons of pig iron a day. Our output of steel per month is now 26,500 tons, our output of rails 13,000 tons, and our output of rods from 8,000 to 9,000 tons. The rail market at the present time is in an exceptionably healthy condition, owing to the construction of so many different lines in Canada. At the present time we have three cargoes of rails

n the way from Sydney to Prince Rupert. These cargoes are oing around 'the Horn.'

"About 3,000 men are now employed on the steel plant at ydney, and about 1,500 more are employed by the company get- ing out iron ore in Newfoundland and limestone at the various uarries in Cape Breton. The coal branch is now employing 6,000 ien, but next summer this number will be increased to 8,500."

Mr. Butler declined to be quoted on the new tariff agreement. t was stated by another Sydney man now in the city, however, hat the renewal of the eight cents a ton duty on coal means a oss to the Dominion Corporation of $120,000 a year. This argu- ient may be used by the steel and coal interests in urging a re- ewal of the bounties.

Toronto, January 30.—A consignment of 100 bars of silver alued at $30,000, passed through Toronto Saturday billed from obalt to Newark, N.J.

Elk Lake, February 2.—Following the recent enthusiastic meet- ngs here and at Gowganda, it has been arranged that a strong elegation will go to Toronto to meet the members of the On- ario Cabinet and urge the immediate necessity for a railroad to lk Lake and Gowganda.

Contingents from Montreal, Ottawa, Cobalt, Haileybury and New iskeard have signified their intention to join with the Montreal iver deputation in impressing upon Premier Whitney and his olleagues the fact that the time is opportune for the affording f better facilities to the Gowganda district, which it is felt the ealth and permanent nature of the camp warrant.

With better railway access there are many new properties which ill be at once placed on a highly paying basis.

Porcupine, February 2.—Following immediately upon the de- arture of Messrs. Heinze and Scott, came A. M. Chisholm, of uluth, Min., accompanied by a party of mining men and others, ho will be associated with him in what is said will be one of the rgest prospecting undertakings ever inaugurated in the district.

Porcupine, February 3.—Close upon the consummation of the ig deal for the Gray claims in the Ogden comes the report f another in the same township, the eight claims involved lying outheast of the Gray group and about a half-mile directly south of the Weston group, the purchase of which is still under consideration by interests who have been negotiating with the owner for their disposal.

BRITISH COLUMBIA.

Phoenix, February 4.—The Granby Company continues its search for new properties with a view to enlarging its field of activity. During the past few days they have secured options on 50 mineral claims on Copper Mountain, northeast of Chesaw, Wash., involving an ultimate purchase price of about $100,000.

E. E. Campbell, assistant engineer of the Granby Mines, and W. J. Mitchell, diamond drill expert, have spent some time at the properties considering the problem of getting in necessary machinery, sites for boilers and drill equipment in order to commence development work early in the spring. Arrangements are now being made for the transfer of the machinery to the mountain, while the heavy hauling may be done on sleighs.

Stewart.—The news of the week in mining circles is the commencement of shipping by the Portland Canal mine. From three to four hundred tons of concentrates are now being hauled down to the railway preparatory to shipment to either the Ladysmith or Tacoma smelters. Plans are now being made for the enlargement of the mill, bringing the capacity of treatment up 75 tons. This will necessitate the temporary closing of the plant pending alterations and installations of new tables. Manager Elmendorf announces that everything will be ready for the resumption of treatment when steel reaches the mill-site.

Red Cliff.—The incline raise started 1,000 feet in from the portal of the main tunnel is now up some 75 feet in an excellent grade of copper ore. A crosscut is also being driven in a westerly direction.

Stewart.—A new ore shoot has been struck in the face of the No. 4 tunnel at a point 220 feet from the winze. The winze is down 25 feet, following an 18-inch vein of solid galena and iron sulphides, assaying $50 to the ton. In the face of the East drift on the No. 3 tunnel, the high grade still maintains its persistence, showing native silver and argentite in noticeable quantities.

Development is also proceeding satisfactorily on the Main Reef, O. K., International, Ben Bolt, and Mt. Gladstone properties.

MINING NEWS OF THE WORLD.

SOUTH AFRICA.

Johannesburg.—A private cablegram from Johannesburg states hat during December the mines of the Rand alone (i.e., excluding utside mines) crushed 1,827,423 tons, the average yield per ton eing 28s. 1d., the working costs per ton 17s. 9d., the profit per on 10s. 5d., and the aggregate profit £952,574.

RHODESIA.

The value of the Rhodesian gold output for last year is announced as £2,569,200, which represents a decrease of about £54,-00 compared with 1909, but an increase of nearly £43,000 when ontrasted with the 1908 return. It is authoritatively explained hat the slight decrease is accounted for by the fact that a large umber of properties which were worked on a small scale by in- ividuals have been taken over by companies, and crushing has emporarily ceased pending development and the erection of up- -date machinery. At the same time the exceptionally large utputs made by the Globe and Phoenix mines should not be for- otten. In October and November last this mine was largely sponsible for the Rhodesian output rising to £234,920 and £240,-'0 respectively, the latter total establishing a fresh monthly ecord. Last month's drop to just under the £200,000 mark is so accounted for by the mine named, its production having allen back to a more normal level, the object of the management temporarily raising the returns having been attained.

The total output of gold from Rhodesia for the month of December is cabled as 47,367 ozs., valued at £199,500, as against 57,158 ozs., valued at £240,573, in the previous month. This is a decrease on the month of 9,791 ozs. There were 159 gold producers last month. The output of other minerals for last month was: Silver, 15,117 ozs.; lead, 57 tons; coal, 13,615 tons; chrome ore, 5,526 tons; asbestos, 25 tons.

UNITED STATES.

New York, February 3.—Conditions prevailing in the copper market are reported to be materially better and the quotation has been firmly established on the basis of 12½c. for electrolytic.

It is stated that sales Tuesday afternoon and Wednesday were in the neighbourhood of 25,000,000 to 30,000,000 lbs., the major portion of which was for European account.

New York, February 4.—Conditions governing the petroleum export market for the year 1910 have been eventful to producers and refiners here and in foreign markets the world over. The extraordinary increase in the world's production of petroleum, which stimulated keen competition by an effort to find an outlet for the enormous supply, led to sharp successive cuts in prices for illuminating oil, for export.

Los Angeles, Cal., February 4.—The most important development in the oil fields during the past month has been the sudden activity displayed by the Standard Oil Company. The great corporation is quietly buying all the light oil it can secure in the Midway, Maricopa, and other San Joaquin Valley fields, and is also closing contracts for this grade of oil at Fullerton. Some of the contracts being closed with producers by Standard people

provide for prices ranging from 45 to 65 cents per barrel at the wells, depending on the grade of the product.

Tonopah, Nev., February 4.—The regular semi-monthly clean-up of cyanide precipitates at the Tonopah Extension mill, covering the first half of January, has been completed and resulted in the production of 13 bars of bullion, weighing 1,705 pounds, and valued at $18,000.

Washington, January 30.—The public lands committee of the House concluded to-day on Representative Mondell's bill to regulate the leasing of coal lands in Alaska. Many interests, including Alaskan railroad and financial interests, have appeared before the committee in reference to the measure. Director George Otis Smith, of the Geological Survey, and Delegate Wickersham, o Alaska, were present.

MEXICO.

Mexico City.—The Transvaal Copper Company has develope an enormous body of ore upon its properties in the Cumpas dis trict, Sonora. Diamond drills were used during 1910 with goo results, the total work amounting to more than 5,000 feet. On ore body 90 feet thick and running 6 per cent. copper, was penc trated. An important thing recently accomplished was the un watering of the Verde shaft. The company holds 2,996 acres o mineral-bearing land, two ranches, which aggregate 41,000 acres a smelter site at Cumpas embracing 50 acres, upon which is locate a 150-ton blast furnace and a 20-ton reverberatory furnace.

COMPANY NOTES

LE ROI NO. 2.

For the last three years the dividends of Le Roi No. 2 have been at the same rate—namely, 6 per cent. per annum. The profits of the last two years, however, have come out at appreciably less than those of the preceding period. The total for the year ended 30th September last is just sufficient to provide the dividends distributed, and as a further £5,000 is added to the reserve, raising that fund to £20,000, the carry forward has become reduced by a corresponding amount. An exceptionally large sum—£21,000—was last year expended upon development, £19,500 being charged against revenue. In 1908-9 some £14,500 was disbursed under this head and £12,500 written off. We contrast below the results of the past three years:

	1909-10	1908-9	1907-8
Gross receipts	£105,946	£114,424	£128,765
Expenses, taxes, etc.	59,295	65,040	75,712
Net profit	8,944	49,384	54,053
Dividends, etc.	37,707	37,700	37,800
To reserve	5,000	5,000	10,000
Brought forward	36,397	29,713	24,460
Carried forward	31,404	36,397	29,713
Ore shipped (tons)	29,776	29,874	29,648
Yield—Gold (ozs)	26,447	28,353	28,453
Silver (ozs)	24,078	22,401	20,489
Copper (lbs)	970,996	956,812	910,384

The quantity of ore shipped to the smelters was last year just a shade less than for the preceding period, the gold contents being lower by some 2,000 ounces, the silver higher by 1,600 ounces, and the copper by 14,000 lbs. A larger tonnage of low grade ore was treated at the mine, producing 1,368 tons of concentrates, value $29.28 per ton, at an average cost, including smelting charges, of $18.6 per ton. These figures are stated to show an advanced improvement, while the percentage of gold recovered is greater than for any previous year. Twelve months ago an interesting question in connection with the mine was as to whether the valuable vein worked by the Consolidated Mining Company extended into the Surprise claim of Le Roi No. 2. It would appear from the manager's report that the drilling done did not result in the discovery of any new veins. So far as opened up at the 1,300 feet level, the extension of the south vein of Le Roi Company has yielded little of importance. The position of the mine is considered to be much the same as a year ago, although there are indications of the discovery of further ore bodies at no very distant date.

HARGRAVES MINING COMPANY.

The annual meeting of the Hargraves Mining Company was held on February 8th. The report showed receipts for the year from sales of bullion, etc., of $71,148.54, which, added to the cash on hand on Dec. 31, 1909, of $31,273.02, made a total of $102,- 421.56. Expenditures during the year were $58,800.73, leavin a cash balance in the bank of $43,620.83. Ore on hand and a smelters is valued at $37,612, making practical cash assets a the end of 1910 of $81,232.83. Total production during the yea was 635 tons, of a gross value of $117,400.74.

CEMENT COMPANY ANNUAL.

The annual meeting of the Canada Cement Company will b held at the Windsor Hotel, Montreal, February 21, at 3 p.m.

CROWN RESERVE.

Dividend No. 12.

Notice is given that a monthly dividend of 2 per cent. for th month of January, 1911, and a bonus in addition of 3 per cen for the same period, making a total payment of 5 per cent has been declared and will be payable on the 15th Februar 1911, to shareholders of record the 31st January, 1911. Transfe books will not be closed. Dividend cheques will be mailed on th 14th February, by the transfer agents, "The Crown Trust Com pany," and shareholders are requested to advise them of an change of address.

DOMINION STEEL CORPORATION.

A circular letter has been issued by the Dominion Steel Co poration announcing that the date for closing the accounts c the company has been changed from December 31, to March 3 the change being made in order that the accounts and reports c the Coal Company and those of the Dominion Iron & Steel Com pany may be presented to shareholders of both companies and t the shareholders of the Dominion Steel Corporation at the sam time.

The next statement of the Coal Company will accordingly cov a period of 15 months and the Steel Company's statement one c 10 months. The combined earnings of the two companies f the period after the payment of all fixed charges will, it is unde stood, show about 5 per cent. earned on the common stock, whi is represented by the stock of the consolidation. The expens incidental to the coal strike are estimated at $450,000, or equiv lent to 1⅛ per cent. on the stock, and the loss from the reductio of steel bounties is placed at $250,000.

MARITIME COAL, RAILWAY AND POWER CO.

A meeting of the directors of the Maritime Coal, Railway Power Company, Limited, was held on January 25th, at the hea office in the Ottawa Bank building, Montreal. It was resolve to build additional packets to facilitate water shipments of co from the new slope at Joggins. It was resolved to open anoth colliery at St. George in the eastern part of the company areas, for the further development of the property and increas the output. A ten years' lighting contract with the town c Amherst was approved and executed.

STATISTICS AND RETURNS

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ding January 28, and those from January 1, 1911, to date:

	Jan. 28. Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver	122,910	186,410
City of Cobalt	.....	60,000
Crown Reserve	115,540	219,740
Chambers-Ferland	64,000	128,900
Hudson Bay	61,240	61,240
La Rose	68,480	344,090
Kerr Lake	120,330	421,233
McKinley-Darragh	83,160	462,660
Nipissing	451,130	1,009,010
Peterson Lake (Little Nip.)	58,430	58,430
Right-of-Way	68,020	128,880

The shipments for the week were 1,273,240 pounds, or 636 tons.
The shipments from January 1 to January 28 were 4,305,203 unds, or 2,152 tons.

Following are the shipments from the Cobalt camp for the week ding February 3, and those from January 1, 1911, to date:

	Feb. 3. Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver	.....	186,410
Buffalo	60,900	245,570
Chambers-Ferland	.....	128,900
City of Cobalt	.....	60,000
Cobalt Lake	.....	131,400
Cobalt Townsite	.....	249,740
Coniagas	215,800	504,450
Crown Reserve	.....	219,740
Hudson Bay	.....	61,240
La Rose	237,240	581,330
Kerr Lake	.....	421,223
McKinley-Darragh	50,960	513,620
Nipissing	62,200	1,071,210
O'Brien	.....	79,200
Peterson Lake (Little Nip.)	.....	58,430
Right-of-Way	64,670	193,550
Silver Cliff	.....	47,920
Temiskaming	75,465	221,285
Trethewey	42,000	139,250

The shipments for the week were 809,265 pounds, or 403 tons.
In 1910 the shipments amounted to 34,420 tons; in 1909, they ere 30,096 tons, valued at $12,456,301.

BRITISH COLUMBIA ORE SHIPMENTS.

The following are the returns of the ore production and movement for the past week ending January 21st and for the year to ate:

Boundary Shipments.		
Granby	21,881	66,434
Mother Lode	6,498	22,022
Snowshoe	1,730	5,445
Rawhide	5,742	12,903
Jack Pot	413	1,242
Number Seven	107	258
Other mines	.....	240
Total	36,371	108,544
Rossland Shipments.		
Centre Star	3,836	11,022
Le Roi No. 2	339	1,343
Le Roi No. 2 milled	300	900
Le Roi	277	719
Other mines	.....	74
Total	4,752	14,058
Slocan-Kootenay Shipments.		
Sullivan	152	1,251
St. Eugene milled	2,775	8,325
Richmond-Eureka	99	216
Ruth	33	69
Rambler-Cariboo	61	175
Hewitt	22	69
Queen milled	420	1,260
Granite-Poorman milled	250	750
Nugget milled	110	330
Wilcox milled	75	225
Emerald	42	142
Standard	59	122
Society Girl	62	96
Silver Bell	14	14
Utica	21	21
Beatrice	29	29
Other mines	.....	346
Total	4,224	13,440

The total shipments for the week, including the estimated milling, were 45,347 tons, and for the year to date, 136,042 tons.

B. C. COPPER CO.'S RECEIPTS.

Greenwood, B.C.

Mother Lode	6,498	22,022
Rawhide	5,742	12,903
Jack Pot	413	1,242
Other mines	.....	240
Total	12,653	36,407

GRANBY SMELTER RECEIPTS.

Grand Forks, B.C.

Granby	21,881	66,434

CONSOLIDATED CO.'S RECEIPTS.

Trail, B.C.

Centre Star	3,836	11,022
Snowshoe	1,730	5,445
Sullivan	152	1,251
Le Roi No. 2, part con.	339	1,343
Le Roi	277	719
Number Seven	107	258
Richmond-Eureka	99	215
St. Eugene	127	307
Ruth	33	69
Rambler-Cariboo	61	175
Hewitt	22	69
Standard	59	122
Emerald	42	142
Society Girl	62	96
Queen concentrates	75	75
Granite-Poorman con.	42	42
Silver Bell	14	14
Utica	21	21
Beatrice	29	29
Other mines	.....	420
Total	7,127	21,835

The total receipts at the smelters for the week, including concentrates, were 41,661 tons, and for the year to date, 124,676 tons.

BRITISH COLUMBIA COPPER RECORD.

The British Columbia Copper Company wound up the calendar year 1910 with the best monthly production ever made—973,700 pounds of copper, which brought the year's total up to 9,411,290 pounds.

UNITED STATES PETROLEUM PRODUCTION.

The annual official report on the production of petroleum in the United States for 1909 has just been published and shows that the quantity obtained amounted to 182,134,274 barrels, as compared with 178,527,355 barrels in the previous year. With regard to the production of individual States, California was easily first, with Oklahoma and Illinois second and third respectively. Consumption of oil fuel by the railroads is steadily advancing and for the year reached a total of 19,939,394 barrels, against 16,889,070 barrels in 1908. Referring to the introduction of oil fuel into the United States Navy, the report states that it has been quite as rapid, and with fully as good results as had been anticipated.

TORONTO MARKETS.

Feb. 9th (Quotations from Canada Metal Co., Toronto):

Spelter, 5.60 cents per lb.
Lead, 3.65 cents per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 44 cents per lb.
Copper, casting, 13.25 cents per lb.
Electrolytic, 13.25 cents per lb.
Ingot brass, 8 to 12½ cents per lb.

Feb. 9th—Pig Iron (Quotations from Drummond, McCall Co., Toronto):

Summerlee No. 1, $23.00 (f.o.b. Toronto).
Summerlee No. 2, $22.50 (f.o.b. Toronto).
Midland No. 1, $20.00 (f.o.b. Toronto).
Midland No. 2, $19.50 (f.o.b. Toronto).
Hamilton No. 1, $18.75 (f.o.b. Hamilton).
Hamilton No. 2, $18.25 (f.o.b. Hamilton).
Clarence, $20.00 (f.o.b. Toronto).
Cleveland, $20.00 (f.o.b. Toronto).

GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼ inch lump.

Coke.

Feb. 7th—Connellsville Coke (f.o.b. ovens).
Furnace coke, prompt, $1.40 to $1.50 per ton.
Foundry coke, prompt, $2.00 to $2.15 per ton.
Feb. 7th—Tin (Straits), 41.00 cents.
Copper, prime lake, 12.70 cents.
Electrolytic copper, 12.40 to 12.50 cents.
Copper wire, 14.00 cents.
Lead, 4.50 cents.
Spelter, 5.65 cents.
Sheet zinc (fo.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.25 cents.
Aluminium, 21.75 to 22.00 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $38.50 per ounce.
Platinum, hard, $41.00 per ounce.
Bismuth, $2.00 to $2.10.
Quicksilver, $42.00 per 75 lb. flask.

SILVER PRICES.

	New York. cents.	London. pence.
January 21	53	24½
" 23	53	24½
" 24	53¼	24 9/16
" 25	53¼	24 9/16
" 26	53	24½
" 27	52⅞	24 7/16
" 28	52⅞	24 7/16
" 30	52¾	24⅜
" 31	52¾	24⅜
February 1	52¾	24⅜
" 2	52¾	24 5/16
" 3	52⅝	25¼
" 4	52⅝	24¼
" 6	51¾	23⅞
" 7	52	24

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous, February 9th, 1911.	Bid.	Ask.
Amalgamated Asbestos	10	..
Black Lake Asbestos	15	15½
Dominion Coal	..	..
Dominion Steel	..	..
Dominion Steel Corp.	58¾	59
Granby	35	37
Consolidated Mining	45	50
Nova Scotia Steel	97	..
Crow's Nest Pass	..	77
Cobalt Stocks.		
Amalgamated	.03	Sellers
Bailey	.05¼	.06
Beaver Consolidated	.36	.36⅛
Buffalo	2.00	2.30
Chambers-Ferland	.12⅞	.13¼
City of Cobalt	.19	.21
Cobalt Central	.09½	.10
Cobalt Lake	.15	.15¼
Coniagas	6.60	6.75
Crown Reserve	2.64	2.70
Foster	.05	.07
Gifford	.02	.03
Great Northern	.10¾	.11½
Green Meehan	.01½	.02
Hargraves	.19¾	20½
Hudson Bay	1.05	1.15
John Black	.01	.02½
Kerr Lake	7.00	7.25
La Rose	4.88	4.90
Little Nipissing	.06¼	.06⅜
McKinley	1.61½	1.62
Nancy Helen	.02	.04½
Nipissing	10.90	11.00
Nova Scotia	.14	.16
Ophir	.08	.12
Otisse	.01½	.01¾
Peterson Lake	.14	.14½
Right of Way	.14	.14¼
Rochester	.03⅜	.03½
Silver Leaf	.05¼	.06¼
Silver Bar	...	...
Silver Queen	.02	.05
Temiskaming	.88⅛	.88⅞
Trethewey	1.08	1.12
Watts	.05	Sellers
Wettlaufer	1.02	1.05
Hollinger	4.50	4.51
New York Curb.		
British Columbia Copper	06⅝	06⅞
Butte Coalition	18¼	19
Chino Copper	22	22⅛
Davis-Daly Copper	01¼	01½
Ely Consolidated	33	35
Giroux Mining	06½	06 9/16
Goldfield Consolidated	06⅝	06¾
Greene-Canadian	06⅜	06½
Harcuvar Copper	02	03
Inspiration Copper	08 1/16	08 3/16
Miami Copper	20¼	20½
New Baltic Copper	...	...
Nevada Con. Copper	19	19⅛
Ohio Copper	01 11/16	01 13/16
Rawhide Coalition	03	04
Ray Central	01 9/16	01⅝
Ray Consolidated	17⅝	17⅞
Union Mines	5/16	⅜
Yukon Gold	04	04⅛

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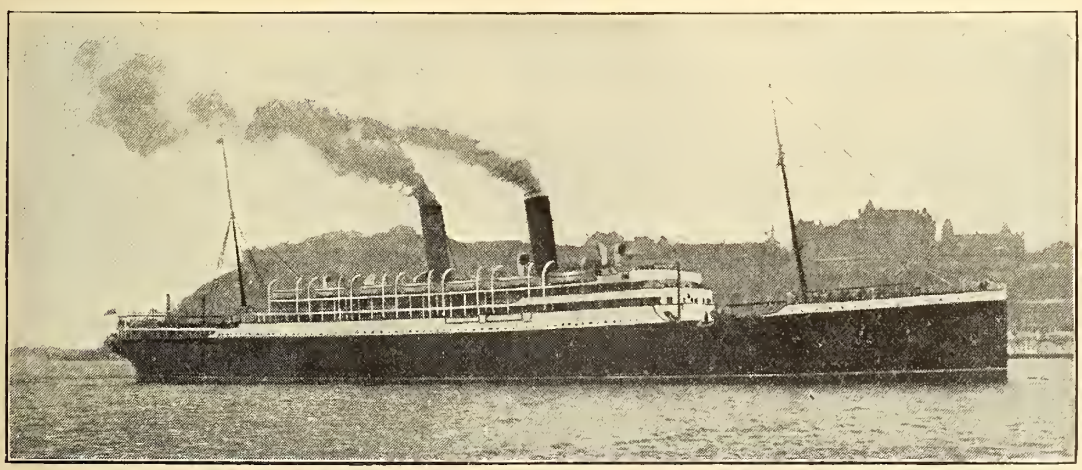

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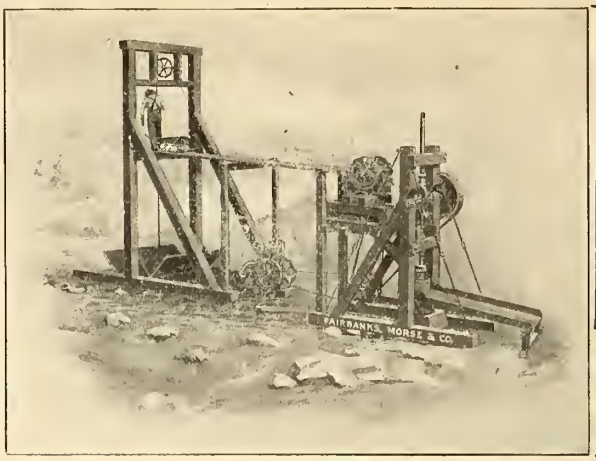

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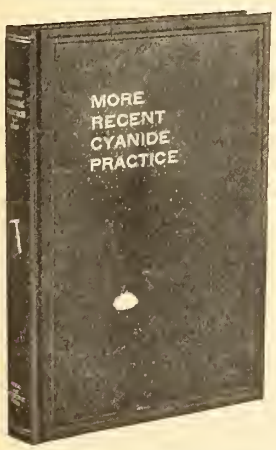

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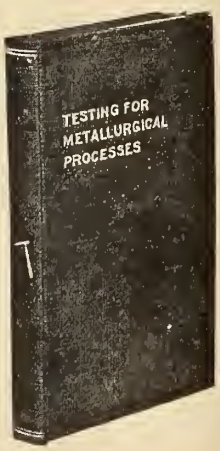

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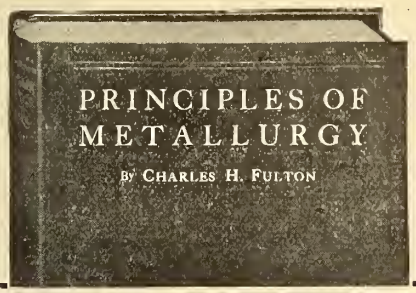

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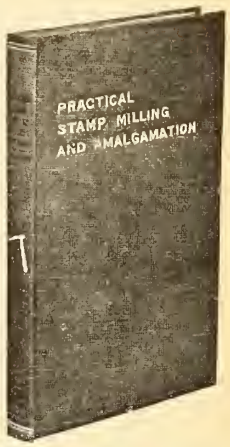

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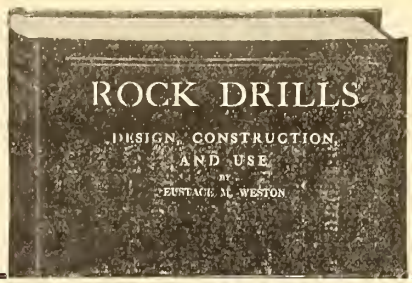

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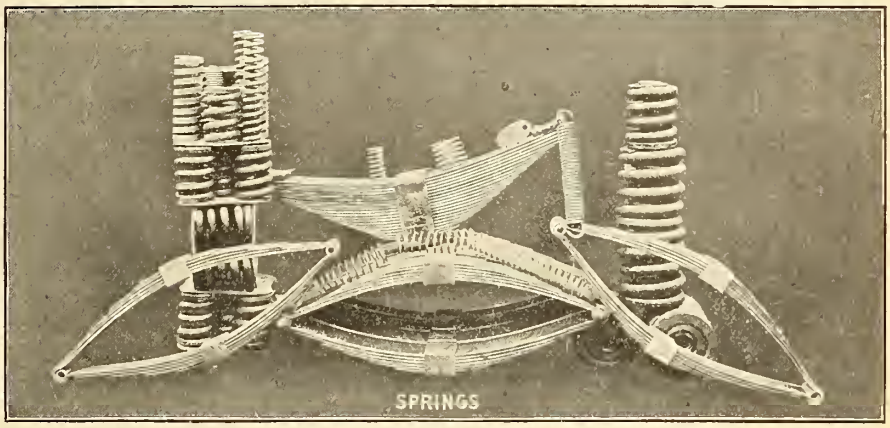

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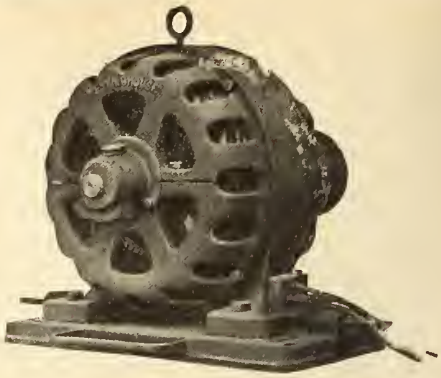

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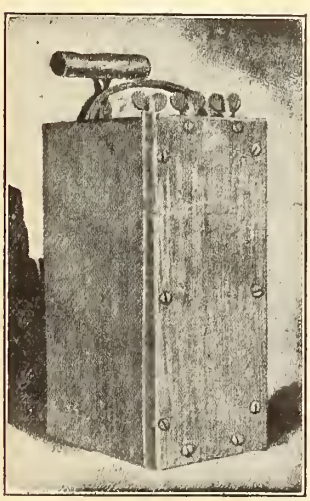

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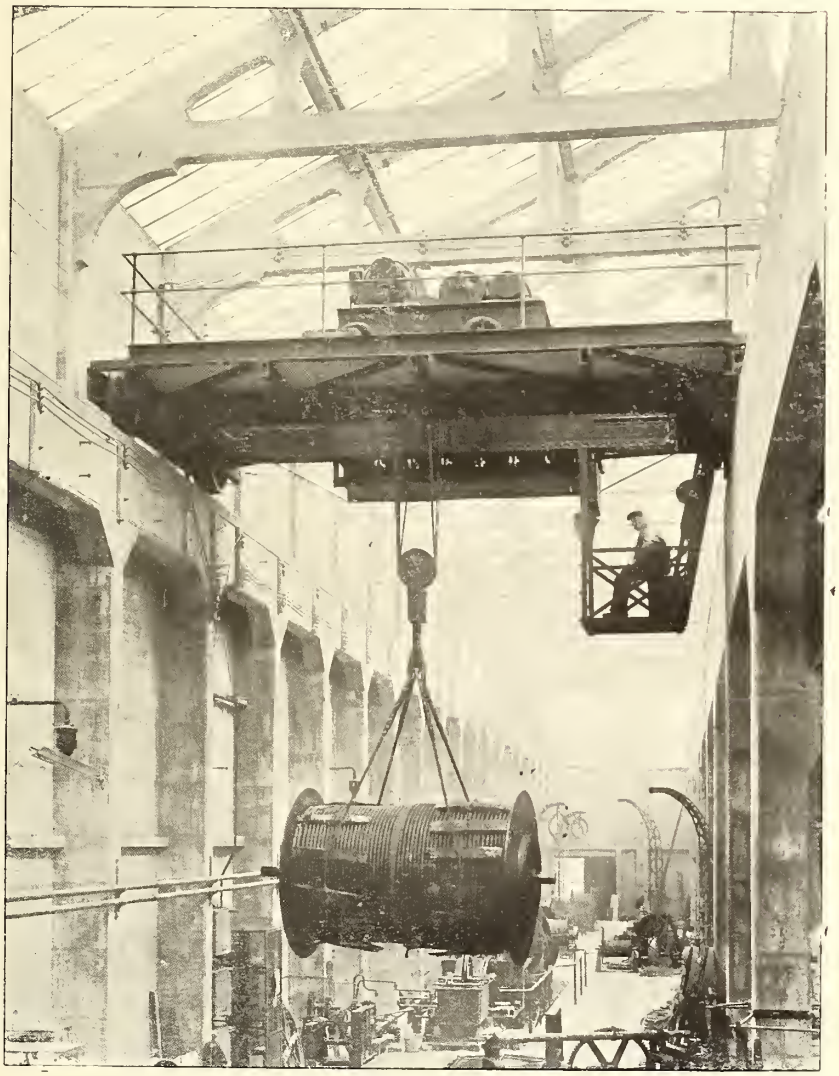

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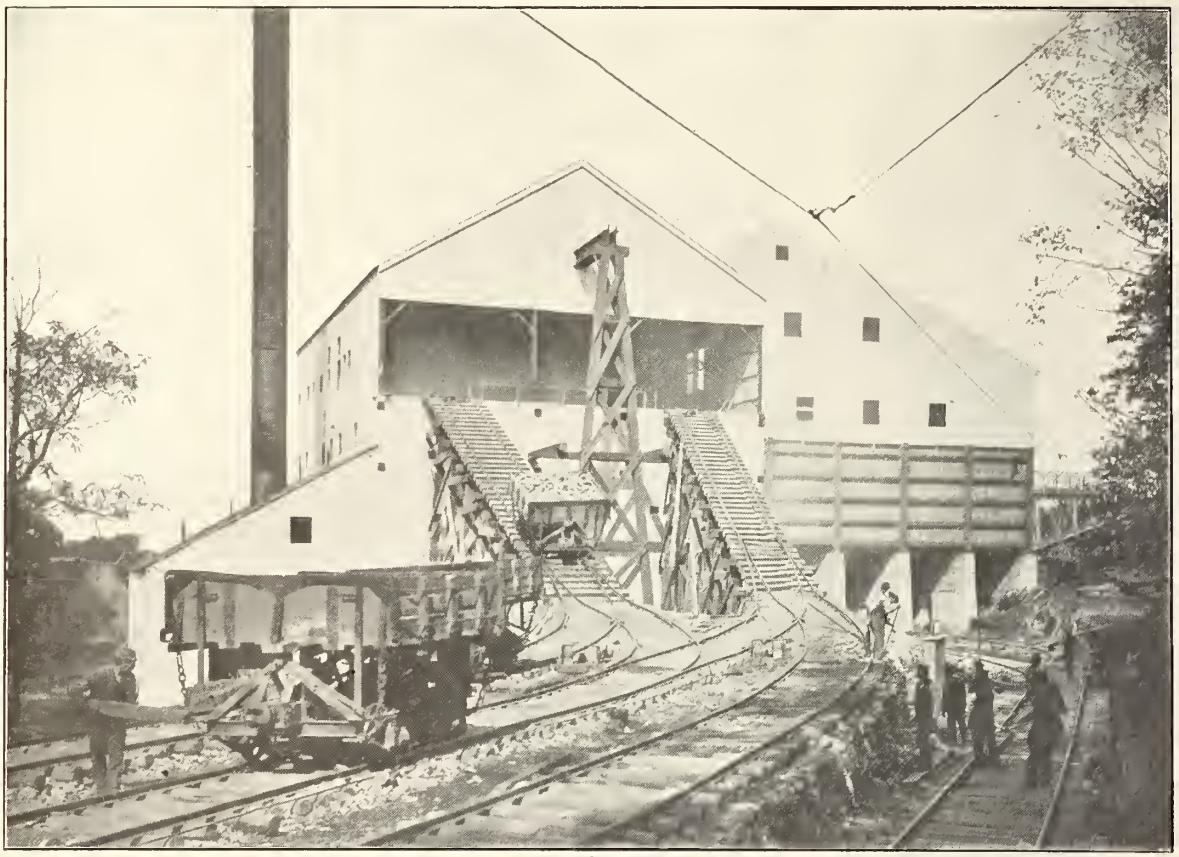

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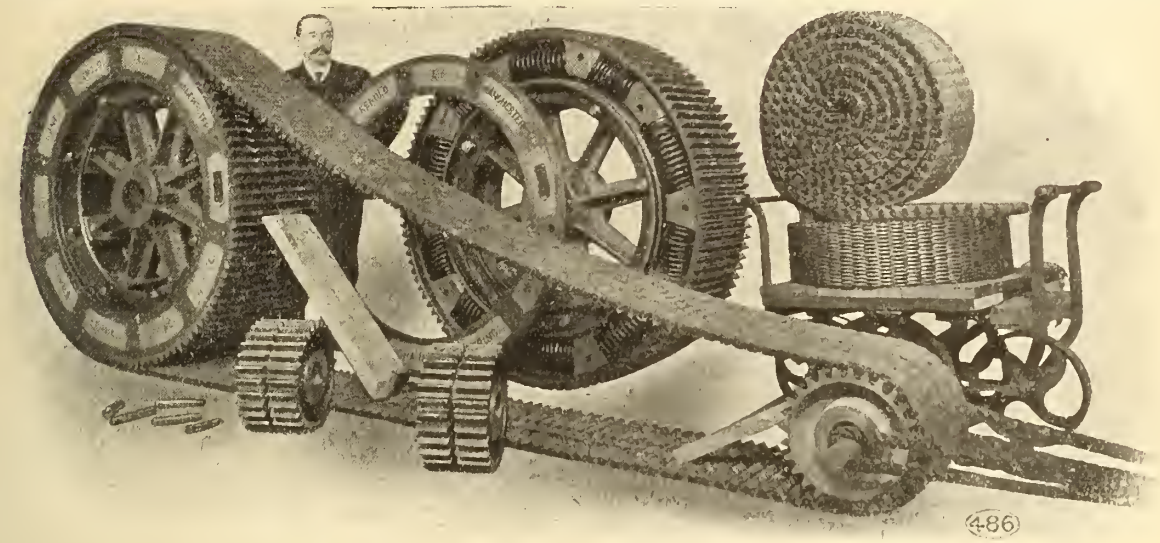

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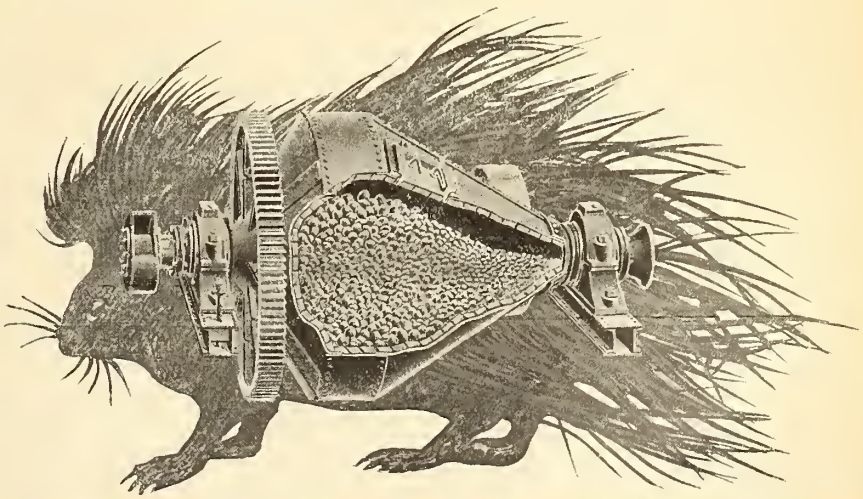

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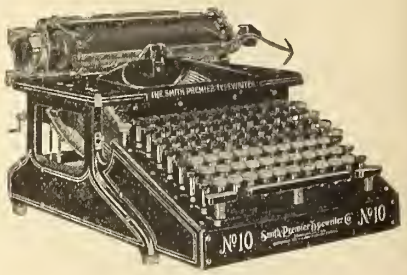

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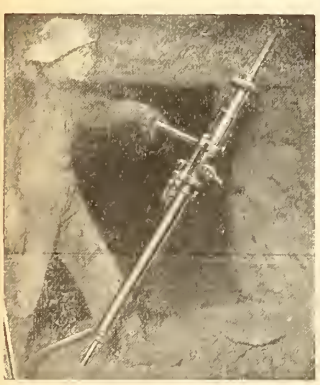

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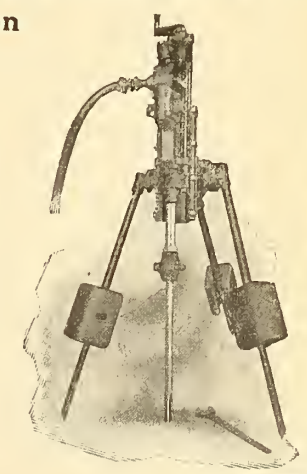

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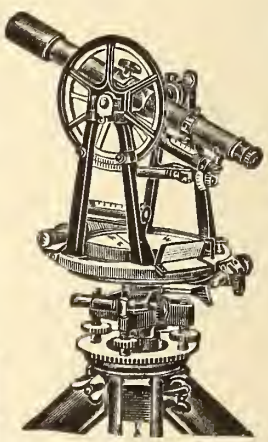

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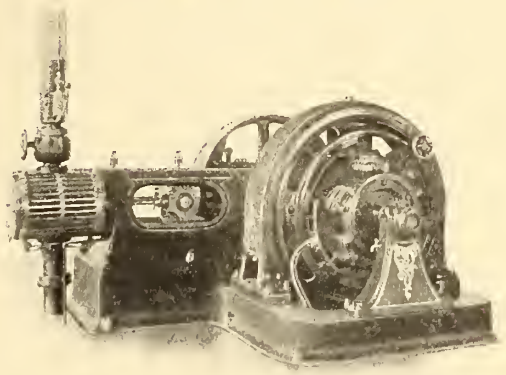

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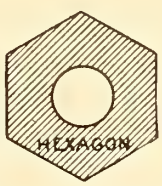

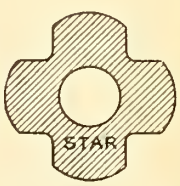

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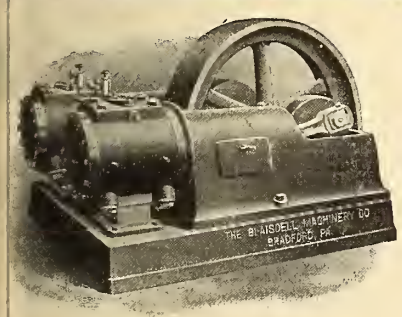

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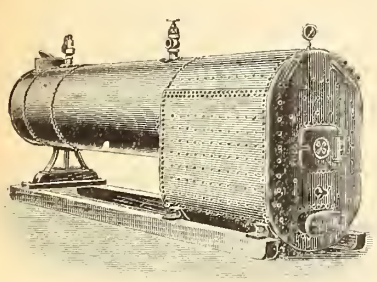

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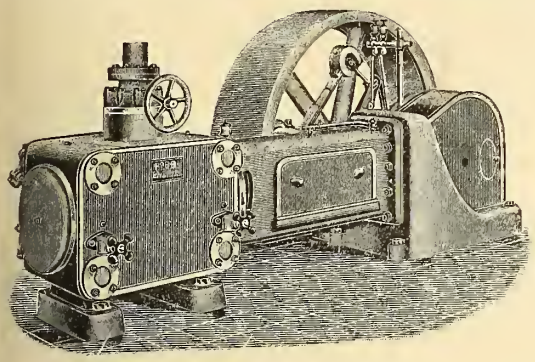

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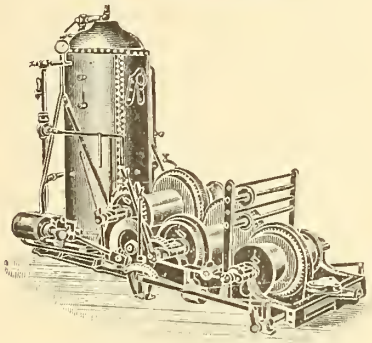

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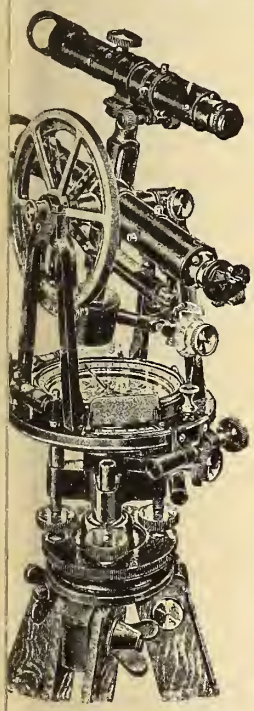

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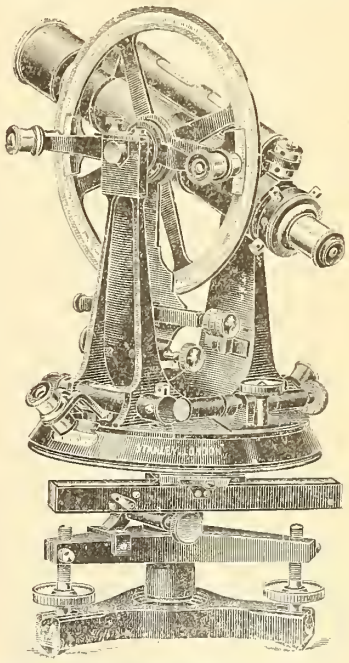

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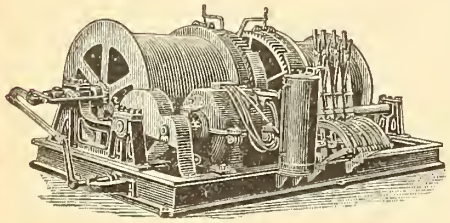

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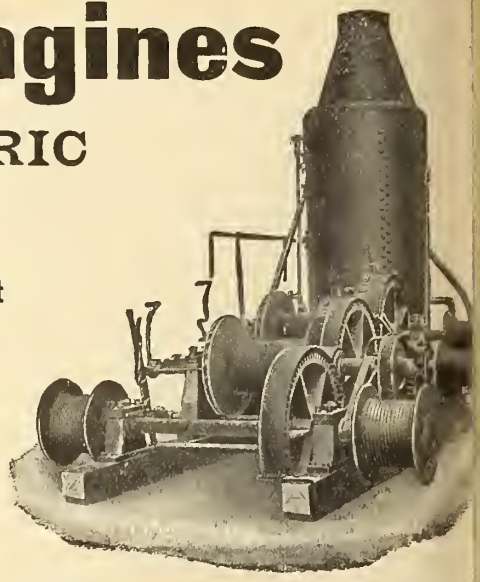

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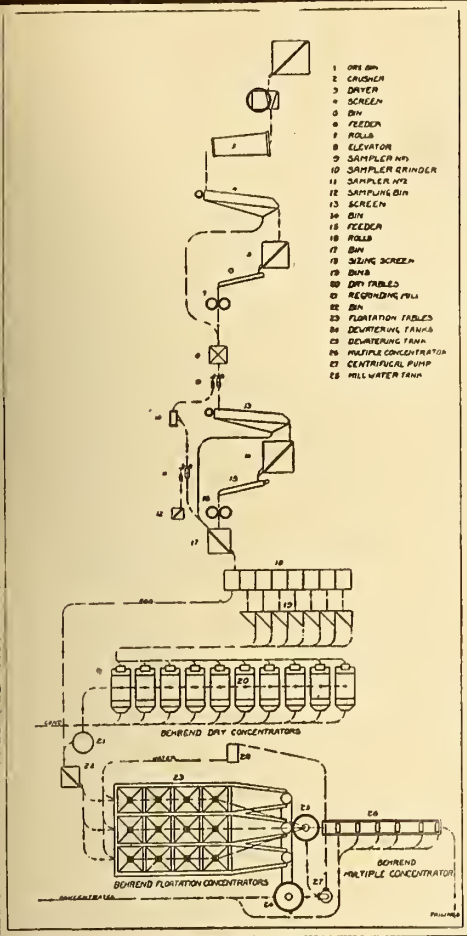

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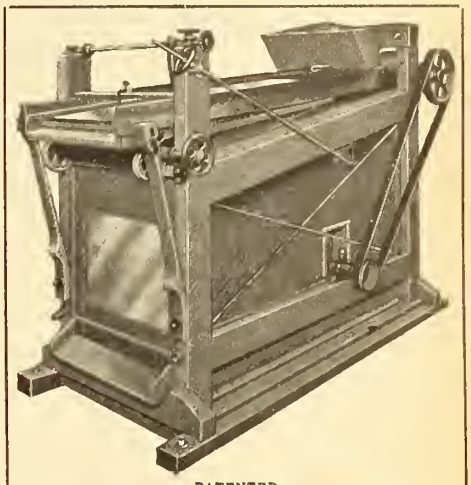

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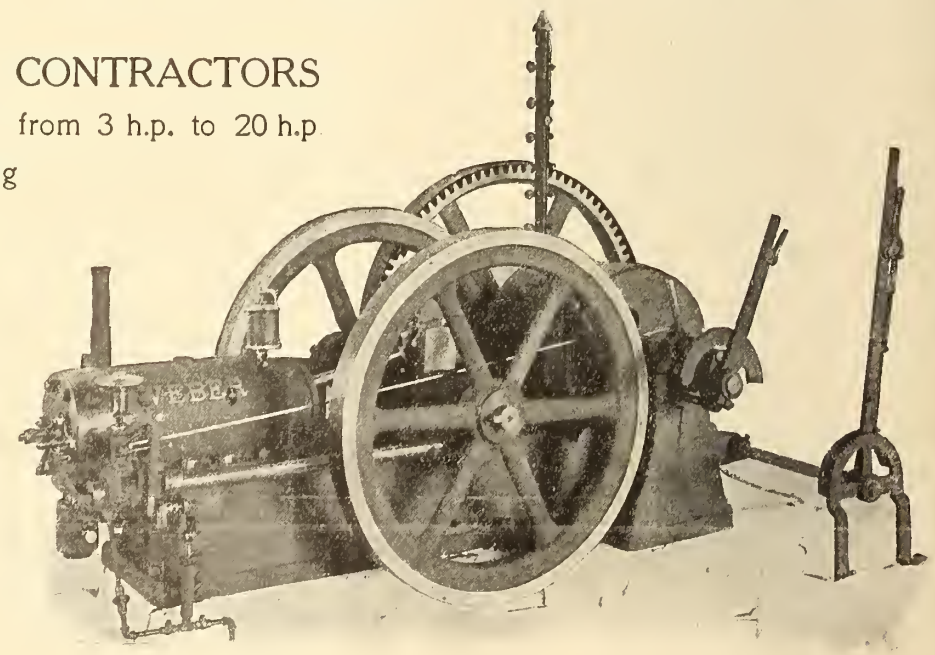

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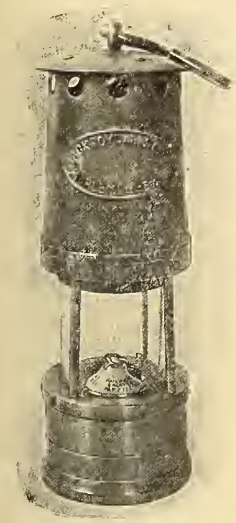

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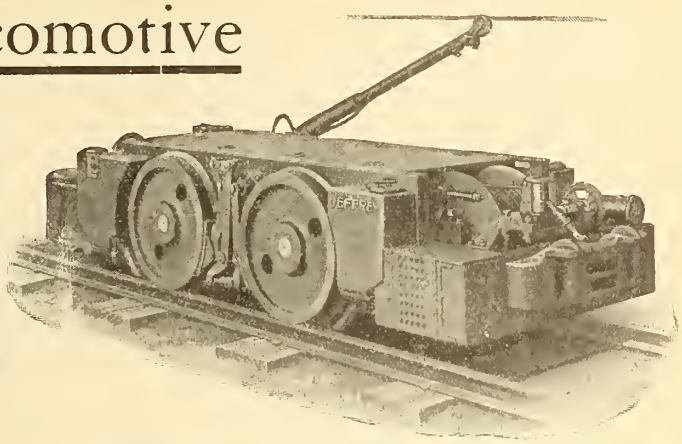

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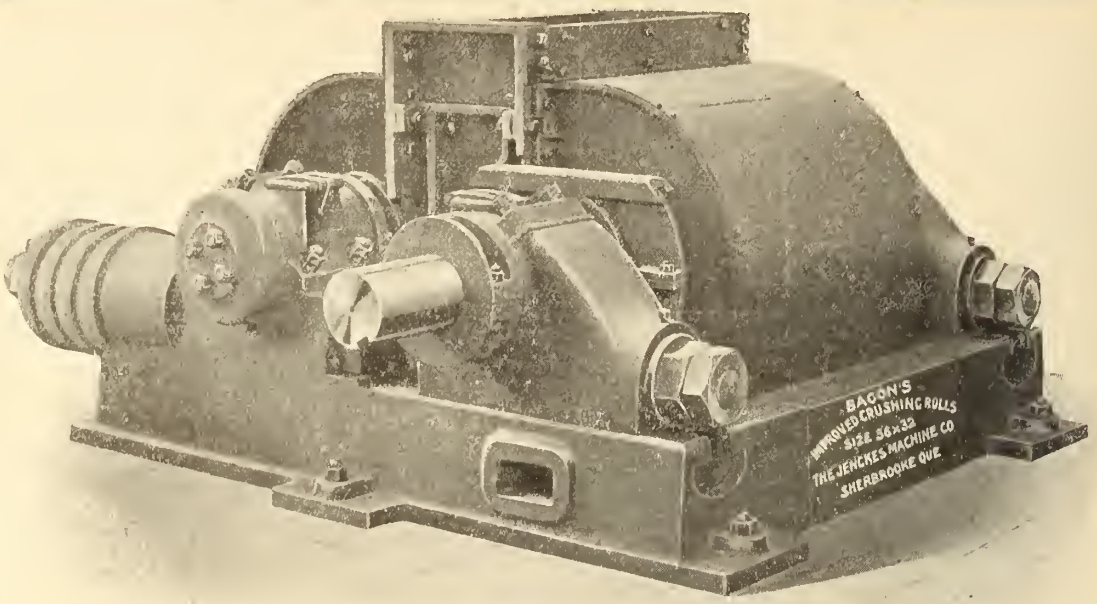

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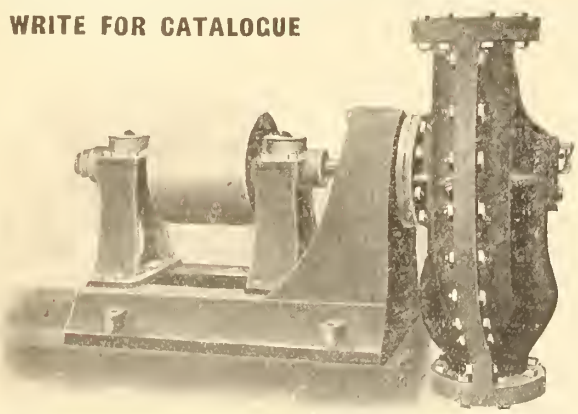

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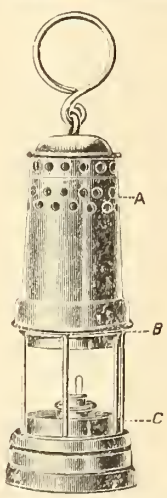

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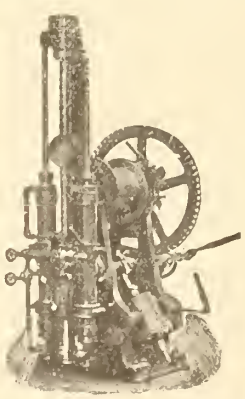

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THE CANADIAN MINING JOURNAL

VOL. XXXII. TORONTO, March 1, 1911 No. 5

The Canadian Mining Journal

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THE PASSING OF NICKEL.

We remember the horrid joy that was ours in reading long ago a novel writ by a talented female. The hero was a mining engineer. He was a strange compound of self-abnegation, silent sentiment, and improbable genius. He led the maiden that he loved through parlous stopes, winzes, and sumps with no regard at all for the law of gravitation. Unless our memory fails, the progress of the two was equally easy in all the workings of the mine. They walked down a ladderless winze as readily as they sauntered up an almost vertical stope. This is mining from the viewpoint of fiction.

Not less entrancing is fiction from the viewpoint of mining. And our exhibit was warm from the press but a few weeks ago. It is a short, all too short, phantasy in the American Review of Reviews, January, 1911. The artist is Dr. David T. Day, of the U. S. Geological Survey. The title is prosaic enough. It suggests nothing of the tingling inwardness of this tabloid romance. Who would or could imagine that under the caption "The Platinum and Nickel Industries" a staid geologist would have cavoorted through the iridescent realm of dreamland! But Dr. Day has thus cavoorted. Let us gambol after him for a space.

Dr. Day's word etching is elegiac; it is the funeral-song of the nickel industry. Platinum also provides a presumptive corpse, but platinum's untimely demise brings no tears to our eyes.

The first picture upon Dr. Day's small canvas is almost pastoral in effect. "For thirty years one strong personality, Joseph Wharton, a Quaker merchant of Philadelphia, ruled the nickel market in peace and prosperity. . Wharton ruled partly by being a great metallurgist, . . but chiefly by his untiring vigilance as a merchant. He ruled until foreign ores of New Caledonia and of Canada pressed their demands."

Despite Wharton's "vigorous protest," the obstreperous foreign ores knocked a hole in the tariff. United States citizens proceeded to operate the Canadian nickel mines, on the plea that their country called for armour plate. Wharton, with Christian resignation, "closed the only considerable nickel mine in the United States and submissively [mark the word!] changed his activity from mining and smelting nickel ores to making government nickel steel at his Bethlehem Iron Works. His reign passed to the International Nickel Company, which controls the nickel supply of the world, and, lacking Wharton's shrewd knowledge of trade principles, has tried to force a great supply upon a market that does not exist." Briefly, the nickel trade is moribund, the trust is an aggregation of visionaries, and there is no balm in Gilead.

That our readers may be able to appreciate fully the playful inversion of fact in the foregoing obituary, we shall skim lightly over the early and actual history of Mr. Wharton's connection with nickel. This is what truly befel. In the year 1863, Mr. Wharton purchased the Lancaster Gap nickel mine. The ore was exceedingly low grade, carrying only 1½ per cent. nickel. In the same year he started his nickel works at Camden. When, in 1887, the Canadian Copper Company put their ores on the market, Mr. Wharton immediately and naturally purchased these in preference to his own. Consequently the output from Lancaster Gap diminished.

Two years later, Mr. Wharton commenced to purchase matte from the Canadian Copper Company. As this was by far the cheapest way for him to obtain raw material, he decided, in 1891, to close the Lancaster Gap mine. Mr. Wharton's "vigorous protest" is, therefore, hardly visible to the naked eye. We may add that, when the International Nickel Company was organized in 1902, Mr. Wharton was one of the active promoters. And we are not credibly informed that he ever saw grave conflict between duty and pleasure, in accepting additions to his bank account from the corporation.

So much for Dr. Day's Quaker patriot. As for the International Nickel Company, we regret to state that, notwithstanding the crass stupidity of its directors, it has increased its business by 40 per cent. within the last twelve months. We hardly know whom to blame, but we fear mightily that one funeral at least will have to be postponed *sine die*.

RECIPROCITY ONCE MORE.

On another page will be found a letter from Mr. G. H. Gillespie commenting upon our attitude towards reciprocity. Mr. Gillespie, being vitally interested in better trade relations with the United States, is an out and out free-trader. Against heavy handicaps he has built up a considerable business in one mineral commodity. Like many other ambitious operators, he is anxiously waiting for the chance to get into the United States markets on equal footing with United States operators. Mr. Gillespie's opinions are coloured by his business interests. This does not in the least detract from their value; in fact, it lends force and sincerity to his argument.

Before touching upon our correspondent's letter, it is appropriate to make a few remarks upon the question of reciprocity as a national issue. And, since our newspapers are the prime moulders of public sentiment, we must here and now express our extreme distaste for the kind of childish twaddle that is being circulated by the partizan elements of the daily press. The worst offenders are in the ranks of the opposition. The silly fiction that United States politicians are conspiring to wrest our heritage from us is as baseless as it is absurd. As well might Diaz have designs upon the throne of England. The equally febrile fancies that a modicum of free trade corrodes our loyalty to the Empire and implies commercial ruin, are not worthy of serious consideration. Loyalty and nationhood are not functions of tariffs. Neither is a tentative measure of reciprocity a menace—it is merely a political lever for opening new channels of trade. The men who have brought it about are not traitors—they are merely much harassed politicians, who are doing their utmost to mend an exceeding bad tariff. And, in so far as the mining industry is affected, they have mended and not marred. That there is anything sinister in this we cannot believe.

Canada's total trade with the United States amounts to about $355,000,000 per annum. Of this amount, exports to the States from Canada total $115,000,000; whilst imports from the States run up to $245,000,000. Contrasting this with our trade with the whole British Empire, we find that the total imports and exports are only $277,000,000. Imports from the British Empire amount to $112,000,000; and exports from Canada to all other parts of the Empire are put at $165,000,000. Thus our total trade with the United States is 22 per cent. larger than our trade with the whole of the British Empire. And it is to be noted that as regards the States there is a balance of trade against us of $130,000,000; whilst within the Empire the balance to our credit is $53,000,000.

In view of these facts it appears that, under existing tariff arrangements, we are certainly not on a satisfactory basis with our largest customer. Reciprocity, *per se*, is obviously to be desired. Reciprocity, as arranged at Washington, may or may not give us the worst of the bargain. That is a matter to be determined by the passage of time, and by the statesmanship of our ministers.

Meanwhile, the point made by Mr. Gillespie is strong. If too few concessions have been made to the mining industries, we have ourselves to blame. What concessions have been granted may be credited to a few active individuals who are enterprising enough to see when and how their bread is buttered.

UNDERGROUND VISITORS.

By no means unmixed blessings are visitors in mining camps. Especially during booms, mine managers and superintendents are too frequently pestered by a horde of persons who wish to go underground. In this country the rule practically is either to have the mine open to everyone, or to admit no one underground. This arrangement does not work well. While a manager cannot be blamed for declining to waste the time of himself or his staff in showing through the mine numerous visitors, many of whom are entirely ignorant of mining and are influenced merely by idle curiosity, still professional etiquette requires that men having a knowledge of mining or of ore deposits should be afforded facilities for visiting the underground

workings. This is best for science and best for the company. Yet the casual visitor is an unmitigated nuisance. Something must be done to exclude him. But is there not a middle road between indiscriminate admission and total exclusion?

One apparently workable scheme suggests itself. Would not the charging of a small fee, say one dollar for each visitor, tend to keep out those who are influenced merely by idle curiosity? Fees collected could be devoted to the miners' hospital, or to a benevolent or accident fund. Before going underground each visitor would be required to purchase at the mine's office a ticket of admission. Idle curiosity would hardly survive this cold touch, while no trifling levy would deter the responsible inquirer.

Some years ago the subject was dealt with by the president of the Institution of Mining and Metallurgy as follows:

"When dealing with this subject, I should like to make a vigorous protest against the system, now happily becoming more and more rare, of closing mines to the public. No doubt in each case where it is being done, or has been done, plausible reason can be given. I think, however, there is a great deal of sound common sense in the old, but somewhat homely, saying that the 'proof of the pudding lies in the eating,' and in this sense the result has, in the majority of cases, been unfortunate for the general public. If a mine is owned by an individual, or a few large shareholders, there is, no doubt, a perfect right to close it against visitors. In the case, however, of a mine which is owned by a public company, the shares of which are actively dealt in, and which the public are invited to buy and sell freely, the same argument, I maintain, does not apply.

"Personally, I always regard a mine which makes great difficulty about letting visitors go underground, and will not give information freely about the workings, and so on, with the very greatest suspicion, and have found that events usually justify that view. In the last four or five years three mines have come under my notice which were subsequently the cause of a so-called mining scandal, and it is worth noting that in each case great mystery was made about giving any information concerning the workings to visitors, and difficulty was made in regard to going underground.

"It would appear that if anything is kept concealed about a mine, some astute individual is pretty sure sooner or later to turn it to his own advantage at the expense of the public.

"A system which seems to have a great deal to recommend it, is for the manager to be empowered to regard all information regarding his mine as open to the public, after it has been reported to the head office, and sufficient time has elapsed to allow for its publication. This system is being acted on in some of the best-managed mines, and I have not heard the managers complain about it, while the protection thereby afforded to the public is very considerable."

Without a doubt we suffer from both extremes in Canada. The wide-open mine is too often burdened with giggling "trippers"; the mine that is sealed to the public is made the object of false and injurious rumours. Examples of the latter are not far to seek. Both extremes are costly; both are unfair and unwise.

The imposition of an admission fee would place the visitor in a better position. It would remove from his mind, in part at least, the feeling that he is getting something for nothing. It might also, as suggested above, do something to ameliorate the hardships that miners too often have to tolerate.

THE STANDARDIZATION OF MINE ACCOUNTS.

Following up its excellent work in the direction of standardizing, the Institution of Mining and Metallurgy now publishes the report of a special committee on mine accounts and cost sheets.

The report mainly deals with the allocation and grouping of expenditure, and lays down certain principles, adherence to which will, amongst other advantages, facilitate the comparison of costs at different mines. It is frankly acknowledged that absolute uniformity is not to be hoped for; but the same general plan can be followed by all operators.

Capital account, profit and loss, working accounts and cost sheets, are the heads under which the report is divided.

Under capital account fall all expenditures before the producing stage is reached. It is recommended that all main shafts or adits be charged direct to capital. Incline shafts that develop ore, subsidiary shafts, winzes or other workings that have assisted ore development, should be charged to underground development, and may remain chargeable to capital or be treated as a temporary development account. All other expenditure before production is attained should be placed in a "general expenditure account"; after the producing stage is reached these should be distributed proportionately after deducting any revenue that may have been received.

After the producing stage is reached, only large special items should be charged to capital account. Purchase of additional property, sinking of new main shafts, the erection of new building, and the purchase of new plant, are the items specified here. All repairs, minor replacements, and all maintenance are to be charged to working costs. The report strongly condemns the charging to capital account items that should be included in working costs.

When production has commenced, all underground work should be charged to development account; or, as an alternative, all development may be treated as a temporary account, in which case this temporary account is to be gradually extinguished by progressive transference to the working account.

Bullion, concentrates, and other marketable products should be shown as assets in the balance sheet and

credited to revenue account at net valuation. Unfinished products should be reckoned only at cost, provided such cost does not exceed market value.

Depreciation, as regards the mine, should be covered by special reserve funds, accumulated out of revenue. As regards machinery, plant, etc., suitable provision also should be made from revenue. The percentage written off should be based on original cost, and not on the balance standing in the books at any subsequent date.

Eight main heads are recommended for classifying all expenditure. These are:—1, Development. 2. Extraction of ore. 3. Sorting at surface, preliminary crushing, and transport. 4. Reduction costs. 5. Administration charges and general charges at mine. 6. Realization charges on products. 7. Taxes and royalties of all kinds, shown separately. 8. Head office charges. Each of these heads is discussed separately. There follows a lengthy memorandum covering each item exhaustively. This, together with the general report, will be reprinted in a later issue of the Canadian Mining Journal.

Comparison of the annual reports of Canadian mining companies proves at once the fact that few such companies follow any rational system of accounting. In fact, the whole responsibility is usually left on the shoulders of an accountant at the head office who may never have seen a mine in his life. Not only is the result grievous to the shareholder, but all possibility of arriving at actual costs is precluded. Capital account is handled in surprisingly various ways. Working costs are frequently artificially reduced by padding capital charges. In divers other ways the annual statement is robbed of meaning and value.

A careful perusal of the report will go far towards removing the misconceptions that now mar the work of mine accountants. But the most important conclusion that can be reached is that the engineer in charge must concern himself in the allocation of expenditure much more than he does at present.

THREE COMPANIES.

To satisfy many inquirers we present here a few facts relating to three of the large mining corporations that have displayed practical interest in the Porcupine gold district.

The Anglo-French Exploration Company, Limited, was organized in 1889. The authorized capital is £1,000,000, in 500,000 preference and 500,000 ordinary shares of £1 each. The dividends paid on ordinary shares, since 1893, have ranged from 8 per cent. to 50 per cent. For three years, 1905, 1906, and 1907, no dividends were declared. In 1908, 10 per cent., and in 1909, 12½ per cent. dividends were distributed. Profits for the calendar year 1910 amounted to £242,333. Mr. William Frecheville, who visited Porcupine last autumn, is a director. Mr. J. B. Tyrrell, Toronto, is retained by the company to look after its Canadian interests.

One of the early purchasers was the Consolidated Gold Fields of South Africa, Ltd. This company was organized in 1892. Its authorized capital is £3,250,000, divided into 1,250,000 six per cent., cumulative preference shares of £1 each, and 2,000,000 ordinary shares of £1 each. Dividends on the common have ranged from 12½ per cent. to 125 per cent. The last three annual distributions were respectively, 20 per cent., 35 per cent., and 35 per cent. The net profits for the year ending June 30, 1910, were £993,382. Mr. H. H. Webb, the company's consulting engineer, was its representative in Porcupine.

The third of the trinity is the International Nickel Company, whose property, the Dome, has been much in the public eye. The International's authorized capital is $24,000,000, in 120,000 six per cent., non-cumulative preferred, and 120,000 ordinary shares of $100 each. There are also $8,912,836 five per cent. debentures, part of an issue of $10,000,000. Since September, 1909, one 1 per cent., and five 1½ per cent. dividends, together with an extra declaration of 25 per cent. last July, have been paid on the common. The last annual report shows a profit of $2,067,528 for the year.

There is something extremely impressive about the history and standing of such companies. The fact that they are taking Porcupine seriously is worth more than numberless pages of newspaper touting. If the investments of the two British companies are successful, it is to be hoped that other Canadian districts will attract their attention. Distinctly it is this class of investor that we should encourage.

GOWGANDA'S GRIEVANCE.

The large delegation that waited upon the Premier of Ontario and his Ministers a few days ago, presented forcibly the claims of the Gowganda mining region for a government railway. The powers, though impressed, were not inclined to give immediate consent. It was decided that full investigation would be made. High hopes are entertained that Gowganda will be connected by rail with the outer world.

The Ontario Government in this instance is wise in taking its time. Some of the claims put forward by the delegation were unwarranted, and some of the statements made had little basis in fact. Gowganda does need transportation facilities. There is no doubt whatever of this. But calm deliberation brings us to the conclusion that a well built wagon road would meet all present requirements.

It is to be regretted that the Government wasted so much money on the road as it now stands. We are confident that, had the appropriation been carefully expended, the whole road from Charlton to Gowganda would now have been in excellent shape. Instead of this, there are long stretches of bare corduroy and only a minimum of good road. The Government is morally

bound, both for its own sake and because of its duty to the country, to retrieve this blunder.

Whether the Government is or is not called upon to build a railway remains yet to be demonstrated. The delegation's representations were vehement rather than eonvincing.

NOVA SCOTIA STEEL AND COAL.

If we may accept the annual report of the Nova Scotia Steel and Coal Company at its face value that corporation has had a really suecessful year. For the calendar year ending December 31st, 1910, a profit of $1,140,504.37 is shown. Reduction in fixed charges will now put the company in a position to bring its dividend on common up to 6 per cent. During the year additional capital to the extent of $1,500,000 was secured, but fixed charges were reduced by $50,000.

The financial statement sets at rest many adverse street rumours. The company is apparently sound financially. There is no question as to the value of its physical assets.

EDITORIAL NOTES.

Mr. John Hays Hammond has been appointed special ambassador for the United States at the coronation of King George. At that function Mr. Hammond will renew some warm South African friendships.

A two-page advertisement of the Eneyclopædia Britannica will be noticed in this issue of the Canadian Mining Journal. It is well worth study. The mechanical exploit of reducing these volumes to easily portable size is a triumph of modern book-making. Particularly interesting to mining and metallurgieal engineers is the list of contributors on subjects touehing their professions. Dr. J. S. Kemp, Dr. H. M. Howe, Dr. H. S. Munroe, Prof. R. Peele, Mr. Walter Hunter, and many others write on technical topics. As the Encyclopædia is also a compendium of nearly all human knowledge, and as the price set is well within the means of the majority of professional men, it should decorate many libraries.

Correspondence

Editor Canadian Mining Journal:

Sir,—I have read your editorial in Feb. 15th issue of the Canadian Mining Journal with a good deal of disappointment. The action of the Government, so far as it affects the mining industry, in my opinion calls for approval rather than for somewhat eryptic eomment.

I have reason to believe that your statements in the first part of your editorial concerning sulphite pulp are hardly correct. Are you aware that a good deal of sulphite pulp is at present made in Canada, and that not a pound of sulphurie acid is used for this purpose?

When you speak of genuine reciprocity, what do you mean, or has this sentence any meaning? Here I may instance the following mineral industries:—Canadian talc has free entry to the United States; so also have feldspar, fluorspar, and ground and crude mica. It is possible that with these concessions important new industries can be built up in Canada. Talc and feldspar which are exported largely in crude form, can now be ground in Canada. Fluorspar, which was practically worthless by reason of the inaccessibility of the Canadian market, can now be mined, milled, and shipped to Buffalo and Pittsburg, the natural market on a short rail haul. The Canadian industries that use fluorspar are not handicapped by having to pay a duty, and can now obtain their supply from British and American sources that are nearer them.

Are you aware that the real effect of the proposed measure of reciproeity is that we get free entry to half a continent on equal terms with American producers, and in that territory get the same protection from European competition as do United States produeers themselves? The United States tariff on ground talc is $20 per ton, on fluorspar $3 per ton, on feldspar 20 per cent. ad valorem, and on mica some $120 per ton. These are to be removed. In return for this the United States gets entry into our limited market, where it has to compete with European products that are not protected. European talc, fluorspar, mica, and feldspar have free entry into Canada.

Does this look like bad business from a mining standpoint? In your editorial you appear to be under the impression that the concessions made in favour of the mineral industry are too few. This is true, but who is to blame for it? Not the responsible minister, but those interested in the mineral industry, who were so indifferent that they made no representations at Ottawa. nor did they indicate what they desired. Had the whole field of the mineral industry been represented, I venture to say you would have seen a free list that would have covered all economic minerals.

Why blame the "temporizing politician" for what is obviously the fault of the industry? You ean hardly expect people to negotiate if they are not supplied with data to negotiate on. You cite the case of gypsum. I believe this is a case where there is no urgent need for change. There is now a sufficient home market to justify the construction and operation of a plant to supply the home market without the necessity of looking to a foreign market.

In my own experience the produetion of Canadian eeonomic minerals suffers from the fact that there is no developed home market. It is difficult, if not impossible, to establish a new industry if dependent upon a foreign market entirely. A business, to be successful, must have a substantial nucleus in its home market; the more so as all reduction or refining processes produce large quantities of by-produets, which will not stand transportation. The solution of this diffieulty in Canada is the free entry of such products into the United States market, which as it fills most of the requirements of a home market since it is easily aeeessible and is analagous in many respects to our own. It appears to me that, as the organ of the mining interests, your policy would be to endorse a bargain and the Government that made such a bargain, when that bargain aids some sections of the industry and harms none.

In due course of time I have no doubt that the limited reciprocity of the present arrangement will be extended to eover the full mineral industry to the great advantage of all eoncerned. Why not come out solidly for or against?

Yours, etc.,

G. H. Gillespie,
Madoc, Ont.

February 20th, 1911.

BOOK REVIEWS

DESCRIPTIVE MINERALOGY — With Especial Reference to the Occurrences and Uses of Minerals—By Edward Henry Kraus, Ph.D., Professor of Mineralogy, etc., University of Michigan—334 Pages—Blank Interleaves Throughout Text—Price $2.75—Published by George Wahr—Ann Arbor, Michigan, U.S.A., 1911.

Doctor Kraus has departed from the lines followed by Dana, and has followed the classification suggested by Groth, in which the simplest minerals are discussed first and the more complex, especially the silicates and allied compounds, last. No attempt is made to cover either optical mineralogy or rock minerals. The inclusion of information as to uses of minerals and statistics of production lends little value to the text.

The minerals are grouped according to their chemical composition and to the important principle of isomorphism. Ten classes are made:—

1. Elements.
2. Sulphides and analogous compounds.
2. Sulphides and analogous compounds of selenium, tellurium, arsenic, antimony, and bismuth.
3. Oxides, hydroxides, etc.
4. Haloids.
5. Nitrates, carbonates, etc.
6. Sulphates, chromates, molybdates, tungstates, and uranates.
7. Borates, aluminates, etc.
8. Phosphates, arsenates, etc.
9. Silicates, titanates, etc.
10. Organic compounds.

Dr. Kraus' book has merit. Typographically its arrangement is clear. It gives evidence of careful preparation. We hardly approve, however, of the attempt to convey economic facts by means of statistics that apply only to the United States.

In all probability the volume before us will be found quite as useful (and perhaps more so) for class-room instruction as the heretofore incomparable Dana.

THE MINING MANUAL FOR 1911—By Walter R. Skinner—A Record of Information Concerning Mining Companies—Twenty-Fifth Year of Publication—1372 Pages—Price $5—For Sale by the Book Department, Canadian Mining Journal—17-23 Manning Arcade Annex, Toronto, Ont.

Mr. Skinner's Mining Manual has frequently received notice in these columns. The 1911 edition, which has just reached us, is even more complete than its predecessors. And this is not faint praise.

As British and foreign capital is now coming into Canada at an unprecedented rate, and as numerous investors, promoters, engineers, and others are constantly in need of information concerning outside mining corporations, the Mining Manual supplies exactly what is needed. For instance, when newspaper despatches mention that prominent English investors are *en route* to Porcupine, or to Portland Canal, or to Cape Breton, the standing of these investors, or the history of their corporation can be discovered at once.

Within the volume are given particulars of 3,120 mining companies operating in all parts of the world. These particulars are concise and inclusive. The promoters, vendors, purchase consideration, and other such items are specified. Lengthy lists of directors and mining secretaries, and names and addresses of mining engineers, are also included.

We have no hesitation in warmly commending the Mining Manual to all our readers. Not only is it a convenience, but it is also highly educative.

Western Branch C.M.I.

The ninth general meeting of the Western Branch of the Canadian Mining Institute was held at Nanaimo, Vancouver Island, B.C., on February 16th. Two sessions were held—afternoon and evening—and these were well attended, and the proceedings proved of much interest.

Mr. W. F. Robertson, provincial mineralogist for British Columbia, chairman of the branch, presided. At the afternoon session the visitors were cordially welcomed by Ald. John Shaw (in the temporary absence from the city of Mayor Planta).

The chairman suitably acknowledged the cordiality of the welcome extended to the visitors. Mr. E. W. Parker, statistician in charge, Division of Mineral Resources, U.S. Geological Survey, responded to the chairman's request that he say a few words.

The first paper read was by Mr. Chas. Graham, superintendent of the Middlesboro Colliery, Nicola Valley, on "First Aid; Its Relation to Coal Mining." Mr. C. F. J. Galloway, B.Sc., next gave a synopsis of a lengthy compilation of reports on "Coal Mining in British Columbia."

In the evening the attendance included a number of coal miners desirous of hearing an address, by Mr. F. Napier Denison, F.R.M.S., of the Meteorologieal Office, Victoria, B.C., on "Earthquake Strains and Stresses in Relation to Coal Mine Explosions." This address was illustrated by lantern-slide views and diagrams.

During the evening the chairman presented five certificates courteously sent by the Dircetor of the U. S. Bureau of Mines, to the Provincial Department of Mines for men from British Columbia who had successfully taken the prescribed course of training in mine-rescue work at the U. S. Mine-Rescue Training Station, Seattle, Wash.

The secretary read from the Canadian Mining Journal the particulars published in its issue of February 1st relative to the late Fred Alderson, who heroically gave up his life to save an Italian miner at the Bellevue Colliery, Alberta, last October, and a resolution was adopted expressive of appreciation of the action of the Government of British Columbia in contributing $500 to the fund for the benefit of the late Mr. Alderson's widow and orphans. On a lantern-slide picture of Mr. Alderson being thrown on the screen, all present stood as a mark of respect to the memory of a brave man. Mr. Thos. R. Stockett, manager of the Western Fuel Company, informed the meeting that $600 had just been remitted as the contribution of the miners and officials of the local mines to the Alderson benefit fund.

On Friday a demonstration of the use of the Draeger oxygen breathing apparatus by men working in a chamber filled with irrespirable gases, was made at the Western Fuel Company's No. 1 mine. Afterwards a visit was paid to the Malaspina gallery, on Gabriola Island, near Nanaimo, which interesting phenomenon, formed by the action of the waves of the sea on the sandstone cliffs, near the entrance to Nanaimo harbour, was discovered in 1792 by Spanish naval offieers, Galiano and Valdez.

Saturday morning's train and steamer took the visitors away from Nanaimo *en route* to their respective homes, after one of the most pleasant and instructive meetings the branch has held.

At the Mount Bischoff mine, Australia, 19,000 tons of tin ore are treated per month. The average tin content is less than one per cent. The extraction is 90 per cent. By Cornwall practice only about 60 per cent. of the contained tin is recovered.

The Advance Made in the Manufacture of Peat Fuel in 1910

(Written for the CANADIAN MINING JOURNAL by ERNEST V. MOORE.)*

Much has been written from time to time, in Canada, on the subject of peat fuel manufacture. Outside of what is found in promotion literature, which is always interesting, some of the articles have been both interesting and constructive; but many of them have been simply a re-hash of peat platitudes accompanying descriptions of old machines in new words. The purpose of this article is to give some idea of what has been accomplished in 1910 that is new, in Sweden, but more particularly in Canada, and from an analysis of this work to make an attempt to overcome the suspicion and prejudice with which the investing public view anything connected with peat products, and to establish, if possible, instead, the feeling of confidence which the present conditions warrant.

After much pioneer work and extravagant experiment the practically unanimous concensus of opinion of those who are in a position to know, is, that it is folly to attempt to make peat fuel by any method other than what is known as the manufacture of machine peat. Owing to a natural peculiarity of the raw material, peat, if it is excavated and, while still containing 85 per cent. to 90 per cent. water, thoroughly macerated and pugged into a homogeneous plastic mass, and then moulded into convenient pieces and left out in the weather to dry, it dries and condenses into a piece of fuel, harder, tougher, and of higher specific gravity than the same raw material will make by any of the well-known and well-tried methods of artificial drying and briquetting. Further, peat so made differs from these briquettes in that the dry mass of machine peat is practically non-hydroscopic and will weather in a pile quite as well as coal. The operation, then, simply consists in excavating the raw peat, putting it through a machine that will macerate and grind it up, and then spreading it out in a layer of proper thickness to dry. Next, the layer is cut in two directions at right angles to each other into blocks of convenient size. Provision is made to leave the mass so spread exposed to the summer weather for from three weeks to two months, depending on the time of year and the dryness of the season. During this time these blocks may or may not be turned over and piled in little heaps as is found necessary. When dried down to about 25 per cent. to 18 per cent. water content, the peat is harvested into a storehouse, directly onto the railway cars, or built up in stacks on the drying field a finished fuel ready for the consumer.

All these operations are very simple, being little different from those almost any large contractor successfully performs almost every day in the year, and the problem, if problem there be, is simply how these operations may be carried out most cheaply. The question to answer is: With the methods available at present can these operations be carried out at such a cost as to make a commercial profit?

The experience of the Department of Mines would go to show that machine peat fuel will sell readily at $3.25 per ton at Ottawa, where the prices of ordinary fuels may be taken as about average. The writer found, in selling about 1,000 tons, that there is a brisk demand for this fuel for domestic purposes and more particularly for cooking, for the grate, and as a kindling for the furnace, at $4.00, but taking the lower figure the above question becomes a definite one. Can machine peat be manufactured to sell at $3.25 per ton and afford the manufacturer such profit as to make the operation an attractive one?

There are a number of conditions which enter into the answer to this question that it is not intended to consider here, as the peat surveys of the Government, already made, show that there are a number of peat bogs where the quality of the raw material, the drainage possibilities, the condition of the surface, and the shipping facilities are all satisfactory and these bogs are located within say a fifty cent freight rate of centres of population and therefore of consumption, and so these elements will not be considered at present.

The phrase "cost of manufacture" requires a word of explanation here. It has been used in two senses without any intention to mislead, and yet this has caused many discrepancies in figures apparently very hard to reconcile. Many peat operators speak of "cost of manufacture" and have in mind only the cost for labour, power, and supplies necessary to produce a ton of peat fuel. This is the net cost of the manufacturing process, the total cost to the man or company intending to make money out of the operation must include a number of overhead charges such as management and superintendence, office expenses, depreciation, interest on the capital investment, taxes, insurance, etc., all of which must be charged up proportionately to each ton of output. These items make up a very different figure from the first one spoken of. In a small plant these elements may be equal to, or even greater than the first; and hence, in considering a small installation like that operated at Alfred, Ont., this year by the Department of Mines, the most unfavourable conditions are present.

However, this Government plant at Alfred illustrates the general plan that seems most desirable for carrying out the before mentioned series of operations to make fuel; and while the figures of 1910 give an unfair impression as to the success of the industry, nevertheless they are a basis to work from, and any fair-minded man will see for the reasons hereafter given, that they do not represent anything like the returns which may be obtained with this same plant, which is situated on the C. P. Railway short line between Montreal and Ottawa, about a mile east of Alfred station.

The Government bog consists of about 300 acres of raw material classified as fairly good. Before peat manufacture was commenced development work was done. The bog was drained, and about 25 acres cleared of shrubs and bushes and to an extent levelled down to form a drying ground.

The manufacturing plant consists of a complete peat mill, made up of a platform about 8 feet x 24 feet mounted on wheels, which, in turn, rest on 30-pound steel rails supported by 6 or 8 wooden ties, 12 feet long. The rails are in short sections, which permit of their being moved ahead conveniently from time to time as desired. The platform supports a locomotive boiler with special grate and ash pan on which is mounted a 34 h.p. steam engine. This is connected by a belt to an Anrep macerating mill, a device which is essentially a number of knives fixed spirally on a horizontal shaft mounted in a cast iron case. Each knife has a forward pitch to force the peat

*Mining Engineer, A. M. Canadian Society of C. E. Peterboro, Ont.

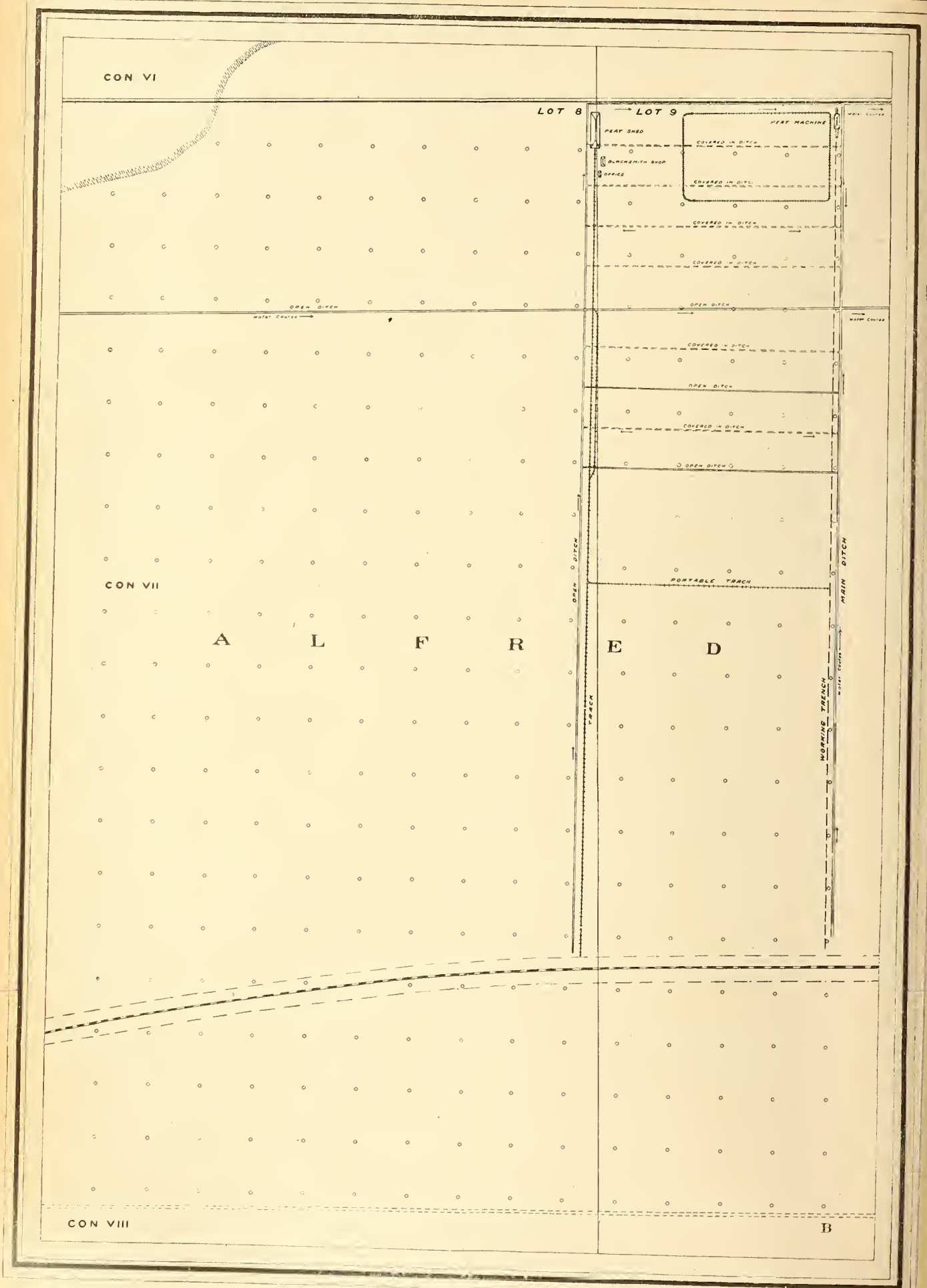


Fig 1

Plan of Government Peat Bog, Alfred, Ont.

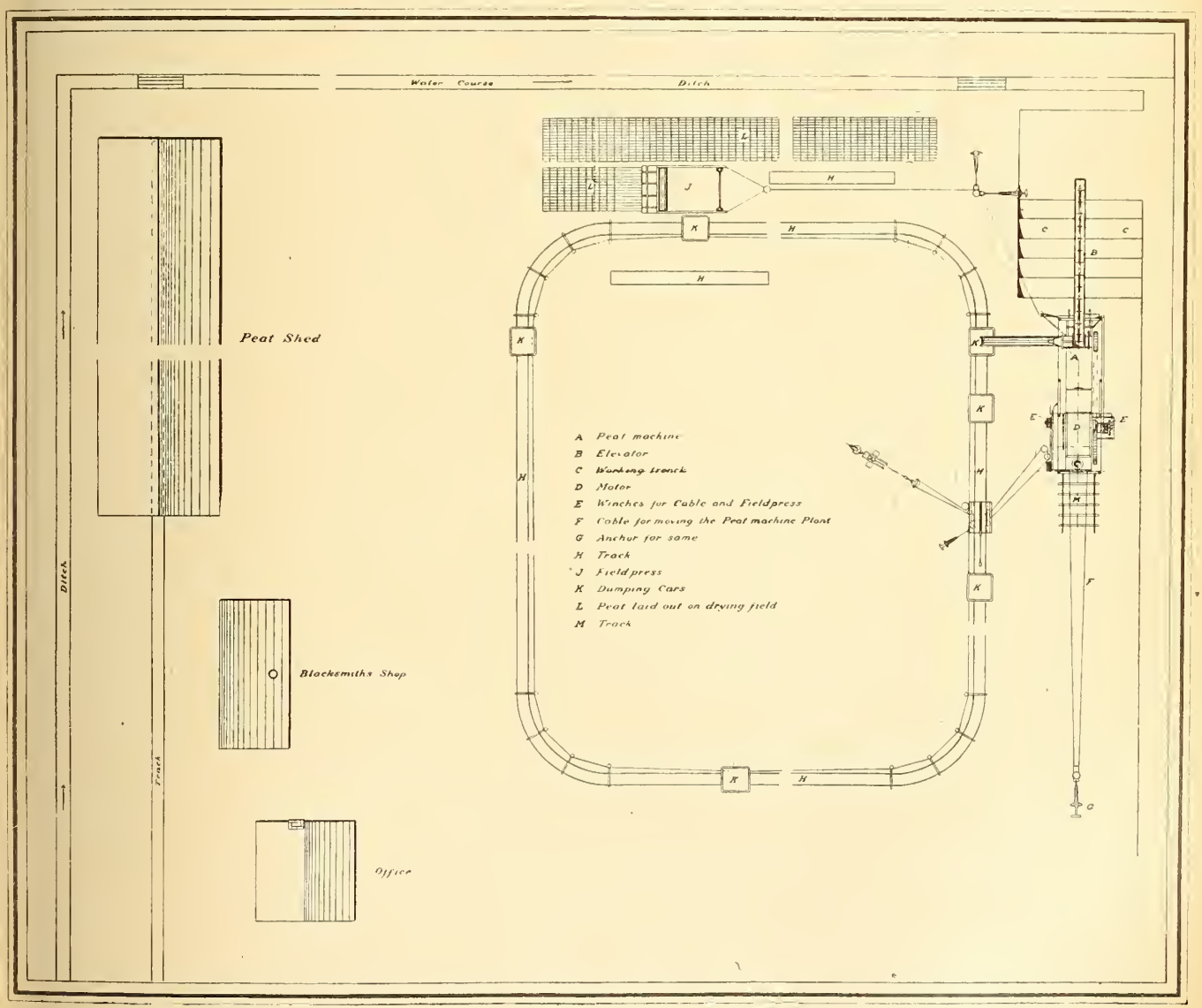
pulp out of a delivery spout, and works against a fixed knife so as to cut up any small roots or fibres remaining undecomposed in the peat, and also to perform a kneading operation. To this mill is attached an elevator extending in a downward sloping position for about 35 feet behind the platform where it is convenient for the shovellers to load into. The platform also supports a number of driving spools to give motion to a cable used to haul the cars which take out the peat pulp, to pull by another cable the device used to spread the pulp, and to pull the whole mill ahead from time to time, which is done by anchoring a cable out ahead and winding in.

A belt conveyor is arranged to carry the peat pulp from the mouth of the macerating mill to a convenient place to load the pulp cars, and the whole mill is protected from the weather by a light housing.

Besides the mill proper there are 8 side-dumping steel cars about ¾ cubic yards capacity, mounted through roller bearings, on double flanged wheels. There is also sufficient 24-inch gauge 12-pound rail portable steel track with steel ties to make a rectangle about 600 feet square and have 600 feet to spare. Quarter-turn curves, mounted so as to be complete in themselves, are used for corners, the whole track being in sections easily moved. Around this rectangle is stretched a small cable which is carried around the corners on pulleys, as is done in many other systems of cable haulage. A device is provided that automatically takes up the slack and keeps the tension right as the tracks are moved.

Finally a spreading device, called a Jackobson Field Press, is provided. It is a simple contrivance made of wood and composed of a front part which receives the peat pulp direct from the dump cars, a middle part which smoothes it down into a uniform layer, and a rear part which, by means of wooden knives weighted to cut through the peat, divides it into longitudinal strips. The press is provided with a cable leading in to the mill, which passes through a snatch block held in place by anchors, so that the press may move parallel to the track along which the cars of pulp come. To complete the equipment a tool is provided, made of three metal disks supported on an axle about 10 inches apart, and attached to a handle so that an operator, by dragging it across the peat laid out by the press, cuts the longitudinal rows crosswise into bricks, the length of which is determined by the distance apart of the disks.

Outside of this equipment five cars to transport the dried peat into the storehouse or to the railway siding, and nearly a mile of narrow gauge track (24-inch), two storehouses 160 feet x 22 feet, a blacksmith shop and tool room, and a small building for an office, have been provided. This covers the entire equipment.



Plan of Government Peat Plant, Alfred, Ont.

The operation during the 1910 season was as follows: A working area about 700 feet wide was chosen parallel to a main ditch which runs north and south. The peat mill put in place at the north end of this area, immediately adjacent to the ditch; so that the working trench excavated simply widened it out. Seven men began the excavation, which was approximately 20 feet wide and up to 9 feet deep, with spades, shovelling into the elevator which conveyed the raw material to the macerating mill, which in turn delivered it thoroughly pulped into a homogeneous mass, about the consistency of fresh mortar, into the dump cars. The boiler and engine were looked after by an engineer, and peat was used for fuel, about 8.8 pounds being used per h.p. hour. Two boys were used to gather this fuel and carry it to the boiler in baskets (a very costly operation). Two attendants watched the cars being loaded, clamped them to the moving cable, and put empty cars in place. These loaded cars then moved out automatically to the field press where a third attendant disconnected the cable and dumped the pulp into the field press and in his spare time cut the peat crosswise. One man attended the field press, and a boy at the mill attended to levers operating it while one other man was provided to assist in moving track and other work as necessary.

The 600-foot rectangle was laid out immediately adjacent to the mill, one side being parallel to the working trench and just far enough away so that the cars came under the delivery end of the conveyor carrying the pulped peat. The field press was at first placed at the northwest corner of this rectangle and just north of it so that in working it moved from west to east, parallel to the track, and such distance from it that the peat pulp was dumped directly into the front part.

The operation continued in this way until the row, i.e., the full length of the north side of the rectangle, was completed. In the meantime another track was laid parallel to the side along which spreading was going on, and just the width of the field press from it, so that as soon as the first row was complete, all that was necessary was to move the corner curves, tighten up the cable, and having brought the field press back to the west side again, the operation was repeated. The track used for the first row was taken out of the way of the field press as it moved along, and placed again inside the now working track. While the tracks were being shifted it was arranged to shift the main mill also to keep it a convenient distance from the working face.

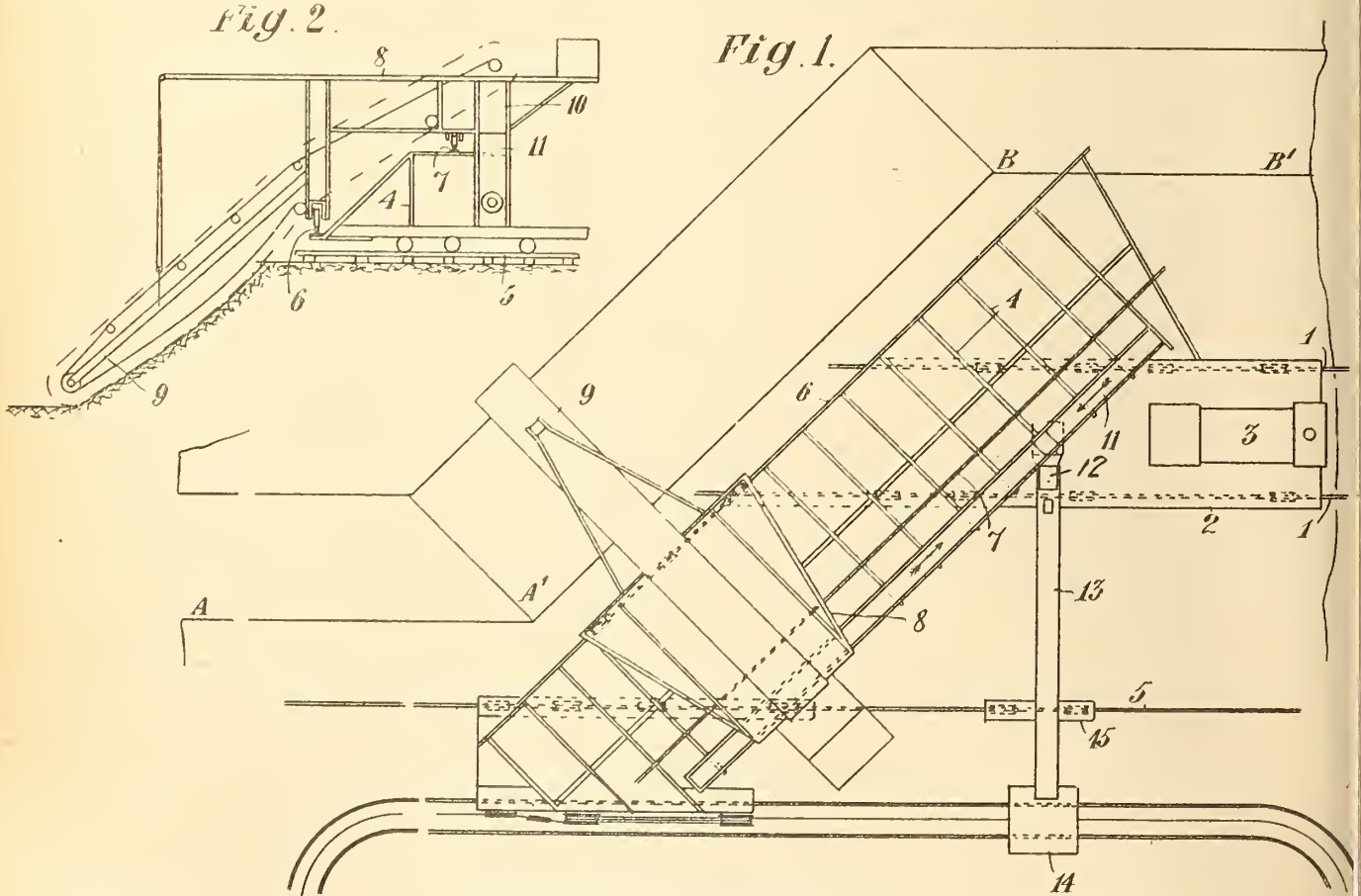
When in the course of the operation the north track approached too close to the south side, the whole rectangle was reconstructed again to the south, this work being preferably done on a rainy day or during some delay.

After the peat was so put out to dry all that was necessary was to turn it over in about three or four days. This was done by contract at 7 cents per ton, and later it was piled in small piles (cubed), for a further 10 cents per ton. From these cubes the finished fuel was taken to the storehouse, or to the railway cars, by the other portable track and cars provided for that purpose.

About four strips, 600 feet long, were laid out per day and each strip represented 8 tons of finished fuel. Fifteen to twenty minutes were taken to shift the tracks and couple up complete for another row.

An analysis of a day's work shows the following:

1	Engineer, at $1.75 per day	$ 1.75
7	Diggers, at $1.75 per day	12.25
3	Attending cars, at $1.75 per day	5.25
1	Attending field press and cutting peat crosswise, at $1.75 per day	1.75
1	Moving track etc., at $1.75 per day	1.75



Anrep's Excavating Machine, Patent Sketch.

1 Attending field press (boy), at $1.00 per day	1.00	
		$23.75
Fuel, 34 h.p. at 8.8 lbs. per h.p. hour, 10 hrs. per day. 34x10x8.8 equals 3,000, or 1½ tons per day.		
The actual capacity of the plant was such as to provide sufficient extra fuel to supply this amount. Fuel damaged in moulding or otherwise was used mainly, and as it would otherwise be waste, it is taken as costing only the labour to collect it, i.e.,		
2 Boys, at $1.00 per day		2.00
Oil and supplies, per day		.50
Total outlay for labour, fuel and supplies for one day		$26.25
Tons peat fuel made, 32.		
Actual manufacturing cost to put fuel on the ground to dry		.83
Add actual cost per ton to turn		.07
And actual cost to pile in small piles (cubing)		.10
Actual cost per ton, exclusive of overhead charges, to manufacture a ton of peat ready for consumer		$1.00

For an estimate for commercial purposes there must be added to this a number of other items, and it is due to these items that much misconception and confusion as to the cost of manufacture has arisen. These items are superintendence and management, depreciation, interest, taxes, and such other fixed charges as go on whether peat is being manufactured or not.

At the Government bog, an estimate of these items would be based on a total investment by the Department of Mines of about $16,000.00, made up of

Cost of bog, draining same, and preparing drying area	$4,000.00
Cost of plant, machinery	7,500.00
Cost of buildings and railway siding	2,500.00
Engineering and superintendence of installation	1,500.00
Sundries	500.00
Total	$16,000.00

The overhead items are:

Management, 3 months, at $150 per month	$ 450.00
Depreciation, 5 per cent. on total capital investment, paying it back in 20 years	800.00
Interest, supposing capital borrowed at 5 per cent.	800.00
Other charges	200.00
Total overhead charges	$2,250.00

If 110 days, the average season's work, had been accomplished, there would have been 3,500 tons available over which to spread this sum, in which case there would be:

Overhead charges per ton	.65
Add cost of manufacturing operations	1.00
Cost of finished fuel on the ground	$1.65
Add to put in storehouse, per ton, and	.15
From storehouse to railway cars	.10
Total cost per ton, on cars	$1.90

Only 50 days' work, however, or 1,600 tons, were available at Alfred in 1910 over which to divide this amount, and therefore:

Overhead charges per ton were	$1.41
Add cost of manufacturing operations	1.00
Cost of finished fuel on the ground	$2.41
Cost of finished fuel in storehouse	2.56
Cost of finished fuel on cars	2.66

This estimate is probably a little high, but is not far from the actual expenditure for the first year's work.

There are a number of reasons why these figures will be made much more attractive in 1911. Last year the plant was new and until it became properly tuned up there were many stoppages. The weather in 1910 was exceptionally wet, heavy rains fell on an abnormal number of days, and work was not carried on as late in the season as is ordinarily possible. The drying field was new and comparatively rough, a condition which will not exist in 1911, and a better showing even in the first element of the cost will be made.

Now, just so surely as it is possible for a contractor to move 100,000 cubic yards, say, of gravel, more cheaply per yard than if he had only 10,000 to move, because it pays him to use a different and more efficient plant, just so surely in the operation of manufacturing machine peat fuel the cost necessarily decreases as the output goes up. There are two reasons: first, because the overhead charges do not increase in proportion to the output and are therefore divided over a greater number of tons, and, second, because, as the output increases, it is possible to introduce mechanical excavating and other improved equipment to advantage. This was actually done in Sweden last year.

Lieutenant Ekelund, at his plant at Back, using essentially the same process as is illustrated at Alfred, but introducing mechanical excavating, was able to put his fuel in the storehouse for 92 cents per ton including all charges. Because of his exceptional bog, the bottom being of hard gravel and easily drained practically dry, he installed there (on the bottom) a heavy electrically operated bucket excavator on which he had mounted an Anrep macerator. With this device he was able to do away with all shovellers, which, for his capacity, 80 to 90 cubic yards per hour, would have required up to 24 men. He used the same portable track method of spreading, but used gasoline locomotives to take out the peat pulp in trains of several cars, which was probably more expensive than the cable haulage, both in labour and in fuel. He also introduced spreading apparatus suitable to the increased output.

This improved showing was not due to any new process, but mainly to larger output, and also to mechanical excavation. The only condition in Canada that is not equally or even more favourable than the conditions in

Anrep Machine in Operation at Alfred, Ont.

Sweden, is the cost of labour; but as Ekelund only uses eight men and two boys, an increase of 50 per cent. in wages would increase his cost only 7 cents per ton, so that he would still be under the $1 mark. His excavator is an adaptation of a device designed to handle much heavier materials, and on this account weighs so much as to be suitable only to bogs with a comparatively hard bottom and capable of being very completely drained; but this objection seems to have been overcome entirely in a mechanical excavator for peat designed for this purpose by Mr. A. Anrep, Sr., of Helsingborg, Sweden, the inventor of the machines and of the process used at Alfred.

This device consists essentially in replacing the elevator taking the raw material to the macerating mill on the platform of the plant at Alfred by a bucket excavator mounted on a carriage that automatically moves backwards and forwards on tracks fastened diagonally across the back end of the platform and moving with it. These superimposed tracks project 10 to 15 feet on either side of the platform proper and are supported at their outside ends by wheels moving on extra single rails placed there for the purpose. The excavating apparatus can be raised or lowered at will, and hence the excavation is made up to 40 feet wide and as deep as is desired. In operation the excavator carriage moves all across the working face, and then the whole device, including the main platform, is automatically moved ahead a small distance and the next cut is made on the return trip.

In this way, using light but strong structural steel construction, a large capacity is obtained with comparatively small weight and this weight is distributed over a large area. Besides this, and perhaps the most unique feature of this device, is the part of its design that causes it to leave all the walls round the excavated part with a natural slope, avoiding all tendency to cave in or break away.

Mr. Anrep has also improved his cable transportation to meet the increased output and has introduced a plan whereby a larger spreading device works in both directions, thereby avoiding the lifting and taking back to a starting point as is done at Alfred. The new spreading device also cuts the peat crosswise automatically.

With this new plant the following conditions approximately will exist: According to precedent established in Sweden, the plant will run 20 to 24 hours per day, and as the plant has a capacity of 8 tons per hour a maximum of 192 tons of finished fuel may be put out in 24 hours. Only 150 per day, however, are used for this estimate, and 100 days as the working time. Thus the season's output is estimated as 15,000 tons.

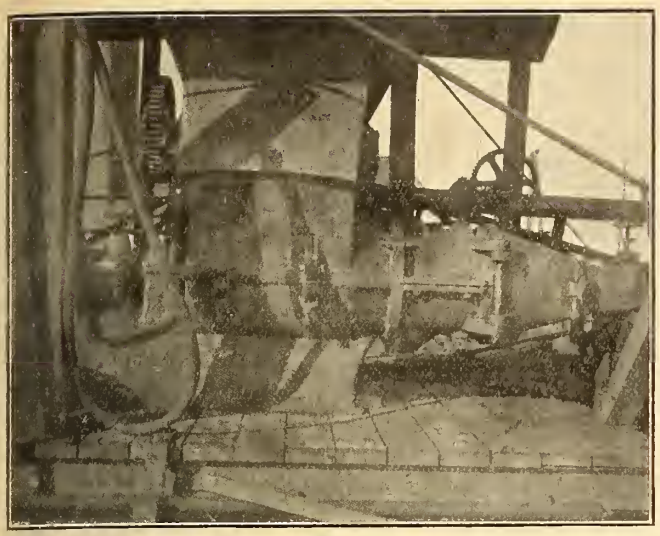
The plant is operated by:

1 Engineer.
1 Man who operates the excavator.
3 Men operating the cars.
1 Man attending the field press.
2 Men picking out roots and stumps (for which a winch is provided on the mill), and moving track ahead for the main mill.
2 Men moving track.

10 Men in all, in place of 13 men and 1 boy.

Wages at an average of $1.75 per day, equal, per day	$17.50
Estimate for oil and supplies, per day	1.00
Fuel, as before, labour collecting	2.00
Making the cost of putting on the ground of ½-day's work, i.e., 75 tons	$20.50
Or, per ton	.28

Machine Peat Stack.



Anrep Mill.

Small Peat Stacks.

Add for turning, and	.07
For piling	.10
Cost of fuel ready for storehouse exclusive of overhead charges	$0.45

Overhead charges in this case may be figured on a capital expenditure of:

Bog investment, drainage, and preparation	$ 4,000.00
Plant	12,000.00
Buildings, etc.	4,000.00
Working capital	5,000.00
Total investment	$25,000.00

Yearly charges to fuel output:

Depreciation, 5 per cent. of $20,000.00	$ 1,000.00
Interest on whole investment at 5 per cent.	1,250.00
Management and superintendence	1,800.00
Office, etc.	1,200.00
Repairs	500.00
Other expenses	750.00
Total	$ 6,500.00
Or, per ton on season's output	$0.45
Making cost on the field	0.90
Add to put in storehouse or on cars	.15
Cost in storehouse	$1.50

This is a conservative estimate of what may be done with this new machinery, and at this figure the manufacturer may safely figure on a net profit of $1.00 per ton on his output, a return that should be very satisfactory.

Until such time as there is a reserve supply of peat fuel on hand it will be difficult to get a commercial demonstration in this country of the production of power by producer gas, from peat fuel, excepting what may be done by the Department of Mines. Two plants installed in Sweden, and running continuously, are described by Mr. Nystrom in his report to the Government in 1908.

The question of the use of peat as a powder is also in its infancy. Small experiments have been made in Canada in burning cement and also in raising steam, with very promising results; but as the peat must first be dried to such water content as to be available for fuel, it would seem well to develop this part of the industry first.

The foregoing figures with regard to the Ottawa Government plant are made up from the writer's observations during a number of visits to Alfred. Some reference has also been made to one or two statements made by Dr. Haanel in his address before the Canadian Club in Toronto. The description of the new Anrep plant is from plans and information received direct from Mr. A. Anrep, Sr., Sweden. The operations, however, are so simple that the interested reader can verify almost every figure for himself with very little trouble.

There is no doubt that both Mr. Anrep's and Lieut. Ekelund's plants will be improved upon from time to time; but even with the machines at hand and with the information and demonstrations available, it seems safe to say that the uncertain element has been largely removed from the manufacture of peat into fuel. Beginning in 1911 it is hoped the peat fuel industry in Canada may turn over a new leaf and begin on a profitable page.

In conclusion, attention is drawn to two things: first, that processes by which the manufacture of peat fuel has been attempted, particularly in this country, have been so modified that no longer is a complicated and very expensive plant, involving many difficult operations, required; the simple problem of handling so much material so many times remains, an operation the cost of which may be fairly accurately and reliably estimated; and, second, that while the figures given herein are mainly estimates, they are based on actual work in 1910, much of which has come under the writer's personal observation. It is hoped that prejudice born of ignorance, or of the mistakes of some years ago may be to an extent dispelled, and this industry, than which there are few others more important, given a chance to get on its feet.

The United States production of coal during 1910 amounted to the vast total of 480,000,000 short tons, which almost equals the highest previous record in 1907.

From a Canadian point of view it is significant to note that the tide-water shipments from West Virginia have been materially enlarged. The strong position that this State is taking in the Atlantic seaboard trade affects Nova Scotian collieries. The contention that Nova Scotia can capture a considerable part of the New England market becomes weaker every year.

On the west coast, the production is still small, the State of Washington being credited with about 4,750,000 tons. California, Alaska, and Oregon, between them, produced only 100,000 tons. But California's oil is equivalent to a yearly output of nearly 20,000,000 tons of coal.

A GEOLOGICAL TRIP IN SCOTLAND

(By W. G. Miller.)

(Continued from Feb. 1st issue.)

Grenville and Keewatin.

The following quotations, taken from different pages of the Memoir, will bring out more clearly the resemblance of the sedimentary material in the Lewisian gneiss to the Grenville series of Canada. Moreover, it will be seen that the sedimentary material is associated with hornblende or chlorite schist, some of which may be altered basic lava. Associated with the hornblende schists are "quartz-magnetite granulites resembling the rocks of the Penokee iron-bearing series described by Irving and Van Hise." The hornblende schist, in so far as the writer knows, has not been proved to be intrusive into the crystalline limestone and associated sediments, but it is said that it "appears to have been injected along the margins" of the sedimentary bands. Since the hornblende schist is not known to be intrusive, one might be pardoned for hazarding the opinion that the relationship between at least some of the hornblende or chlorite schist on the one hand, and the crystalline limestone, iron-formation and other sedimentary material, on the other, is like that between the Keewatin and the iron formation and other sedimentary material in Ontario and the Lake Superior region in general. In any case it may be said that the Scottish rocks, in character and in their association, are strikingly like those of the last mentioned region.

"In Gairloch the chief belt of these altered sediments extends for seven or eight miles . . . . Its width is about a mile and a quarter, half of which is occupied by bands of hornblende-schist or hornblende chlorite schist. Consisting for the most part of a fine-grained brown mica-schist, it contains also various bands of limestone, graphite-schist and quartz-schist or quartz-magnetite-schist."

"There is no proof of the intrusion of the gneissose rocks of the Fundamental Complex into the supposed sediments, nor yet of the unconformability of the latter on the former. In certain places bands of marble and of kyanite-gneiss lie within gneisses of common type in the complex, and pass gradually into them."

"Great intrusions of igneous material, most of them now in the form of hornblende-schist, appear also to have been injected along the margins." And further: "Their (the hornblende schists) general uniformity of composition and texture and the rarity of inclusions in them which can be regarded as detached fragments of other rocks, or distorted amygdules, are hardly consistent with the supposition that they are altered contemporaneous lavas, but, on the other hand, they have nowhere been observed to transgress the sediments in any clear section. In general they are more finely foliated than most of the dykes either near them or elsewhere."

"On the southeast side of Shieldaig a band of micaceous schist, 120 yards broad at its greatest width, often calcareous and with outcrops of marble, emerges from beneath the Torridon rocks."

"It is interesting to compare the rocks of this and the preceding group (quartz-schists) with certain rocks found in the Penokee iron-bearing series. . . The rocks of this series include (1) cherty carbonates; (2) ferruginous slates and cherts; and (3) actinolitic and magnetitic slates. The quartz-hornblende rocks and the quartz-magnetite rocks from the Loch Maree area have decided affinities with the actinolitic and magnetitic slates of Van Hise. Both groups of rocks contain the same minerals and possess to a certain extent the same structures."

The altered sediments on the north-east side of Loch Maree "are associated with broad outcrops of hornblende-schist, and consist for the most part of mica-schist, graphite-schist and limestone, with bands which may represent altered quartzite and chert. The broadest development of these rocks stretches from Letterewe to Fasagh and may be called the Furnes belt. Its length from north-west to south-east is about five miles, and its greatest breadth, including various outcrops of hornblende-schist, nearly three-quarters of a mile."

"Near Kerrysdale chloritic schists occur on both sides of the more north-westerly of the two hornblende-schists. . . . . These schists merge into hornblende-schists. . . . small crystals of magnetite and calcareous spots and streaks appear more commonly in the chloritic than in the hornblendic schists. The chloritic schists usually effervesce freely with hydrochloric acid, even when no carbonate can be recognized macroscopically, and one of the calcareous streaks near Auchtercairn is a good limestone."

"A quartz-magnetite-schist, mixed with limestone and calcareous chlorite-schist, is seen in various places at the north-east side of the thick hornblende-schist which runs north-west from a point 300 yards south-west of the outlet of Loch Bad an Sgalaig in the Gairloch district. .

The quartz-schists in both districts may possibly represent altered schists, but the present resemblance of certain portions of them to cherts is perhaps rather the result of deformation. In some exposures north-east of Loch Maree more than 30 thin laminæ may be counted in the thickness of a quarter of an inch. Each of them was not improbably broader originally but has been dragged out and thinned."

It may be that some of the Canadian banded gneisses which have been called Laurentian are in reality older than the Keewatin. If this is the case, then these gneisses represent the surface over which the Keewatin rocks have flowed, and the crystalline limestones and other sediments have been deposited on the surface of the lavas or interbedded with them. If such be the case in Canada and the Lewisian gneiss is not intrusive into the crystalline limestones and schists of the Highlands, then the relationships and resemblance between the oldest rocks of Canada and the Highlands is similar.

On the other hand, if the Lewisian is intrusive into the crystalline limestones and associated schists, the relationship is exactly like, in so far as is known, that which the Laurentian granite and gneiss bears to the Keewatin and Grenville rocks of Canada.

Group (2) of the Lewisian.

Group (2), the igneous rocks intrusive into group (1), corresponds in a general way with certain post-Laurentian intrusive rocks of Canada, viz., certain granites and so forth which are pre-Keweenawan in age.

The Torridonian.

There is no means of definitely determining whether the Torridonian of Scotland corresponds to the Huronian or to the Keweenawan of Canada. It has been correlated with the Keweenawan by some writers on ac-

count of its reddish or brownish colour and degree of consolidation. But rocks that look alike, especially in the pre-Cambrian, are frequently quite different in age. Moreover, in the writer's opinion, much of the Keweenawan shows as great a degree of consolidation as does some of the Huronian. In fact, in certain localities, the Torridonian has a schistose structure.

"The great bulk of the formation consists of more or less coarse-grained arenaceous sediments in the form of felspathic grits and sandstones (arkose), with occasional thin intercalations of fine-grained micaceous shale and sandstone. Coarse angular breccia occurs as a local base, and numerous bands of pebbly grit, conglomerate, and scattered pebbles are found at different horizons, while the whole series is characterized by false bedding and other signs of current action." The prevalent features of the series are the uniformity of composition and fresh appearance, and the regularity and generally undisturbed character of their disposition.

"The base of the Torridonian series is usually formed of a conglomerate or breccia, sometimes exceedingly coarse in texture, and derived from the Lewisian rocks in the immediate vicinity."

"The pebbles that occur so abundantly throughout the arkose series afford, however, the strongest proof of the foreign origin of most of the Torridonian sediments . . . it may be sufficient to state here that they (the pebbles) include examples of sedimentary, metamorphic and igneous rocks which are not found within the Lewisian area, and suggest the existence of a pre-Torridonian sedimentary and eruptive series as the source of the coarser materials of the Torridonian formation."

While the writer does not think that the lithological resemblance of the Torridonian to the Keweenawan is sufficient evidence on which to base the correlation of the one with the other, there is other evidence to the effect that the two series should probably be correlated. (a) On a preceding page it has been shown that certain pebbles, quartzite and so forth, in the Torridon conglomerate, prove that a sedimentary series has been removed before the deposition of the Torridonian. This series that has been eroded may correspond to the Huronian of America. If so, then the Torridonian may be considered to correspond to the youngest of the pre-Cambrian sedimentary series of America, the Keweenawan. (b) The intrusive rocks of group (2) of the Lewisian do not cut the Torridonian. They bear a relationship to the latter like that which certain granites, and so forth, of America, which cut the Huronian, bear to the Keweenawan.

The following table will make clear the suggested relationships:

1. Canada—
. Keweenawan.
. Huronian with intrusives.
. Keewatin-Laurentian Complex (Laurentian granite and gneiss, Keewatin greenstones, etc., together with crystalline limestone, iron-formation, etc.)

2. North-West Highlands.
. Torridonian.
. Intrusives (of group (2) of Lewisian). A fragmental series consisting of quartzite, etc., has been removed by denudation prior to deposition of Torridonian.
. Lewisian, Fundamental Complex (gneiss, hornblende and chlorite-schists, crystalline limestone, iron-formation, etc.)

After the eruption of the dykes and sills of group (2) of the Lewisian, and long before the deposition of the Torridonian rocks, the whole region of northwest Scotland was subjected to terrestrial stresses which affected both the Fundamental Complex and the intrusive masses that penetrate it.

Glacial Origin of Conglomerate.

It is interesting to note that a glacial origin was suggested formerly for the Torridon conglomerate, as it has been suggested in late years for Huronian conglomerate of Ontario. "The mammilated contour so characteristic of the plateau of Lewisian gneiss was attributed by Sir A. Geikie in 1880 to the action of landice, and he compared the overlying breccia of Torridon sandstone age, that fills up the hollows and buries the rounded domes of rock near Gairlock, to moraine stuff." In the final memoir by the Geological Survey on the Northwest Highlands, 1907, the theory of the glacial origin of the Torridon conglomerate is dropped. "The basal breccias which often flank the buried mountains (Lewisian below Torridonian), are, as already explained, of the nature of scree material. They consist of fragments of the local rocks embedded in a sandstone matrix. The conglomerates, on the other hand, are probably torrential deposits brought down from a district very different in geological structure from that of the area in which Lewisian gneiss occurs."

The fragments of rock in the Torridon conglomerate and breccia have frequently come from a considerable distance. "In one instance, on the north side of Loch Maree, it has been observed that blocks in the conglomerate have come from the hornblende-schist ridge of Ben Lair, and may have travelled a distance of three miles."

Absence of Ore Deposits in Highlands.

Considering the importance of the ore deposits in the pre-Cambrian of the Lakes Huron-Superior region, the absence of valuable deposits in the Highlands at first seems remarkable. If we bring to mind, however, the difference between the pre-Cambrian of the two regions, the non-economic importance of the Highland rocks is not so much to be wondered at. The Keewatin series is not known to occur in the Highlands, and, if it does, the outcrops are comparatively insignificant. In this series in America are found the Vermilion and other important iron ranges. The Animikie or Upper Huronian is likewise absent in Scotland, while in the Lake Superior region the great Mesabi iron deposits occur in it. Moreover, if there are rocks in Scotland similar to the quartz-diabase of Cobalt or the norite of Sudbury, which have been the ore bearers in these two important mineral areas, they are of small volume. The copper deposits of Michigan are found in the Keweenawan but the Torridonian has not been rendered of similar economic importance by basic igneous rocks.

Cambrian and Eastern Schists.

Little need be said concerning the Cambrian except that it rests unconformably on the Torridonian and its lower beds represent the *Olenellus* zone. One of the most puzzling points that the early workers in the field had to deal with was the relation of the Cambrian to what are known as the Eastern or Moine Schists, the fourth great group of the Highlands. Later work has shown that the superposition of the highly metamorphosed rocks on the Cambrian has been brought about, as has been said on a preceding page, by thrust.

The character of the Eastern Schists and the knowledge possessed of their age relationships will be understood from the following: "Only a brief reference need be made here to the Eastern Schists that appear to the east of the Moine Thrust-plane. Excluding the belt of mylonized rocks (ground-up rocks), usually found in association with that displacement, this group comprises flaggy, quartzose schists with muscovite, quartz-biotite, granulites, and garnetiferous muscovite-biotite-schists, which together evidently represent an altered sediment-

ary series . . . . These rocks have been the subject of much discussion. They were once regarded as portions of the oldest or Azoic architecture of the country. Murchison considered them to be a metamorphic series of mainly sedimentary formations, later in date than the Lower Silurian (Cambrian) limestones and quartz-rocks which underlie them, and into which they seemed to pass downward in a conformable succession. The detailed study of them by the Geological Survey has thrown considerable light on their composition and structure, but the problem of their age and origin has not yet been completely solved. . . . When the rest of the Highlands lying to the east of that belt has been surveyed, it may be possible to offer some more definite opinion as to the stratigraphical relations and history of these rocks."

While rocks of diverse age and origin are included under the name Moine Schists, "which together evidently represent an altered sedimentary series," a person familiar with the pre-Cambrian of Canada will be inclined to ask himself whether much of this altered sedimentary series does not represent a group of rocks that, in age, lies between the Lewisian and the Torridonian. If this is the age relation of some of the schists, they occupy a place in the geological column similar to that of the Huronian of Canada, which lies between the older Laurentian-Keewatin complex and the younger Keweenawan. In the description, given above, of the Torridonian, it was said that the pebbles of quartzite and other rocks, "derived from formations that are not now visible anywhere in the western part of the counties of Sutherland and Ross," are found in the conglomerates of the series, showing that an older sedimentary series has been removed before the deposition of the Torridonian. Similarly in Canada it is found in some localities that the Huronian has been removed before the deposition of the Keweenawan on the Laurentian-Keewatin complex.

The relationship that has been observed to exist, in two or three localities, between the Lewisian and the Eastern Schists, will be seen from the following: "More recent work, however, between Stromeferry and Loch Alsh has led Dr. Peach to the belief that the Moine-Schists in that district rest unconformably on gneisses of Lewisian type. He has found what he regards as a conglomerate locally developed at the base of the Moine-Schists and overlain by a definite order of succession among the schists analogous to that in the Diabaig group of the Torridon sandstone. . . . It would thus appear that at least some of these rocks existed as crystalline schists before they had reached their present position." Schists in one locality in Skye possess characteristics from which it might be inferred that they represent a sedimentary series older than the Torridonian. "These schists represent what were originally false-bedded grits and sandy and gritty shales."

General Notes.

In addition to their highly interesting stratigraphy and structure the Northwest Highlands have a charm for the traveller or tourist. At times the region has very changeable weather with much rain, but during the ten days of my visit the conditions were ideal. To me the region was something new and entrancing. The high, ordinarily rounded hills or mountains, practically bare of trees, have a somewhat strange appearance to one from the wooded regions of Canada. Were it not that the surface is clothed with grass and heather, one would be inclined to compare it in a general way with the arid or semi-arid parts of the southwestern United States. The moist climate of the Highlands, however, is conducive to a rich growth of grass. Peat is found well up the hillsides and not merely in low swampy areas as with us. The supply of it seems to be inexhaustible. It has served as a fuel supply for countless generations and is still being used by the dwindling population. Much of the surface of the Highlands seems to have been well wooded in past ages, judging from the remains of trees found in peat deposits. The timber has been destroyed and its growth has not been encouraged in later times. Small plantations here and there in the valleys show that timber trees will grow well in this climate. Probably if afforestation were taken up in earnest, by first setting out trees in the valleys and gradually working the growth up the hillsides, the greater part of the surface could be turned into a forest region. To the writer it seemed that afforestation is the most important economic subject that can be dealt with in the region. The small areas of arable land that in past generations, when people's wants and desires were more simple, supported isolated groups of families, cannot under modern conditions retain the population. Many of even the more productive localities have now less than half of the number of people that they formerly supported.

One cannot but feel that a spirit of melancholy pervades the Highlands, due to the fact that the population is decreasing. The young people are emigrating in large numbers, leaving the old.

Comparatively little attempt has been made at afforestation. Most of the surface is devoted to deer "forests" and a tree-covered surface is not considered good stalking ground. The term forest as applied to these areas is a misnomer. There is often scarcely a tree in a square mile of "forest." Rentals for hunting rights are probably as great or greater than they would be if the surface were devoted to any other purpose.

It would seem that the Highlands will soon be monopolized as a field for tourists and holiday seekers. The Macs, and all people with clannish cognomens, are going to the Highlands in increasing numbers each year. Many of them are three generations or more removed from Scottish soil, but they all wish to see something of their ancestral abodes. The Macs, especially the American girls and their "mas," from the four quarters of the globe, are to be found in great numbers looking up the seats of their clans. The sellers of tartans are kept busy.

The ease and speed of travel across the ocean now-a-days has done much to make a kindlier feeling towards Britain than existed in parts of North America, at least, fifty or even twenty-five years ago. "Tail-twisting," which was a common spectacle in the United States during election campaigns not many years ago, owes its decadence as much to summer travel as to any other cause. The English speaking people are getting closer and closer together, and in the years to come one of Britain's chief industries will be catering to the visitors from among the two hundred million or more overseas Anglo-Saxons.

In one of its issues last summer a London newspaper had an item to the effect that a reporter on its staff took a stroll up the Strand in the morning and saw only one Englishman. There were crowds of Americans. This is an exaggeration, but it shows the impression that summer visitors make even on the population of London.

Travelling in the Highlands is now pleasant and easy compared with what it was a few years ago. The automobile has done wonders. Motor stages run on many of the main roads. The little hotels scattered here and there, especially where holiday fishermen congregate are good.

Since the Lloyd George taxes were imposed the national beverage is not taken on faith. It is claimed that

there is now a tendency to substitute inferior brands or dilutions for the genuine old time stuff. It is a common sight to see a man first sniff his glass to get the "bouquet," then take a sip before venturing on a swallow. Although this paper is intended to deal with solids rather than with liquids, since we have mentioned the latter we may add that many of the clubs in Britain have not increased their prices but they have substituted a "pony" for the former larger volume. Thus does the budget restrain the bibulous!

The Companies Act and Suggested Amendments

(Written for the CANADIAN MINING JOURNAL by JAMES E. DAY.)*

My remarks at a recent luncheon of the Toronto Branch of the Canadian Mining Institute, as to the danger of unskilled amendments to the Companies Acts led the Editor of the CANADIAN MINING JOURNAL to ask for an article thereon, and also on the unwisdom of so many of the proposed amendments makes a discussion from the point of view of the lawyer not untimely. The mining man devotes his life to increasing the nation's wealth and resources, and to bringing to light the hidden treasures nature has for those who have persistence and skill to discover them, and knowledge and experience enough to make the development not a gamble but a manufacturing and commercial proposition. When he finds, however, that investors and bankers look on mining as gambling pure and simple, he naturally calls for some means to be taken to remove from the mining industry the bad name imposed by those who with worthless stock mine the public instead of the ground. With all deference, however, to the good intentions of the reformers it is well to point out that remedies should be carefully thought out before being administered. Had there never been any mining companies, and had all the money that has gone into mining experiments in Ontario been raised by private partnerships, there would be now an equally loud clamour for the Government to protect the public against their errors of judgment, in sinking their shafts in the wrong locations. In Cobalt, inspection of properties was to be the panacea that would prevent money being lost; instead, inspection merely proved another bait for the hook the unscrupulous promoter dangled before the suckers.

This much is plain—that some disreputable promoters, and many more unwise ones have hurt the mining industry, but it has not been all an unmixed evil. The public learns much by experience, and is also learning the need of sufficient money in the treasury, the unfairness of over issue of stock to promoters, the necessity of business management, and the distinction between promoters' stock and treasury stock. A little examination of the various suggestions made by way of amendments to the Companies Act shows us two things: First, that in our present craze for the law to do everything we are forgetting the prime importance of leaving grown men free to make their own bargains; and, second, that those most free with suggestions of improvement have not always taken the trouble to know what the law is which they seek to amend, or to study out the effect of their amendments.

A bill aimed to prevent over capitalization is now being introduced in the Ontario House by Mr. Johnston. The intent is good; the real effect would be awful. It provides that companies dealing in commodities that will be offered to the public (and what commodity is not?) may issue stock only for cash and at par. The law at present is, that only mining companies can issue stock at less than par. Why the need of this change? And if stock can be issued only for cash, then the merchant who converts his business into a company must somehow get the cash and can not take stock.

It has been suggested that the number of shares of all mining companies be fixed at the same number, limited, for example, to 100,000 or 1,000,000 shares, having no fixed value except what the company chooses to impose and the public is willing from time to time to pay. This has many merits. A buyer knows that he has an aliquot part of a mine, say, for example, seventy one-hundred-thousandths, instead of having a certificate of 700 shares of a value of one dollar each in a company, which shares on their face purport to be worth $1.00 each, but may, in fact, be worth not ten cents each. But what would happen to such a company if its shares were all issued and further money were needed? There would be no new shares to be issued, no more could be created, and concerns that would be in absolute need of money for further development would either have to issue bonds, which is not always possible and is seldom desirable, or go out of business. Money for further development would be raised by subsidiary power companies, milling companies, transportation companies, selling companies, each absorbing its share, and a little more, of the profits legitimately belonging to the company, and each a fertile source of graft.

The company's directors would of necessity have to fix the value at which its shares would be sold. The shares of a Nipissing would be worth more than of a Little Nipissing. Once that is allowed, every clever promoter would see that in the beginning the shares were put low enough for him to be able to get most of them without being open to any charge of over valuing the property. And, while the legitimate company would be hampered, the promoter seeking a cheap stock would simply pool a controlling number of shares and issue trust certificates against them at seven cents per share.

If a mining company can not sell its stock at less than par, then a company that had started with good prospects and had sold some stock, yet found its values depleted, might as well go out of business and let its shareholders lose their investments, for, while a man would buy shares at par at the start of a promising proposition, he could not fairly be expected to do so later on when its condition had turned out to be not as good as expected. The experience of the Mixado mine in the Rainy River district, which, after being shut down for years is now being re-opened, shows what it is possible to do if the men who are now willing to risk some money have not to be asked to put up as much as those who bought stock in its first flush of prosperity. Experience shows also that, in order to get the first investors (in Canada, at least), to take the chance there always must be in any mine, at least until after much development, he must have not only a prospect of dividends but also a chance of increase of stock value which can only be got by getting stock cheaper than it can be expected to sell after the mine is producing steadily.

It has been suggested that a fixed percentage of the total capital must be subscribed before the stock be

*Barrister, etc., Day, Ferguson & O'Sullivan, Toronto, Ont.

issued to the public. But that is the law to-day. To avoid the certain disaster awaiting the company, which, though it might be prosperous with sufficient capital, must be a failure if it starts out with insufficient funds, the law stipulates that a prospectus must be filed stating what amount of stock must be subscribed before the subscriptions to its capital stock are binding. If the public has not learned this what hope of their learning still more laws? How can a man be protected who will not protect himself? One can hardly imagine an English investor signing an application for stock without seeing what is the minimum subscription on which the company will go to allotment. All the investor has to do it to inquire for himself. He would not buy other things without some inquiry, and if he does not know that capital is needed in a company—as in an unincorporated business—making a new law will not help him. But even this beneficial law shows how difficult it is to frame a law that will meet every case. While the law calls for the prospectus, the investor does not. If he does, he finds often, either that the company has issued all its stock as is the custom in the United States and is raising money from the proceeds of stock held by a trustee for it, or that the prospectus stipulates that on application for and allotment of, one share all future subscriptions are binding.

This last is legal, and in some cases is wise. How can it be prevented unless the Government undertakes to devise some machinery to investigate each case, and tell each company how much stock it must sell? Such a condition would be intolerable, would be certain to be abused. The company would at first proceed with some proposition calling only for a small capital, and, having gone to allotment, would take up the large scheme with perhaps insufficient funds. Any attempt to prevent this by providing for fixing a new minimum allotment on the making of each new contract would mean that the Government would have to supervise every contract made by every company that may at any time want to sell any stock, and would lead to an intolerable and unjustifiable handing over of the reputation of private business to the Governmental department in the hope of doing what has never been and never will successfully be done, namely, preventing men from making foolish bargains.

Unwise and unconsidered legislation will mean an unworkable law, will mean that companies instead of coming under Government control will be altogether beyond it. For, while the operating companies might remain Ontario companies, the stock of these companies would be held by means of pools or arrangements or other forms varying from time to time, by American companies. You can not prevent a man buying stock in an American company, nor the owner of a mining prospect from selling his interest to an American company, either directly or by means of selling to the American company—or to a trustee—the stock he has got from an Ontario company. Nor can a sane and satisfactory law be devised to prevent an individual selling his own shares in a company on any terms that he chooses, so long as he commits no fraud. Hasty and ill-considered legislation will only lead to consequences never thought of by its proposers.

Yet the facts remain that conditions are not what they should be and that the Government, which gives to corporations their existence, has a right to regulate them so long as the regulations do not defeat their object. It is for the mining, commercial and legal fraternity to help by education and by suggestions. If we once definitely locate the weak points and defects in the system it will be possible to better it, though never to attain perfection. We need more common sense and less law making, more publishing and advertising of changes in the law, more investigating into what the law really is, more backbone in refusing to buy stock in the concerns that in one guise or another have their stock put out without telling the public what is the price paid for the property, what amount is required for its operation, and what guarantee there is that this money will be raised. And when a panacea is proposed that is to remedy all the wrongs we might first investigate to see whether older countries, which have had the same experiences as we, have tried this remedy and if not why not. Away back a century and a half ago Blackstone said, "What kind of an interpretation can he be enabled to give who is a stranger to text on which he comments! It is perfectly amazing that there should be no other state of life, no other occupation, art, or science in which some method of instruction is not looked upon as requisite except only the science of legislation, the noblest and most difficult of any."

MINE ACCOUNTS AND COST SHEETS

(From the Bulletin of the Institution of Mining and Metallurgy.)

The dissimilarity of conditions in mines renders uniformity in accounts impracticable; nevertheless the committee have arrived at the conclusion that as regards the allocation and grouping of expenditure certain general principles may be laid down. The following principles are therefore put forward as of general applicability, and it is recommended that they be adhered to, so far as circumstances may permit. If the procedure recommended in this Report be adopted, in addition to securing many other advantages, it would facilitate a comparison of costs at different mines.

Capital Account.

Before the producing stage is reached, all expenditure should be charged to Capital Account and may be grouped under the following heads: (1) Property; (2) Main Shafts or Main Adits; (3) Machinery and Plant; (4) Buildings; (5) Surface Works (Reservoirs, Water Service, Railway Sidings, Roads, etc); (6) Underground Development.

Main shafts or adits to reach orebodies should be charged direct to capital. Incline shafts which develop ore, subsidiary shafts, winzes or other workings which have assisted development of ore during progress, should be charged to "Underground Development," which either may be subsequently treated as a Temporary "Development" Account, or may remain a Capital charge.

All other expenditure should be carried to a "General Expenditure Account," to be distributed proportionately, as soon as possible after the mine enters the producing stage, over the remaining heads of expendi-

ure, after deducting any revenue which may have been eceived.

After the producing stage is reached, no expenditure hould be charged to Capital Account except large spe- ial items, such as (1) Purchase of additional property; 2) Sinking of new main shafts to reach orebodies; 3) Erection of additional buildings, machinery, plant, r surface works which may be necessary either to in- rease output, to improve recovery, or to decrease costs. Such items of capital expenditure should bear their roportion of the administration and general charges. f any existing shafts, machinery, plant or buildings hould be entirely superseded and replaced, the cost of he old items should be written off Capital to Profit and Loss, either at once (if small) or in the case of large tems, by instalments spread over as short a period as he responsible engineer may recommend. All repairs, naintenance, and replaeements of minor machinery and lant should be charged to Working Costs.

In the interest of shareholders, the Committee desire o express their strong disapproval of the practice, vhich is sometimes resorted to, of charging to Capital, tems of expenditure that should properly be included n Working Costs, thus exhibiting a fictitious statement f profit.

Profit and Loss Account, Etc.

Development.—After the producing stage is reached, ll deepening of main shafts after they have reached the re-body, sinking of interior shafts, as well as all driv- ng, cross-cutting, raising, winze-sinking and plat-cut- ing, should be charged to Development Aceount, which nay be treated as a main head of Working Costs, or he whole of the development before and after reaching he produeing stage may be treated as a Temporary Ac- ount. In the latter case the Working Account should e debited with an average rate of Development Re- demption slightly in excess of the average cost at which he payable ore-reserves have been developed, reckoned n a milling basis; with the object of gradually ex- inguishing the Temporary Account, or of providing unds for securing a gradual and automatic increase n the ore-reserves. After such temporary account is xtinguished all development should be charged direct o Working Costs.

Temporary or Distribution Accounts.—With the bjeet of distributing costs as evenly as possible, it may e desirable to open other temporary accounts in order o spread the cost of considerable items of machinery r plant replacement, or payments which recur annu- lly or at somewhat long intervals, over the monthly osts; the multiplication of such accounts is, however, ndesirable, and they should be rigorously extinguished.

Valuations for Balance Sheet and Profit and Loss Account.—Bullion, concentrates or other marketable products ready for shipment should be shown as assets n the Balance Sheet and credited to Revenue Account t net valuation after deducting all possible reduction harges. Unfinished products when taken into account hould be reckoned only at cost, provided such cost does ot exceed market value.

Depreciation may be considered as it affects the prin- ipal heads of Capital expenditure, viz.:—(1) Property; (2) Main Shafts or Adits; (3) Machinery, Plant, Build- ngs and Surface Works.

As regards property, systematic depreciation is theor- tieally correct, and especially so in the case of mines with ore-bodies of limited and definitely determinable xtent, but is seldom or never carried out. In such ases, however, special reserve funds may be accumu- lated out of revenue with the full knowledge and assent of the shareholders.

In the case of some mines, the probability that exist- ing main shafts will sooner or later require to be super- seded by new ones is so great, that it becomes desirable to write down gradually and systematically the cost of existing main shafts, or to accumulate otherwise an equivalent cash reserve sufficient to cover the cost of a new shaft when required.

As regards machinery, plant, buildings and surface plant, it is clear that although maintained out of Reve- nue in perfect repair and efficiency all such items are liable to become obsolete and have to be superseded. The Committee are therefore of opinion that suitable financial provision should be made gradually out of revenue in the case of every mine for new machinery and plant, buildings and surface works, all of which will probably be needed before the mine is worked out.

Such provision is generally made, (often, however, to an insufficient extent), by means of depreciation charged annually or semi-annually to Profit and Loss Account on the original cost of the plant, buildings, etc., the amount written off being fixed accordingly to a conser- vatively estimated "life" of eaeh item. This method not only accumulates a fund for new plant, but also gradually reduees the assets shown in the Balance Sheet to something more nearly approaching their real value.

Another method which attains the desired end of mak- ing provision for contingencies in an equally effective way, without depreciation, is to include regularly in Working Costs an allowance of a certain sum per month, or per ton, under a separate main heading of "Provision for Additions to Machinery and Plant," or to appropriate each year a certain porportion of the profit to a special reserve fund.

This method simplifies accounts, and, where ample cash reserves are kept in hand, it seems to work well in the case of ore deposits with a determinable life which is ascertained from year to year.

The method of depreciation, however, appears to be generally considered preferable; but care should be taken that the percentage written off is based on the original cost, and not on a balance standing in the books at any subsequent date.

The above recommendations should be carried out as soon as there is an available balance at the credit of Profit and Loss.

Working Accounts and Cost Sheets.

The Committee recommend that for the sake of con- venient comparison, both in working accounts and cost sheets, all expenditure should be classified under the following main heads, viz.:—

1. Development.
2. Extraction of ore (i.e. mining).
3. Sorting at surface, preliminary crushing and trans- port.
4. Reduction costs (i.e. ore treatment).
5. Administration charges and general charges at mine.
6. Realization charges on products.
7. Taxes and royalties of all kinds, shown separately.
8. Head office charges.

The total Capital Expenditure should also be shown on all General Expenditure Sheets.

The sub-division of these main heads into sub-heads must necessarily depend somewhat upon the conditions, but the advantages of adhering as closely as possible to one form, and departing from it only where necessary,

are manifest. The following may be suggested as desirable sub-divisions:—

1. Development Costs need only appear in the general cost sheet in one total, but a detailed sheet should be prepared showing the total expenditure and cost per foot in shaft-sinking, driving, cross-cutting, raising, winzing, and plat (or station) cutting separately, as well as the proportions of these expenditures which are for labour and for materials respectively.

2. Extraction of Ore may be usefully divided into:—
   (a) Stoping or breaking of ore, including under sub-heads: compressed air and rock-drill costs, labour and supplies, shovelling, etc.
   (b) Timbering, filling excavations and sorting of ore in stopes (if any).
   (c) Hoisting.
   (d) Pumping.

Note.—Where the cost of pumping is exceptionally heavy, it may be convenient to make this item a main head. The same remark applies to the removal of overburden when a deposit requires to be stripped.

   (e) Underground tramming.
   (f) Sampling, assaying and surveying.
   (g) General underground maintenance.

It is suggested that these sub-divisions of the main head, Mining or Extraction of Ore, should be set out in detail in the general cost sheet, because mining is at once the principal item of working cost and offers the greatest scope for economies.

4. Reduction Costs must be sub-divided according to the treatment undergone by the ore, as, e.g., crushing, amalgamation, concentration, fine grinding, cyaniding sands, slimes treatment, roasting, smelting, converting, leaching, precipitation, etc.; for each of which a detail sheet should be prepared in such form as circumstances may dictate.

5. Administration may be divided into salaries (general resident manager and clerical staff on the spot), stationery and office general expenses, travelling expenses, insurance and legal expenses, accidents, medical, sanitary and hospital expenses, stabling and sundry transport, etc.

8. Head Office Charges, besides ordinary central office expenses, will include a great variety of items such as agency expenses, directors', consulting engineers' and auditors' fees, bank charges, etc., also interest on debentures (if any).

Note.—The individual items under (5) and (8) are liable at times to merge one into the other.

The Committee recommend that all statements as to the quantities and values of stores, ores and products on hand should be certified by the responsible officials, countersigned by the manager of the mine. An independent audit of stores, etc., is advisable from time to time.

The Committee append to this Report a supplementary memorandum amplifying their conclusions and explaining the grounds upon which these conclusions have been based.

(Sgd.) A. G. CHARLETON,
Chairman of Sectional Committee "E"—
Mine Accounts and Cost Sheets.

STANDARDIZATION.

Memorandum accompanying the Report of the Mine Accounts and Cost Sheets Committee.

The Sectional Committee have carefully considered the views elicited in reply to the circular issued by the Council on April 30th, 1908.

As a result they have come to the conclusion, after thoroughly considering the various aspects of the subject, that uniformity in all the details of Mine Accounts and Cost Sheets, so as to co-ordinate them on precisely the same lines in different districts, is impossible of attainment in practice. This is due to the fact that mines are frequently operated under entirely different conditions, and have, besides, to deal with dissimilar metals, sometimes alone, but frequently in association, necessitating different metallurgical treatment, which naturally involves keeping accounts and cost sheets adapted to meet special requirements of this kind, on somewhat different lines; hence it follows that methods that are applicable in some cases do not always suit others equally well.

They think, however, that a great deal might be done in the direction of standardizing mine accounts and forms by local committees or associations representing groups of mines on each field.

General Principles.

It must be recollected that mine accounts have to fill several different primary functions, and are not merely confined to one object; for instance, whilst serving as records for guidance in the distribution of expenditure and the collection of revenue, they must also show the profit and loss, or the financial condition of the undertaking; but this does not exhaust their aims, as they should be properly designed to supply the management with the statistical data necessary to check the efficiency of the administration, and to point out the direction in which useless expenses may be cut down, or revenue may be increased.

It should also be remembered that the presentation of Working Costs is of little service, unless given in a form that is useful for comparative purposes, and, if due care is not exercised in their preparation, "Cost Sheets" may in some cases be worse than useless, through being absolutely misleading. In fact, as a prominent mining engineer has well stated the case:—"The wide variations in physical and economic environment are so likely to vitiate conclusions from comparison of statistics from two mines, or from two detailed works on the same mine, or even from two different months on the same work, that the greatest care and discrimination are demanded in their application."

The Committee feel, however, that a recognized broad common basis of arrangement, and agreement of details in presenting accounts and cost sheets furnished by mines in different parts of the world, would be of great benefit to the mining profession, as well as to the public who are concerned in the advancement of the mining industry.

There are certain bounds, of course, beyond which segregation and division of working-costs and accounts cannot be carried with advantage in any case, and the value of working costs largely depends, (1) upon their being spread over a considerable length of time, so as to represent true average rates of expenditure; and (2) upon the interest and care taken by managers and heads of departments in securing as far as possible accurate data upon which to base such calculations. It is also of great importance that all items which recur regularly should appear in working costs and always under the same headings, and (3) that all items not clearly chargeable to Capital Account should be included in working costs.

(Continued Next Issue.)

TERRY SHOT DRILLS

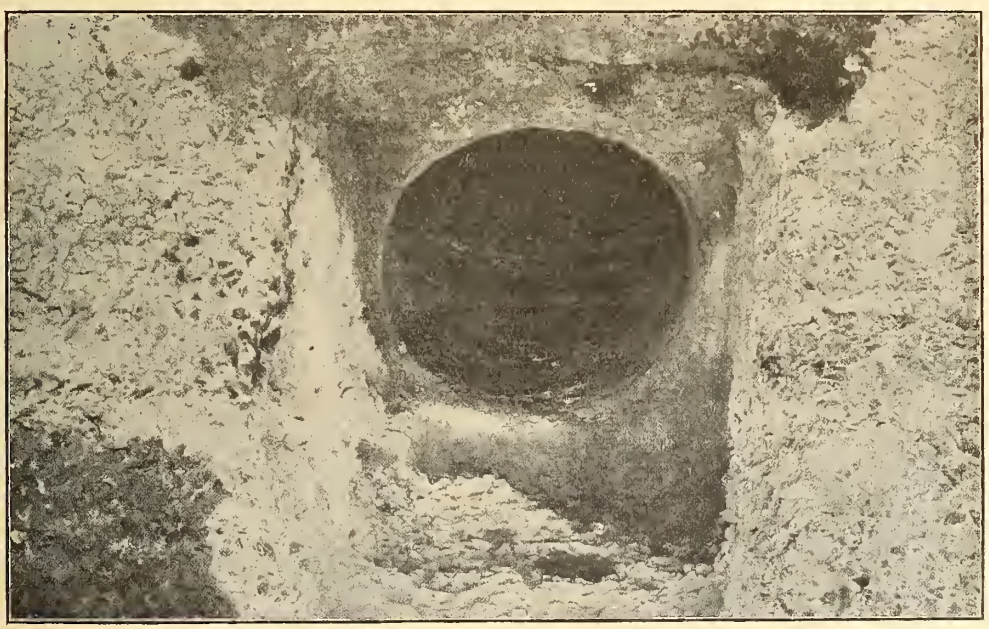
(By P. H. Moore, Consulting Engineer for the McKiernan-Terry Drill Company.)

It has been our experience in the core drill business o find but comparatively few mining, railroad, and ci- il engineers, contractors, and quarry men who realize he practical and numerous ways a core drill of the shot ariety can be used.

In mining exploratory work you can drill a hole to ractically any depth, and, depending on the size of machine used, can take out any size core from one inch to three feet. A hole can be put down at any angle less than 45 deg. from the vertical, and even a flatter angle can be bored providing the speed of the bit is sufficient so that the centrifugal force will keep the shot evenly distributed around the cutting edge. You can put a hole down through hard rock at a speed of twenty inches per hour and much faster in favourable formations. As the machines are entirely portable and self contained it is almost as quick to put down a dozen 100-foot holes as it is to put down one 1,200-foot hole.

Climatic conditions do not seriously hinder core-drill work when the drill is properly rigged. The ease, economy, and speed, with which a mining property can be thoroughly tested is surprising to the every-day miner. The core drill is particularly valuable to the tentative investor in mining properties, who may have obtained a short option on a promising property, but who would like to make sure of just what he is getting before making the final and heavier payments. Sixty and ninety days is long enough to prove up any pro-

Cores from a 29 inch bore hole. Note water-pipe and eye beam cut clean through.



A 29 inch bore hole drilled in the side of a trap rock concrete embankment.

perty if a prospective purchaser would put the proper number of core drills to work, depending, of course, upon the area to be tested, and get a perfect sample of the underlying formation.

The advantage of large cores in mining, say up to 20 or 30 inches, is that the cost of drilling the hole is but little more than a two or three-inch hole, and the core obtained gives a better horizontal sample of the formation.

Then in case the core from some particular hole is sufficiently interesting and the operators deem it wiser to put a working shaft at that point, the core hole of say 20 or 30 inches serves as a sump and a cut to blast to in sinking the shaft. The work thus carried on is in the nature of underhand stoping (always breaking the rock to the large core hole) instead of being obliged to take out sinks and cuts before breaking the bottom of the shaft out to its full size. The large core hole also acts as a sump, and no water can impede the progress of sinking.

For the bare purpose of proving up a prospect where the speed is essential, the Terry Class A drill is big enough, taking out a 1 3-4 inch core to depth of 500 feet. In coal mining the large cores are particularly advantageous as the cores do not break up so badly in friable rock and a more perfect sample is obtained.

The large core holes are also the cheapest way to ventilate a mine. At the Stella mine in Herman, N.Y., numerous 20-inch holes were bored with a Terry drill in place of winzes and raises. It was the experience at this mine also that using a small shot drill, a larger per cent. of perfect core was obtained with the shot drills than with the diamond drills—the shot drill cores being 1¾ inches in diameter, and the diamond drill core being 7-8 inch.

For railroad engineers the shot core drills are particularly useful in testing river and lake bottoms, or in seeking solid formation for piers and bridges, also to prospect for iron, coal, etc., on the railroad lands, or in prospecting to determine the mineral possibilities of different sections of any country through which it might pay to build a line.

The shot-drill is of the utmost benefit to the civil engineer in testing formations for foundations for heavy buildings. Many costly mistakes can be avoided by a perfect knowledge of the underlying formation upon which a building is going to rest.

Contractors and builders use the shot-drills in many ways—boring holes for blasting heavy rock, for elevator plungers, for artesian wells, for oil and gas. The quarry man can use this shot drill for boring deep holes for blasting, for testing the depth of their marketable formation, and last but not least it is perfectly feasable to use a large drill and take out marble or granite columns up to 36 inches in diameter, or even larger, in one solid piece and as long as the natural fractures in the formation will allow, providing the grain of the rock runs the right way.

Advantages Over Diamond Drills.

We perhaps owe more to the diamond drills (and to the intelligent class of men that have operated them) than to any other agents for the disclosure of the mineral wealth of the world. But the shot drill has several advantages over its honoured and rightly respected rival, namely:—

(1) Cost.—The whole shot drill outfit costing barely as much as a single diamond bit. Hence less installation cost. The cost for shot and the wear on bits per foot is about half the cost for wear on diamond.

(2) Speed.—The shot drill cuts a two-inch core at about the same speed as a diamond bit cuts a ⅞-inch core.

(3) Results.—The shot drill gives a larger per cent. of perfect core, of larger size, at less cost, at same speed.

A Class D Terry Drill was lately purchased by the United States Government, for drilling 30-inch holes in a diabase conerete embankment reinforced with steel I beams and drain pipes. The illustration shows how the shot bit bored cleanly through this peculiar formation

Part of 80 tons of Granite and Quartz taken from a 10-inch Bore Hole 2,000 feet deep by a Terry Class C. Drill. Some of the Cores are in solid pieces 18 feet long.

leaving the steel beams and pipe imbedded in the core.

In summing up the many practical ways a core drill can be used to great advantage, I would call attention to the fact that after their invaluable services to the prospector, their greatest value should be to the coal miner—in rescue work. A few 30-inch holes put down in strategic positions from the surface into the lower workings of coal mines, and equipped with ladders, would give ready egress and good ventilation at all times.

Reciprocity in Zinc and Lead Ores and Products.

The thirteenth annual convention of the Associated Boards of Trade of Eastern British Columbia was held at Creston, B.C., in January. It was attended by delegates from the respective Boards of Trade of the following towns: Nelson, Trail, Rossland, Kaslo, Creston, Moyie, and Fort Steele. Among many subjects affecting the commercial and industrial interests of the Kootenay district discussed was that of reciprocity between Canada and the United States in zinc ores and zinc in all its forms, the latter including zinc manufactures.

A resolution of the Kaslo Board of Trade, submitted by the delegates from that Board, H. Giegerich and J. W. Cockle, and adopted by the convention, was as follows:

"Resolved, That the Associated Boards of Trade hereby approve and endorse a certain memorial, a copy of which is attached and made a part of this resolution, dated November 28th, 1910, addressed by J. L. Retallack, on behalf of a majority of actual and potential producers of zinc ore in this province to the Hon. the Minister of Finance, Ottawa, requesting that 'in case of negotiations toward a measure of reciprocal trade between Canada and the United States being entered into in the near future, an attempt should be made to secure the free interchange of zinc ore and zinc in all its forms.'"

MEMORIAL TO MINISTER OF FINANCE.

The memorial thus endorsed was as follows:

"The Hon. W. S. Fielding, Minister of Finance, Ottawa:

"Sir,—After consultation with the majority of present and potential producers of zinc ore from these districts, I beg to respectfully submit that in case of negotiations toward a measure of reciprocal trade between Canada and the United States being entered into in the near future, an attempt should be made to secure the free interchange of zinc ore and zinc in all its forms.

"According to recent announcements, it would appear that the principle upon which the United States tariff has been to some extent framed in recent years, and upon which it will be framed, is the protection of American industries to an extent equal to the difference between the cost of American labour in the exporting countries, whose products compete.

"Under the Dingley tariff, zinc ore was admitted free into the United States, and, on the authority of the 'Mineral Industry,' the total imports of such ores from all sources were for the years hereunder stated as follows:

	1906. Tons.	1907. Tons.	1908. Tons.
Mexico	88,900	108,800	68,383
British Columbia	600	1,157	6,157

.."This in comparison with the domestic production in the United States of: .

1906	905,175	tons.
1907	902,923	tons.
1908	838,277	tons.

"At the hearing of the Ways and Means Committee at Washington in 1908, which resulted in the Payne-Aldrich tariff of 1909, considerable attention was given to zinc. Representatives of the producers of such ore from the mining districts of the west laid much stress upon the low wages paid in Mexico, stating that the peon miner received only 37½ to 50 cents per day (United States currency), whereas the United States miner was paid six or seven times that amount. Not a word, however, was said about low wages in British Columbia, for the sufficient reason, no doubt, that miners' wages here are generally higher than in the productive districts of the United States. They are certainly higher than in New Jersey or the Joplin district of Missouri, which jointly account for more than two-thirds of the production of zinc ore in the United States, or in Oklahoma, and are as high as Wisconsin, Colorado, Montana, Idaho, or any other productive state.

"It would appear, therefore, that the whole argument for the present high zinc duties in the United States was based upon the low wages in Mexico, and that the representations of the United States producers to the Ways and Means Committee in 1908 were that they could not compete with Mexico on even terms. Accordingly, the Payne-Aldrich tariff imposed a duty on zinc-bearing ore carrying 25 per cent. metallic zinc or over of one cent per pound on the zinc in the ore. Certain reductions were provided for ores carrying less than 25 per cent. zinc, but such low-grade ores cannot be handled from this province, and we are concerned, therefore, only with the aforesaid maximum rate.

"This tariff has proved a serious blow to the producers of British Columbia zinc ores and concentrates, and to the production of lead, which in our deposits is usually found associated with zinc. A falling off in the production of one consequently entails a similar condition as to the other.

"As there are no works for the reduction of zinc ores in operation in Canada, and as distance and consequent high freight rates prohibit exportation to Europe, British Columbia producers have now either to ship to the United States for smelting in bond (the granting of such privilege resting with and being dependent upon the arrangements of the American smelters), the resulting product being sold in cheap foreign markets, or to the United States with payment of said onerous duties.

"These duties have prohibited business, except from exceptionally high-grade properties and one or two where a high-grade zinc concentrate is produced as a by-product in the milling of zinc-lead ores.

"Meanwhile Canada imports a considerable quantity of zinc and its products from the United States, so that while the producer of zinc ore in British Columbia has to sell at an exceedingly low figure, the products of his ore are returned to Canada as finished articles at a high figure, an anomaly which it would seem can best be removed through reciprocity.

"The effect of a reciprocal arrangement in regard to zinc may well be that for the present the smelting of our zinc ores will be carried on in the United States. Following the stimulation of a profitable market to production and development, should come such assured increased production as will justify the construction and operation of works in Canada. With a free market for their products, the advantage of reducing existing high

freight rates on ore should provide an incentive for such works.

"Reference has already been made to the indirect benefit which will be conferred on the established lead industry by the increased production of zinc ores.

"I have the honour to be, sir, your obedient servant,

"(Signed) J. L. RETALLACK."

OPINIONS OF DELEGATES.

T. G. Proctor strongly urged the passage of the resolution, as of the utmost importance to the zinc resources of the Kootenay.

H. Giegerich said the Dominion Government, in negotiating a reciprocity treaty, would have in view all the facts thus far presented, and particularly the fact that it had appropriated $50,000 for experimentation in reducing zinc ores, and would safeguard Canada's zinc interests. But this might take three years, and was nothing to be done in the meantime?

G. O. Buchanan said the resolution named not zinc ore merely, but zinc products, and those behind it would insist on that. If the processes were successful, and reciprocity of this kind were obtained, the American market would be absolutely open to the zinc products of the Kootenay.

PRODUCERS OF ZINC ORES.

Mr. Buchanan read from a memo. of Mr. Retallack's as follows: "In addition to the companies and interests represented by J. L. Retallack, viz., the Deep Mine, Limited, Whitewater; John L. Retallack & Co., Whitewater, and the Washington Mine, McGuigan, the memorial had been submitted to and approved by the following: A. J. Becker, for the Lucky Jim Zinc Mines, Limited; the Van Roi Mining Co., per Ernest Levy; the Consolidated Mining & Smelting Company of Canada, Limited, W. H. Aldridge, managing director; the Aurora Mining & Milling Co., of Moyie, per its manager; S. S. Fowler, for the New Canadian Metal Co., Limited; the Enterprise Mine, Limited; the Whitewater Mines, Limited, and other interests; Byron N. White, for the Slocan Star, etc.; A. Fournier, for the Selkirk Mines, Limited; James Anderson, for the Ruth Mines, Limited; the Jackson Mines, Limited; the Ferguson Mines, Limited; Alex. Smith, for the Surprise mine; H. Giegerich, for the Province Mine, etc.; John A. Thomson, managing director of the Mount Stephen Mining Syndicate, Field; and George Aylard, for the Standard Mine, Silverton." Mr. Retallack had received the assurance of the Ministers that if reciprocal arrangements were made, zinc products would be included.

RECIPROCITY IN LEAD.

Reciprocity in lead ores and manufactures was also discussed, and the following resolution, which was submitted by R. Campbell and J. W. Fitch, of the Moyie Board of Trade, was unanimously adopted by the convention:

"Whereas any measure of reciprocal trade with the United States which would permit the free entry of lead ores into that country without also providing for the free admission of pig lead and lead bullion, would, because of the higher price of lead products in the United States, draw away British Columbia lead ores to that country, thereby extinguishing within Canada the industries of smelting, refining, and manufacturing lead, which the Government of Canada has done so much to encourage; and whereas the ultimate effect of this would be to leave our producers of lead ores wholly at the mercy of the American Lead Trust: Therefore, be it resolved that the Associated Boards of Trade of Eastern British Columbia petition the Dominion Government that should they grant reciprocity to lead ores, they will insist that this reciprocal arrangement shall be extended to cover the entire lead schedule."

RESOLUTIONS PASSED IN BRITISH COLUMBIA.

In addition to resolutions relating to reciprocity in lead and zinc ores and manufactures, information concerning which is given separately, discussed by the recently-held annual convention of the Associated Boards of Trade of Eastern British Columbia, the following were adopted:

(1)—"Whereas there are large bodies of complex ores in British Columbia and elsewhere in Canada that cannot be economically treated by any known method; and whereas there is no public establishment in Canada for experimenting with or testing the treatment of such ores; and whereas this convention considers such work to legitimately belong to the Dominion of Canada: Therefore, be it resolved that the Associated Boards of Trade petition the Dominion Government to establish in connection with its Department of Mines a well equipped metallurgical laboratory and testing works, to be properly officered by qualified men, for solving the problems presented by the discovery of various complex ores, which cannot be treated economically at the present time."

(2)—"Resolved, that the resolution regarding the establishment of a Government assay office for the purchase of gold and silver bullion, passed at previous conventions, be re-affirmed, as follows: 'Whereas the only refinery in Canada producing gold and silver is located at Trail, British Columbia; Therefore, be it resolved that, in order that Canadian gold and silver may be used for coining purposes, the Dominion Government be requested to purchase gold and silver at Trail, B.C., on the same basis as the United States purchases these metals through its assay offices situated at Seattle, Wash.; Helena, Mont., and other places, and thereby prevent the exportation of Canadian gold and silver to the United States."

(3)—"Resolved, that we, the Associated Boards of Trade of Eastern British Columbia, desire to record our appreciation of Mr. W. H. Aldridge, who for many years has been managing director of the Consolidated Mining and Smelting Company of Canada, Limited, operating within our territory. Ever since the inception of this association, Mr. Aldridge has been one of its active members. He has been present at nearly all of its meetings, and has always manifested a lively interest, not only in matters pertaining to the mining and smelting industries with which he was identified, but also in all other matters affecting the general welfare of the country. We recognize Mr. Aldridge as a man of extraordinary ability in mining and metallurgy, and we deeply regret his removal from the province. We wish him great prosperity in his new sphere of action." (The secretary was instructed to forward to Mr. Aldridge a copy of this resolution.)

A resolution, submitted by Nelson delegates, providing that the Associated Boards shall petition the Provincial Government "to establish the mining school to be attached to the new University of British Columbia, or a branch of said school, in the Kootenays, and that this school be well-equipped and properly officered by qualified men," was withdrawn upon its becoming evident that a majority of the delegates agreed with G. O. Buchanan, of Kaslo, who expressed the opinion that the "mining school should be at the university, near the city of Vancouver, the Government having a large enough task to get the university started, without having a separate mining school, and dividing the faculty, thus decreasing its effectiveness."

A letter was received from a mine operator, suggesting that the Dominion Government when negotiating a reciprocity treaty with the United States, shall endeavour to have placed on the free list various mine supplies. It was decided to reply to the effect that the Associated Boards did not feel that they could agree upon a resolution that would embody their correspondent's views on this subject.

It was decided that the next annual convention shall be held at Rossland, B.C.

RAMBLER-CARIBOO MINE, SLOCAN, BRITISH COLUMBIA.

An important development in the Slocan district, British Columbia, was the recent opening on the 1050-foot level of the Rambler-Cariboo mine of a shoot of high-grade galena ore four to five feet in thickness. This has renewed interest in this mine, concerning which the following information is believed to be dependable:

The company, incorporated on July 31, 1899, as the Rambler-Cariboo Mines, Limited, has its head office in Spokane, Washington, U.S.A., and its British Columbia office at Kaslo, the Kootenay Lake terminus of the Kaslo & Slocan Railway. Mr. W. E. Zwicky is manager. The company's property embraces five mineral claims having a total area of 175 acres, situated in McGuigan Basin, Slocan mining division, and distant about three miles from the K. & S. Railway at McGuigan.

EARLIER DEVELOPMENT OF THE MINE.

Prior to 1904 development work consisted chiefly of a shaft with levels opened from it. This shaft was sunk from what is known as the 300-foot level, the original workings down to 300 feet having been adits driven in the mountain-side above. The shaft was sunk 500 feet and levels were opened at 100-foot intervals down to what is called the 800-foot level, below which depth it was not practicable to work the mine with the power plant then possessed, for in the spring of each year pumping, especially, would have been too heavy for the available power. By that time much ore had been extracted and from the profits earned $230,000 in dividends had been paid to stockholders. At the beginning of 1904 the directors found themselves in this position: they had to choose between (1) buying and putting in a larger power plant, (2) driving a long adit to cut the vein at a deeper level and at the same time provide for the drainage of the mine at little or no cost after the vein should have been intersected by such deep-level working, or (3) abandoning the mine. Another serious consideration was the altitude of the surface works—concentrating mill, mine buildings, etc.—situated at about 6,000 feet above sea-level, at which height snowslides were troublesome.

A DEEP-LEVEL ADIT.

In the foregoing circumstances Mr. Zwicky strongly recommended that a deep-level adit be driven. Eventually he was authorized by the directors to proceed with this important work, which was commenced on July 9, 1904, and completed on April 16, 1906. The portal of the adit is at an altitude 1,450 feet lower than that of the lowest outcrop of the vein, 2,400 feet below the apex outcrop on the summit of the mountain, and 650 feet lower than the eighth or former bottom level of the mine. At 4,523 feet from the portal of this adit driving was discontinued. The requisite grade having been maintained for draining off the water, the face of the adit is about 1,425 feet below the lowest outcrop of the vein. The writer has stood at the face of the adit and from there seen daylight at the portal distant nearly seven-eighths of a mile. The excellence of the engineering and workmanship in driving this adit, which is 7 feet by 7 feet 6 inches in the clear, was therefore plainly evident.

AN OFFICIAL DESCRIPTION.

Writing of conditions as he found them about the close of 1907, Mr. Robert R. Hedley, in his description for the Dominion Department of Mines' "Report on the Mining and Metallurgical Industries of Canada, 1907-8," observed: "The manager of the Rambler-Cariboo mine states that owing to some disturbance, or fault, at or about the point to which the vein had been projected on this level, the vein was not found, though the tunnel was driven some 90 feet beyond that point. He, consequently, decided to cut the vein at the nearest possible point under the main shaft. A diagonal drift was then run, and from this a raise was made to connect with the upper workings. In about 200 feet of raise the 1,250-foot level was reached and a cross-cut started. At 47 feet from the raise the vein was cut; it was found to be 8 feet wide and contained several streaks of clean galena. Raising was continued, and some driving done at the 1,150-foot level. Stations were established at the 9 and 10 levels. After connection had been made with the old workings some stoping was done in the upper levels, and the work of connecting with the tunnel by a suitable shaft was proceeded with. The necessary equipment was installed at the portal of the tunnel, and suitable cottages, bunkhouse, etc., for the new camp were erected near this lower entrance to the mine."

LATER DEVELOPMENTS.

The further exploration of the mine has been in continuous progress ever since the completion of the above-described development and equipment, except for a few weeks following a fire last summer. Old levels were extended and new levels driven, with the satisfactory result that orebodies were found on these down to the 1,050-foot level. By last summer everything was in readiness for regularly making comparatively large shipments of ore; but the fire came, destroyed mine buildings and all accessories to the compressor plant (though the compressor itself was not much damaged), took away transportation facilities by burning trestles and bridges along five or six miles of the railway, and left the undertaking temporarily at a standstill just when the outlook for large production and a return for years of plucky enterprise seemed within reach. However, the best was made of the position, and steps were promptly taken to overcome the fresh difficulties that had so unexpectedly beset the company. New buildings were erected at the mine, the compressor plant was restored to working order, wagon road communication was (with the assistance of the Provincial Government and the Lucky Jim Zinc Mines, Limited,) established with the C.P.R. Company's Sandon-Nakusp railway at Three Forks, distant about seven miles from the mine, and teams and sleighs were purchased for winter hauling. Snow was late in coming this winter, consequently it was not for some time practicable to haul ore all the way to Three Forks, but by the middle of December 4,000 sacks of ore and concentrate (for the mill was not destroyed by the fire) were hauled half-way to Three Forks, and later it was taken to the railway and shipped thence to the smeltery. It was estimated that while the sleighing should continue good shipments would total about 200 tons a month. The year's shipments prior to July 16, the date of the fire, totalled 601 tons of crude ore and 63 tons of concentrate. The smeltery returns for 1910 show a total of 802 tons received from this mine. Shipments in 1909 aggregated about 1,020 tons, this quantity including 340 tons of concentrate. No information is possessed relative to 1907 and 1908, but it is known that during the period 1893-1906, inclusive, the aggregate output was about 14,500 tons of ore and concentrate, with the following average metal contents: Lead, 37 per

cent.; zinc, 14 per cent., and silver, 127 oz. per ton. It would appear, therefore, that to date between 16,000 and 17,000 tons of ore has been shipped from this mine, which now has an excellent prospect of adding substantially to this comparatively large output tonnage.

A BRIGHT OUTLOOK.

The following comment, written last year, may be quoted as an appropriate conclusion to the foregoing information concerning the Rambler-Cariboo mine: "There is no doubt that the Rambler-Cariboo is now in better condition to return substantial profits above operating costs than at any other time for years. The successful outcome of the enterprise planned six years ago by Mr. Zwicky, whose wise foresight was not at that time generally recognized, is of much moment to the Sloean district as a whole. Recognition of the pluck of the directors of the Rambler-Cariboo company, themselves large stockholders, in financing what at first seemed a somewhat hazardous as well as costly undertaking, is also merited. They had faith, though, in their manager's skill and good judgment, and the sequel has proved that it was well grounded."

It may be added that there are now eight or ten mines in the Sloean district at which development in the deep has been carried out, and in most of them is being continued. The results are generally satisfactory, so that there seems to be good reason to think mining in the Sloean will be productive and profitable for years, and particularly so if it shall be found practicable to turn to profitable account the zinc contents of the ores as well as the silver and lead.

An English Compressed Air Mine Haulage Engine

BY FRANK C. PERKINS.

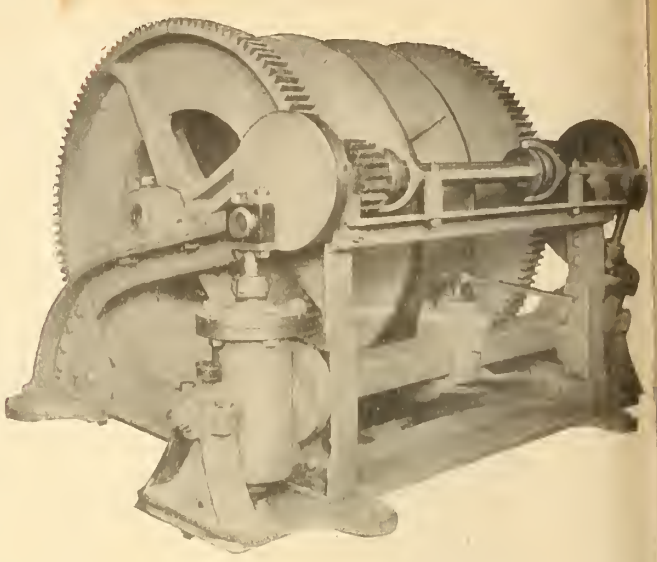
An English compressed air haulage engine of unique design is shown in the accompanying illustration, designed and built at Park Sheffield, England. It will be noted that the machine is constructed for lightness, combined with strength, and is portable, being quickly dismantled and installed in another part of the mine.

It will be seen that the drums, of which there are two, are easily rolled into their places, no lifting being necessary, and each drum is capable of containing 500 yards of ½-inch wire rope, which lead off in either direction, top or bottom. The gear is cast, the pinion being of cast steel, with double keys solid with the shaft, sliding in or out of gear as desired.

It is stated that the cylinders, although oscillating, give no trouble, as they are well supported on large trunnions and not fitted with glands, as the air does not pass through them, but through separately arranged ports upon a flat face. The faces are held together by a spring saucer washer, and a ball thrust ring, so that friction is reduced to a minimum, whilst the faces are light, so that no dust can get in.

It is claimed that the piston rods are the only working parts exposed to dust, and they are fitted with metallic packing, a white metal bush filling the stuffing box and the cylinders are placed behind the drums on the hoists of large size.

In this English air hoist the controlling valve is the leading feature. It is said to start, stop, reverse and regulate the speed to the greatest nicety with one lever, dispensing with all link motions, eccentrics, sliding valves and rod pins, which are liable to come loose and cause trouble.



It is maintained that freezing is impossible as th inlet and outlet passages are close together and th temperature is equalized. Powerful brakes are fitted t each drum, and the machines are so simple and access ible that they can be taken to pieces in 20 minutes an put together again in 40 minutes by two men withou difficulty.

In some mines where there are dangerous gases ther is a desire to dispense with ponies and at the same tim avoid the dangerous use of electricity in the mines This has led to the introduction of this new and ex ceedingly simple form of haulage gear and engin driven by compressed air.

Personal and General

Mr. P. Kirkegaard, managing director The Deloro Min ing & Reduction Co., Ltd., has resigned that position i order to devote his whole time to his other interests. Mr Kirkegaard and his associates, Messrs. MacKechnie and Hughes, recently bought the Belmont gold mine at Cordova, and it is their intention to start active work in the spring. Mr. Kirkegaard will act as managing director. His duties in this capacity will occupy only a part of his time, and he will be able to direct operations on various properties in Cobalt, Gowganda, Porcupine, and elsewhere. Mr. S. B. Wright has been appointed manager at Deloro, and Mr. T. Melvar, chief chemist, assumes the added duties of superintendent.

Mr. R. B. Lamb, mining engineer, Toronto, is in Porcupine on professional business.

Mr. Alexander Grant, manager of the Marble Bay gold-copper mine, near Van Anda, Texada Island, B.C., is convalescent and has resumed his duties at the mine after having been ill at Victoria nearly all the winter.

Mr. W. H. Trewartha-James, of Victoria, B.C., general manager of the Tyee Copper Company, Limited, was in New York early in February. He contemplated going thence to England on a business visit, before returning to British Columbia.

Among the Cariboo district hydraulic placer-gold mining men who have been spending the winter in one or other of the Coast cities, are Mr. John B. Hobson, who has been at his home in Victoria; Mr. John Hopp, whose Coast home is in Seattle, Washington, and Mr. Mel-

bourne Bailey, whose family residence is in Tacoma, Washington.

Mr. Thomas Kiddie, of Vancouver, B.C., has again been superintending trials of oil as fuel for smelting copper ores, at the Van Anda smeltery, Texada Island, B.C. The demonstrations made at those works during recent months have attracted the attention of several other metallurgists, who are also much interested in the considerable measure of success that has been achieved.

Late movements of British Columbia mining engineers or managers include the following: Mr. J. W. Bryant, the Tyee Copper Company's senior field mining engineer, is in charge of the development work that company is engaged in at the Cornell gold-copper mine on Texada Island; Mr. Lewis Hind, of Hind & Cane, mining engineers, Victoria, has returned from a professional visit to Mexico and southern California; Mr. Louis Pratt, formerly manager of silver-lead mines in the Slocan district, has again gone to England in connection with Messrs. P. Burns & Company's mining business.

Arrangements were made during the early part of February by a number of men prominently associated with the industrial, commercial, and financial interests of the Kootenay district of British Columbia, to entertain at a valedictory banquet, Mr. W. H. Aldridge, late managing director of the Consolidated Mining & Smelting Company of Canada, Limited, who recently retired from the general management of the company's big mining and smelting business. The date of the banquet was to be dependent on Mr. Aldridge's convenience—probably late in February, when he was expected to return to Trail, B.C., on a brief visit.

There have been several recent changes in connection with western coal mines; among them the following: Mr. F. W. Guernsey, formerly of Trail, B.C., is now manager of the Bankhead colliery, Alberta; Mr. J. Robertson has been appointed manager for the Head Syndicate, Ltd., which is developing a valuable coal property adjoining on the south that of the International Coal & Coke Co., Ltd., in southwestern Alberta; Mr. Jas. Holden has succeeded Mr. Chas. Graham as superintendent of the Princeton Coal & Land Company's colliery at Princeton, Similkameen, B.C.; Mr. Andrew Bryden, for years manager of the Dunsmuirs' Extension colliery, Vancouver Island, is superintending the development of the Coal Hill Syndicate's property in Nicola Valley; Mr. Edward Hodgson, of Victoria, and associate capitalists resident in New York, are stated to have obtained control of the Pacific Coast Coal Company, operating on Vancouver Island, and will shortly assume full charge of the company's mines and offices. It is reported that Mr. W. R. Wilson, who some years ago was with the Crow's Nest Pass Coal Company, is expected to again become connected with the operation of that company's coal mines in southeast Kootenay.

SPECIAL CORRESPONDENCE

ONTARIO.

Cobalt and Other Silver Areas.

The pressure from the Hydraulic power plant is still low though the plant at Ragged Chutes has now been completely repaired. There is a shortage of water but the tributary dams on the Montreal should give all the pressure desired in a few days.

The Nova Scotia ran into a very rich but short ore shoot on the 79-foot level. For ten to twelve feet the vein was extremely rich and about five inches wide. Some beautiful leaf silver was also taken out of the diabase wall rock.

On the T. & H. B. claims in the Hangingstone section of Gowganda three shafts have been put down on separate veins. One, down 80 feet, still shows excellent high grade silver ore and another at 50 feet is also rich, while in the third shaft there is heavy smaltite. A bigger plant is being taken in.

The thawing house at the Beaver mine was destroyed, and an Austrian, George Ranik, killed instantly, by the explosion of 300 pounds of dynamite in the early part of last week. Some of the camp buildings were wrecked.

In the Gowganda section the Bartlett and Reeves Dobie have both shipped high grade ore. The Reeves Dobie has sent out about four tons of concentrates from its mill, which at the present time is not operating. The Bartlett despatched five tons from an open cut.

The Welsh property, in which the Farmers Bank is stated to have an interest, is to open up operations very shortly with power from the Bartlett. A very considerable amount of development work has been done to date.

The Wettlaufer has just shipped another 30-ton car of high grade ore which will run between 3,000 and 4,000 ounces to the ton. The shaft at this South Lorrain property is down 240 feet, with a winze 60 feet deeper and still in ore.

In the Gowganda district the Miller Lake O'Brien to date has shipped 54 tons of ore, containing 150,000 ounces of silver, and it is now producing at the rate of $15,000 per month. There is an ore body 275 feet long at the 90-foot level and 80 feet long at the 140-foot level, with excellent high grade in the heading of the south drift. It is stated that there are two years' reserves now in sight.

In the Lost Lake section of the Montreal River Company the Calcite Lake Mining Company has recently run into a vein of good ore at the 125-foot level. It has been opened up for twelve feet from two to three inches wide and will run about two thousand ounces.

The Nipissing report for January shows that the company mined ore of an estimated value of $200,821 net, and shipped ore worth $165,768. The principal development was at shaft 64, where an ore body 40 feet long has been extended for another 54 feet, and for that distance is eight inches wide of very rich ore. The drift of 54 feet yielded at the rate of $960 per foot.

At the present time the Beaver has in its No. 5 vein at the 300-foot level one of the most spectacular showings in the camp. At the top of a small stope there is 21 inches of 6,000 or 7,000 ounce ore and the average for ten to fifteen feet will be 18 inches. The Beaver has two exposures of high grade ore on No. 5 vein at the 300-foot and is still stoping on ore at the 200-foot level. No. 3 vein is also showing up well.

The revelation of over-issue of capital at Little Nipissing has temporarily closed down the mine till after the meeting when the financial matters have been straightened out. The Little Nipissing has had some rich pockets of ore, but they were very short. There is still some high grade unstoped in the mine.

Porcupine and Other Gold Areas.

A drift has now been opened on one vein of the Hollinger at the 100-foot level for 1,200 feet. A winze has been sunk another 100 feet, and is still in ore. All the stamps and mortars for the 30-stamp customs mill have arrived and it is believed will be in operation by July at latest.

A diamond drill core from the 200-foot level of the Rea Mines, the Goldfields Consolidated holding in Porcupine, shows considerable values in free gold. Thus another property has proven values at depth.

Since it is believed that there will be an early break-up many properties are rushing in small plants. The Preston East Dome,

the Tisdale, and the Armstrong Booth have all ordered small plants to be delivered at once.

After working for almost three years the Swastika mine in Otto township has now got excellent gold values in a winze 25 feet below the 100-foot level. The little mill has produced 50 ounces. A new stamp mill has been erected and will be running in a few days. The property is located in a section that has generally been discredited as a mining area.

The first gold brick from the little Nissen mill at the Vipond property has just been sent to the company's offices in New York. The brick weighs 92 ounces and is stated to be worth $1,700.

The English house of Bewick, Moreing & Co. is stated to have taken up on option the 50 undeveloped claims of the Timmins McMartin Dunlap syndicate and an immediate expenditure of half a million dollars to open them up is guaranteed.

Mr. F. Augustus Heinze, who has had an option on the Foster property, is going to test the formation at depth with two shot drills. Mr. Bob Weiss is in charge of the property.

W. S. Edwards, one of the stakers of the Dome property, has taken an option on the Smith veteran, upon which a good find was made recently. He has sampled and examined it thoroughly.

An extremely good find in the Cripple Creek district is recorded on the Carleton claims. Free gold in the blue quartz was discovered at the bottom of a 12-foot shaft. The assays are uniform, but specimens are not as spectacular as in Porcupine itself.

The discovery of excellent free gold values at the Swastika mine in Otto township may put new life into the Larder Lake field. The values first became good at the 100-foot level and spectacular in the winze 25 feet below. The persistence of values to depth has caused a rush of prospectors to take up expired claims. The property has been operated by a Tavistock, Ont., syndicate for almost three years now. A small three-stamp mill will be replaced shortly by a new five-stamp mill. The little property has already produced 50 ounces of gold.

Many properties are now ordering small plants before the break up and the consequent demoralization of the roads. Among these are the Tisdale Mining Company, the Booth Armstrong, and the Imperial Porcupine.

The Standard Gold Mines in Deloro township will let a contract for a thousand feet of diamond drilling on its claims. A small plant will also be shipped directly the railroad reaches Porcupine. The company owns what are known as the Silver properties.

The magic word "tellurides" has again precipitated a rush directly south to the Bartlett township and the Sudbury division directly south of it. So far the statement of the prospectors, who declare they found telluride ore down there, has not been corroborated. A Cobalt firm of assayers made the declaration of gold in the ore.

GENERAL MINING NEWS.

NOVA SCOTIA.

GLACE BAY.—All of the collieries of the Dominion Coal Company are working actively and an exceptionally large tonnage is being banked in preparation for the present year's expected record output and shipments. About 12,000 tons a day is now being hoisted.

SYDNEY.—Malcolm Beaton, former manager of the Inverness and Richmond Coal Company, has taken a position with the Dominion Coal Company, and has entered on his duties as manager of No. 16 colliery.

NEW BRUNSWICK.

ST. JOHN, N.B., Feb. 13.—What is declared to be probably the most valuable cargo ever sent from a Canadian port is on board the C.P.R. liner Empress of Ireland, sailing from this port Friday for Liverpool. The value is $393,000. Included are two tons of Cobalt bar silver and 250 tons of nickel copper matte, the latter for British navy armour plate.

QUEBEC.

MONTREAL.—Following is an abstract of the report of Mr. Edward Slade, managing director of the Black Lake Consolidated Asbestos Company:

The mill is designed to operate as two independent units, each unit producing identically the same grades.

It will be interesting to know that the mill will handle, without crowding, one thousand tons of rock per day of 20 hours, an actual run of over 600 tons having been made with one-half the mill on several occasions.

With a view to testing out thoroughly the new process of treatment adopted in order to produce the most marketable grades, the work during a considerable portion of last season was largely experimental and we purposely delayed the completion of the second unit until the end of the year.

The mill is now complete in every detail and the grades thoroughly established so that now the mill is ready to operate at full capacity as soon as weather conditions permit. During this period the company produced 3,046 tons of asbestos of various grades. Of this, 837 tons have been shipped. Owing to the satisfactory character of our grading, contracts have already been closed for 2,400 tons additional and negotiations are pending for over 3,000 tons more, so that the sale of our entire output is now fairly well assured.

It is gratifying to be able to state that the pits, which have been developed to date, have more than realized our expectations. The quantities of high grade asbestos are steadily increasing as the pits are enlarged, so that with the addition of the extra hoists referred to above we can be assured of a continuous supply of mill rock, the quantities of which in sight and proven are practically inexhaustible.

I can safely state that the property is now in a position to earn all its fixed charges, and a substantial surplus.

ONTARIO.

COBALT, Feb. 18.—The Wettlaufer mine of South Lorrain is making a shipment of high-grade ore through Haileybury.

SAULT STE. MARIE, Feb. 23.—J. J. Byrne, who has been interested in gold and silver discoveries at Cobalt, Porcupine, and Gowganda, returned to the Soo yesterday afternoon from Hobon, the new gold field discovered by Wm. Noquist, of the Soo, last November. Mr. Byrne, with Mr. J. Hollinger, have staked 16 claims at Hobon, adjoining the Noquist claims, and all show rich values. Assays made on ore run from $6.60 to $400 to the ton. It is expected that with the advent of spring a rush will bo made to Hobon.

COPPER CLIFF.—Mr. A. P. Turner, president of the Canadian Copper Company, has gone south on account of his health, and expects to remain in Florida for a couple of months. He has always been a vigorous worker and has well earned a rest. Mr. John Lawson, who has been his right hand man, is also unfortunately ill, and is on a course among the islands of the West Indies. He is rapidly recovering and is expected in Copper Cliff again early next month. Meantime, Mr. D. H. Browne, Chief Metallurgist, has charge of operations.

PORCUPINE CITY, Feb. 13.—Messrs. Pope and Kuehn, in the employ of Bewick-Moreing, have been here three weeks sampling veins on the Feldon properties which were sold to P. Kirkegaard, of Deloro, Ont., and the John Gray properties in Ogden.

To date, a total of 72 claims in the townships of Whitney, Tisdale, Deloro, Shaw, Carman, Munro, and Langmuir, have been placed in the hands of Mr. McConnell, of Montreal.

BRITISH COLUMBIA.

NELSON.—The Molly Gibson mine has again commenced to ship ore to the smelter, a number of sleigh loads having been brought from the end of the tramway to the landing at Kokanee during the past few days. The ore is being left at the landing pending the arrival of a barge when it will be shipped to the smelter at Trail.

The new tramway, which contains one of the longest spans in the province, is working smoothly. It is a trifle over four and a half miles in length and the long span is over a mile long. The successful building of this tramway, which was for the purpose of carrying the ore from the mine over the portion of the road frequently impassable in the winter and spring owing to snowslides, is considered a fine piece of engineering work, the construction of the long span having presented exceptional difficulties.

With the new tramway in working order and with a large supply of ore on hand in the mine, the Molly Gibson is expected to be a regular shipper from now onwards.

NEW DENVER, Feb. 16.—The Sweet Grass lessees have struck a good vein of high grade ore in their No. 2 tunnel.

Three carloads of machinery for the Van Roi mine at Silverton, arrived last week.

With the opening of the Van Roi new mill and a large staff of men at the mine, the working of the Standard mine on a larger scale, whether Patsy Clarke takes up his option or not, the operating of the Enterprise, Slocan Star, Ruth, Hope, Evening, McAllister, Reco, Richmond-Eureka, Sweet Grass, Molly Hughes, Neglected, Jo-Jo, etc., the spring outlook for mining in the Slocan district and New Denver and Silverton is of the brightest.

The Noble Five mine at Cody shipped a car of high grade silver galena ore this week, the first in ten years. Development work will be kept up all winter. T. L. McAllister, of Cody, is in charge.

New Denver merchants complain bitterly of Nelson and coast wholesalers selling to the mines in this vicinity at wholesale prices.

NELSON, Feb. 18.—The Phoenix Amalgamated, Ottawa, Knob Mill, and Noble Five mines joined the shipping list the past week. The Phoenix Amalgamated is the property of the Consolidated Mining & Smelting Company, on which work was recently resumed. The Ottawa is a silver-lead mine at Slocan City, and was a shipper last year. The Noble Five is a silver-lead property that has long been off the shipping list, and is one of the Cody mines. The Knob Hill is in the Republic camp in Washington.

MINING NEWS OF THE WORLD.

UNITED STATES.

BAKERSFIELD, CAL., Feb. 21.—During January there was a decline of 119,497 barrels in the production of oil in California, compared with the production of December. The January output amounted to 5,993,300 barrels, and that of December to 6,111,807. The daily average of January production was 193,300 barrels and that of December 197,155.

CRIPPLE CREEK, COLO., Feb. 20.—The project for a third deep drainage tunnel is still to be considered after Engineer T. R. Counryman has made his report, according to President Frank G. Peck, of the Cripple Creek Drainage & Tunnel Company, who was one of the committee to visit the district and inspected the Roosevelt tunnel.

BUTTE, MONT., Feb. 14.—A company with a capital of $1,500,000 is being organized by capitalists of this city and the East for the purpose of constructing an electric railway for the hauling of ore from the Silver Lake district to Anaconda. In this district is located the celebrated Southern Cross mine, which eastern men inspected about one year ago and on which they had an option and afterwards relinquished. That property has now 75 men at work and is shipping its ore to the Washoe smelter, necessitating a waggon haul of 12 miles.

SPOKANE, WASH., Feb. 18.—Bunker Hill and Sullivan Mining & Concentrating Company, operating at Kellogg, Idaho, brought its total disbursements to date to $12,456,000 by the payment of dividend No. 161, amounting to $81,750, a few days ago. One hundred and sixty-three thousand five hundred dollars has been paid so far this year. The Bunker Hill property is declared by experts to be the greatest dividend-paying silver-lead property in the United States, if not in the world.

MEXICO.

PARRAL, Feb. 21.—Another big strike has been made at the Santa Ines property of silver ore running 20 kilos. The engineer advises that values are increasing with depth. The depth reached so far is 125 metres.

CANANEA, SONORA, Feb. 21.—While there is nothing of the sensationalism in development among the mines of the State of Sonora, there is, however, a widespread development of old and new properties unattended by excitement that is accomplishing more substantial good than has yet been vouchsafed the industry. All work is systematic and is being conducted by strong financial interests.

SOUTH AFRICA.

JOHANNESBURG, Feb. 7th.—Three hundred out of the Randfontein Central's full mill of 600 stamps are to be dropped on Wednesday.

At the meeting of the Randfontein Estates the chairman announced that henceforward profits would be devoted to dividends.

The Langlaagte Estates has acquired mining rights on a bewaarplaatsen area.

COMPANY NOTES

CROWN RESERVE.

The Crown Reserve directors met Feb. 13th and declared the second of the monthly dividends of 5 per cent. It is payable March 15 to shareholders of February 28. The finances are still in fine shape, and after paying the dividend and all other charges $20,000 will be added to the reserve.

RIGHT OF WAY.

The report of the Right of Way Mines, Limited, for 1910, shows that the ore sales amounted to $233,838. Four quarterly dividends of two per cent., at the rate of eight per cent. per annum, were paid, amounting to $134,840. A balance of $45,027 remains to the credit of profit and loss account. At the end of the year the company had cash on hand and due from smelters, $76,361. The total assets of the company, including mine property, plant, etc., amount to $1,784,388, and the issued capital stock is $1,685,500. The old board of directors was re-elected.

BAILEY.

At the annual meeting of the Bailey Cobalt is was shown that the company had a surplus of $26,529 in addition to 413 pounds of bullion and seven bars of silver, as well as a car of ore about ready to ship, expected to return about $20,000.

N. S. STEEL & COAL CO.

The Nova Scotia Steel & Coal financial report for year ending December 31, 1910, shows profits of $1,140,504.37, which, with reductions in fixed charges, enabled the directors to declare an increase in dividend to 6 per cent. President Harris says the dividend has not been increased without careful consideration.

In 1909 profits were $907,949, and at that time were about $200,000 in excess of 1908.

The following is taken from the president's report:

The balance carried forward to credit of Profit and Loss, January 1st, 1910, was $336,807.38, which, added to the profits for the year, gives a sum of $1,477,311.75, at the credit of this account.

The sum of $79,371 has been transferred to Reserve Fund, and $6,344 to Fire Insurance Fund; $218,104.80 written off, which includes the entire amount paid for discount and expense on the new bonds issued during the year, as well as a considerable sum paid for improvements and betterments.

After fixed charges and dividends there remains a balance to the credit of profit and loss account of $500,602.95. The sum of $908,362.63 has been expended during the year on capital account.

TEMISKAMING.

At the annual meeting of shareholders on Feb. 18th, the statement for the eleven months to Dec. 31, 1910, was presented. Formerly the company's year ended Jan. 31, but last year it was changed to the calendar year so that the period covered is for only eleven months.

The income for the eleven months amounted in all to $1,022,390.52 and the expenditure to $308,071.01, leaving a profit of $714,319.51, which amounts to some 35 per cent. of the capitalization. The income of the previous year amounted to $345,306.60.

"It is gratifying to be able to report that high-grade ore is now being encountered at a depth of 540 feet from the surface," said President Cartwright in his address. "The formation is here found to be unchanged."

"Our ore still maintains its high silver values. The average of the 1,029 tons of all grades produced during the year was 1,819 ounces to the ton, and that of the 359 tons produced from the sorting tables and shipped was 3,715 ounces to the ton. We believe these to be the highest averages in the camp, which is interesting from the fact that it is won from Cobalt's deepest workings."

WESTERN COKE & COAL.

Tho Western Coke & Coal Company, at its annual meeting at Montreal, heard the reports of the various officers who told that by August of this year it is expected that the company will be able to produce from its coal fields about 1,000 tons of coal per day. The company has a paid-up capital of $2,300,000, and is engaged in coal mining thirteen miles from Pincher Creek, near the Crow's Nest Pass. The directors re-elected are: Messrs. E. B. Greenshields, Hon. Robert Mackay, J. W. McConnell, H. A. Lovett, K.C., Charles Fergie, and Nathaniel Curry.

AMALGAMATED ASBESTOS.

The annual general meeting of the Amalgamated Asbestos Corporation will be held on March 8. It is understood that the shareholders will be told of the greatly improved circumstances financial and physical.

STATISTICS AND RETURNS

TORONTO MARKETS.

Feb. 24. (Quotations from Canada Metal Co., Toronto):
Spelter, 5.60 cents per lb.
Lead, 3.65 cents per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 44 cents per lb.
Copper, casting, 13.25 cents per lb.
Electrolytic, 13.25 cents per lb.
Ingot brass, 8 to 12½ cents per lb.

Feb. 24—Pig Iron.—(Quotations from Drummond, McCall Co., Toronto):
Summerlee No. 1, $23.00 (f.o.b. Toronto).
Summerlee No. 2, $22.50 (f.o.b. Toronto).
Midland No. 1, $20.00 (f.o.b. Toronto).
Midland No. 2, $19.50 (f.o.b. Toronto).
Hamilton No. 1, $18.50 (f.o.b. Hamilton).
Hamilton No. 2, $18.00 (f.o.b. Hamilton).
Clarence, $20,00 (f.o.b. Toronto).
Cleveland, $20.00 (f.o.b. Toronto).

GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.

COKE.

Feb. 21.—Connellsville Coke (f.o.b. ovens).
Furnace Coke, prompt, $1.50 to $1.60 per ton.
Foundry Coke, prompt, $2.00 to $2.15 per ton.

Feb. 21.—Tin (Straits), 44.25 cents.
Copper, Prime Lake, 12.75 cents.
Electrolytic copper, 12.50 cents.
Copper wire, 14.00 cents.
Lead, 4.50 cents.
Spelter, 5.75 cents.
Sheet zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.50 cents.
Aluminium, 21.00 to 21.50 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $38.50 per ounce.
Platinum, hard, $41.00 per ounce.
Bismuth, $2.00 to $2.10 per lb.
Quicksilver, $48.00 per 75-lb. flask.

SILVER PRICES.

		New York. cents.	London. pence.
February	8	51¾	23⅞
"	9	51⅜	23 11/16
"	10	51⅝	23 13/16
"	11	51⅞	23 15/16
"	13	Holiday	23 15/16
"	14	51⅞	23 15/16
"	15	51⅝	23 13/16
"	16	51⅞	23 15/16
"	17	52⅛	24 1/16
"	18	52⅛	24 1/16
"	20	52⅜	24 3/16
"	21	52½	24 3/16

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

MISCELLANEOUS.

	February 23, 1911. Bid.	Ask.
Amalgamated Asbestos	10½	12
Black Lake	15	17
Dominion Coal	..	..
Dominion Steel	..	..
Dominion Steel Corp.	57¼	58½
Granby	34	35
Consolidated Mining	43	50
Nova Scotia Steel	95	96
Crow's Nest Pass	..	77

Cobalt Stocks.

Amalgamated	.01	.02
Bailey	.06⅛	.06¼
Beaver Consolidated	.40	.40¼
Buffalo	2.15	2.35
Chambers-Ferland	.13¾	.15
City of Cobalt	.17	.19
Cobalt Central	.08	.10
Cobalt Lake	.19¾	.20½
Coniagas	6.90	7.15
Crown Reserve	2.71	2.73
Foster	.05½	.07
Gifford	.02½	.03¼
Great Northern	.10¾	.11
Green Meehan	.02	.02⅛
Hargraves	.24⅞	.25¼
Hudson Bay	1.00	1.05
John Black	.01½	.02½
Kerr Lake	6.83	6.90
La Rose	4.88	4.94
Little Nipissing	.05	.05¼
McKinley	1.77½	1.78
Nancy Helen	.02	.05
Nipissing	10.80	11.25
Nova Scotia	.16	.16½
Ophir	.13¼	.20
Otisse	.01¼	.01½
Peterson Lake	.14⅞	.15⅛
Right of Way	.13	.14
Rochester	.04½	.04¾
Silver Leaf	.05	.05⅜
Silver Bar	...	...
Silver Queen	.03	.05
Temiskaming	.87	.87½
Trethewey	1.05	1.06½
Watts	4 sellers	
Wettlaufer	1.01½	1.03
Hollinger	5.80	5.85

New York Curb.

	Bid.	Ask.
Brit. Col. Copper	06½	06¾
Butte Coalition	18½	19½
Chino Copper	21⅝	21¾
Davis-Daly Copper	01¼	01½
Ely Consolidated	30	31
Giroux Mining	01 5/16	01⅜
Goldfield Consolidated	.06⅝	06¾
Greene-Canadian	06 1/16	06 3/16
Harcuvar Copper	...	...
Inspiration Copper	08 3/16	08 5/16
Miami Copper	20	20¼
New Baltic Copper	...	...
Nevada Con. Copper	19⅛	19⅜
Ohio Copper	01 5/16	01⅝
Rawhide Coalition	03	04
Ray Central	01⅜	01 7/16
Ray Consolidated	17½	17⅞
Union Mines	00¼	00 5/16
Yukon Gold	04	04 1/16

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending Feb. 17, and those from Jan. 1, 1911, to date:

	Feb. 17 Ore in lbs.	Since Jan. 1 Ore in lbs.
Beaver	53,060	310,520
Buffalo	60,110	368,130
Chambers-Ferland	.....	128,900
City of Cobalt	.....	126,280
Cobalt Lake	60,000	380,540
Cobalt Townsite	.....	249,740
Coniagas	.....	504,450
Crown Reserve	56,800	276,540
Hudson Bay	61,110	122,350
La Rose	226,090	807,420
Kerr Lake	60,040	661,419
King Edward	40,000	40,000
McKinley-Dar-Savage	59,800	753,070
Nipissing	186,890	1,323,120
O'Brien	60,000	205,210
Peterson Lake (Little Nip.)	.....	58,430
Right of Way	.....	193,550
Silver Cliff	.....	47,920
Temiskaming	.....	283,195
Trethewey	.....	139,250

The shipments for the week were 933,960 pounds, or 466 tons.

The shipments from Jan. 1 to Feb. 17 were 6,980,034 pounds, or 3,490 tons.

BRITISH COLUMBIA ORE SHIPMENTS.

The following are the returns of the ore production and movement for the week ending February 11th:

Boundary Shipments.

Granby	25,507	137,172
Mother Lode	5,892	38,004
Snowshoe	3,162	12,977
Rawhide	4,101	26,944
Jack Pot	633	2,894
Number Seven	31	411
Other mines	.....	240
Total	39,326	218,642

Rossland Shipments.

Centre Star	3,100	20,377
Le Roi No. 2	787	3,160
Le Roi No. 2, milled	300	1,800
Le Roi	299	1,621
I. X. L.	7	14
Nickle Plate	30	124
Other mines	.....	22
Total	4,523	27,118

Slocan-Kootenay Shipments.

Sullivan	824	3,920
St. Eugene, milled	2,775	16,650
Richmond-Eureka	95	413
Ruth	32	132
Rambler-Cariboo	63	298
Hewitt	20	111
Queen, milled	315	2,310
Granite-Poorman, milled	250	1,500
Nugget, milled	110	660
Wilcox, milled	75	450
Emerald	124	428
Society Girl	60	174
Eastmont	29	58
Yankee Girl	143	213
Mollie Hughes	4	4
Other mines	.....	934
Total	4,919	28,255

The total shipments, including the estimated milling, were for the week, 48,768 tons, and for the year to date 274,015 tons.

B. C. COPPER COMPANY'S RECEIPTS.

Greenwood, B. C.

Mother Lode	5,892	38,004
Rawhide	4,101	26,944
Jack Pot	633	2,894
Other mines		240
Total	10,626	68,082

GRANBY SMELTER RECEIPTS.

Grand Forks, B. C.

Granby	25,507	137,172

CONSOLIDATED COMPANY'S RECEIPTS.

Trail, B. C.

Centre Star	3,100	20,377
Snowshoe	3,162	12,977
Sullivan	824	3,920
Le Roi No. 2	787	3,160
Le Roi	299	1,621
Number Seven	31	411
Richmond-Eureka	95	413
St. Eugene	155	757
Ruth	32	132
Rambler-Cariboo	63	298
Hewitt	20	111
Emerald	124	428
Society Girl	60	174
Eastmont	29	58
I. X. L.	7	14
Nickle Plate	30	124
Queen	40	192
Yankee Girl	143	213
Mollie Hughes	4	4
Other mines		1,029
Total	9,005	46,413

The total receipts at the smelters, including concentrates, were, for the week, 45,138 tons, and for the year to date, 251,667 tons.

The following are the returns of the ore production and movement for the past week, ending Feb. 18th, and for the year to date:—

Boundary Shipments.

Granby	23,110	160,282
Mother Lode	5,173	43,177
Snowshoe	2,313	15,290
Rawhide	1,930	28,874
Jack Pot	528	3,422
Number Seven	91	502
Phoenix Amalgamated	303	303
Other mines		240
Total	33,448	252,090

Rossland Shipments.

Centre Star	3,423	23,800
Le Roi No. 2	575	3,735
Le Roi No. 2, milled	300	2,100
Le Roi	371	1,992
Other mines		160
Total	4,669	31,787

Slocan-Kootenay Shipments.

Sullivan	683	4,603
St. Eugene, milled	2,775	19,425
Richmond-Eureka	33	446
Rambler-Cariboo	27	325
Hewitt	21	132
Queen, milled	420	2,730
Granite-Poorman, milled	250	1,750
Nugget, milled	110	770
Wilcox, milled	75	525
Emerald	82	510
Society Girl	37	211
Hope	36	205
Yankee Girl	245	458
Mollie Hughes	4	8
Knob Hill	43	43
Noble Five	31	31
Phoenix Amalgamated	303	303
Ottawa	20	20
Other mines		955
Total	5,195	33,450

The total shipments for the week, including the estimated milling, were 43,009 tons, and for the year to date, 317,024 tons.

B. C. COPPER COMPANY'S RECEIPTS.

Greenwood, B. C.

Mother Lode	5,173	43,177
Rawhide	1,930	28,874
Jack Pot	528	3,422
Other mines		240
Total	7,631	75,713

GRANBY SMELTER RECEIPTS.

Grand Forks, B. C.

Granby	23,110	160,282

CONSOLIDATED COMPANY'S RECEIPTS.

Trail, B. C.

Centre Star	3,423	23,800
Snowshoe	2,313	15,290
Sullivan	683	4,603
Le Roi No. 2	575	3,735
Le Roi	371	1,992
Number Seven	91	502
Richmond-Eureka	33	446
St. Eugene	198	955
Rambler-Cariboo	27	325
Hewitt	21	132
Emerald	82	510
Society Girl	37	211
Hope	36	205
Queen	38	230
Granite-Poorman	29	71
Yankee Girl	245	458
Mollie Hughes	4	8
Knob Hill	43	43
Noble Five	31	31
Phoenix Amalgamated	303	303
Ottawa	20	20
Other mines		1,146
Total	8,603	55,016

The total receipts at the smelters, including concentrates, were for the week, 39,334 tons, and for the year to date, 291,011 tons.

LA ROSE.

In January the La Rose production was 318,197 ounces, gross value $168,468. Operating profits were $118,497.

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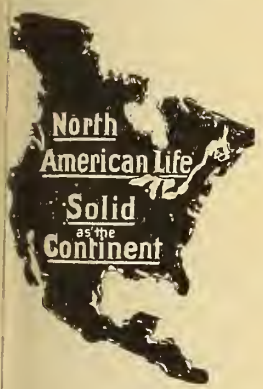

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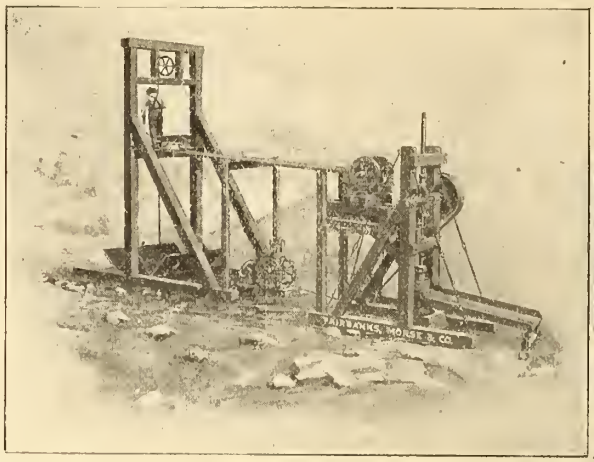

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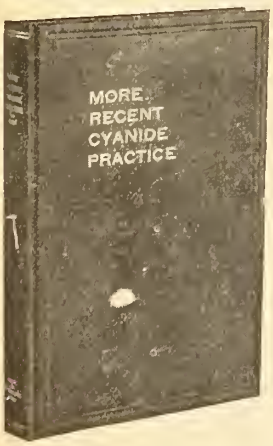

More Recent Cyanide Practice

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424 Pages Indexed Illustrated

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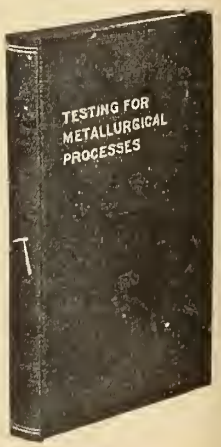
BOOK DEPARTMENT

CANADIAN MINING JOURNAL

TORONTO

Testing for Metallurgical Processes



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216 pages
Illustrated
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Book Dept.

Canadian Mining Journal, Toronto

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining ngineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show gns of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a orough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

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ateman & Brown
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arter, W. E. H.
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vans, J. W.
willim, J. C.
lassan, A. A.
Hore, R. E.
Haultain, H. E. T.
Hille, F.
Lamb, R. B.
Leckie, J. E.
Loring, F. C.
McEvoy, Jas.
Magee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Spencer, W. H.
Sutcliffe & Neilands
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
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Woolsey, W. J.

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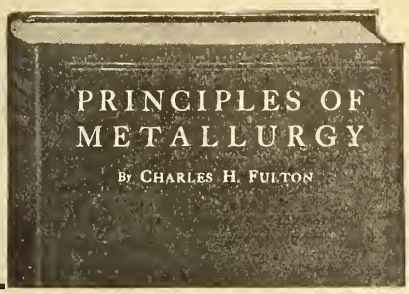

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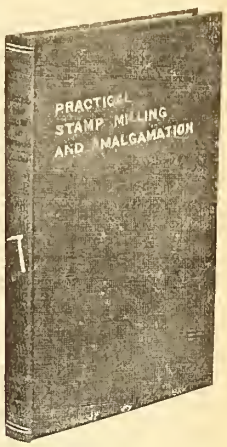

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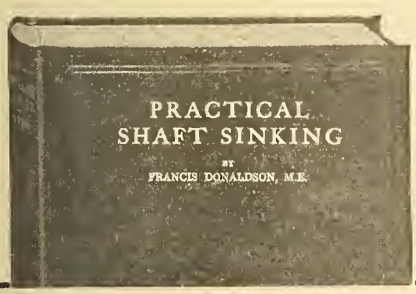

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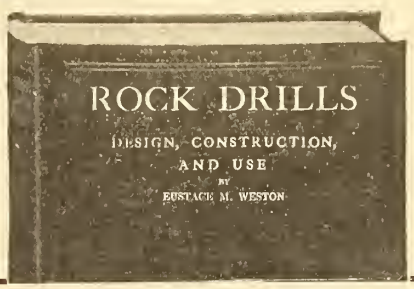

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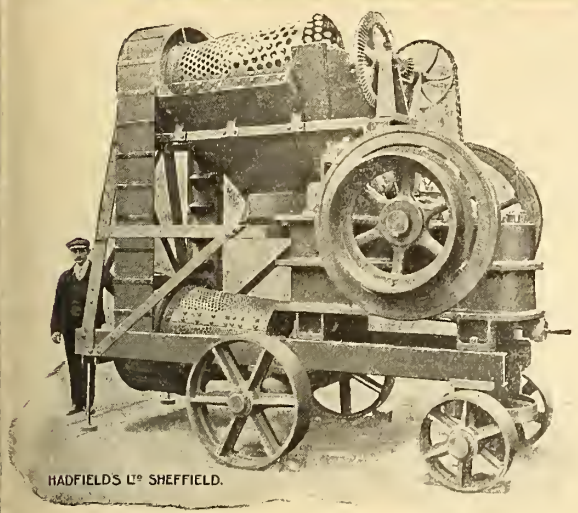

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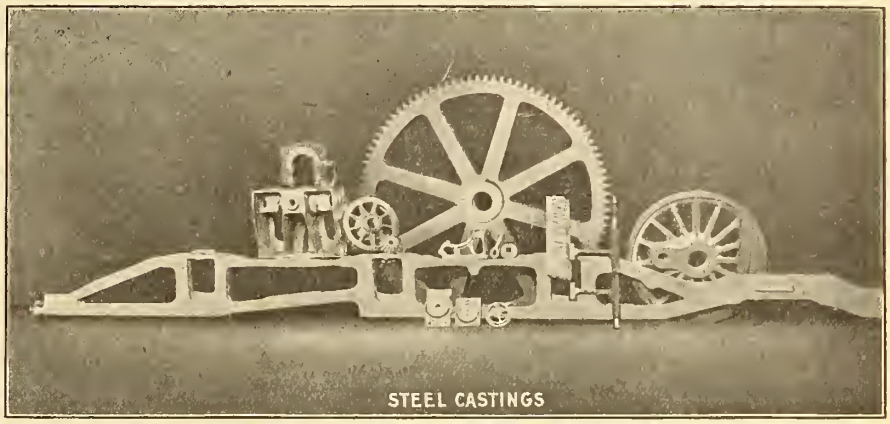
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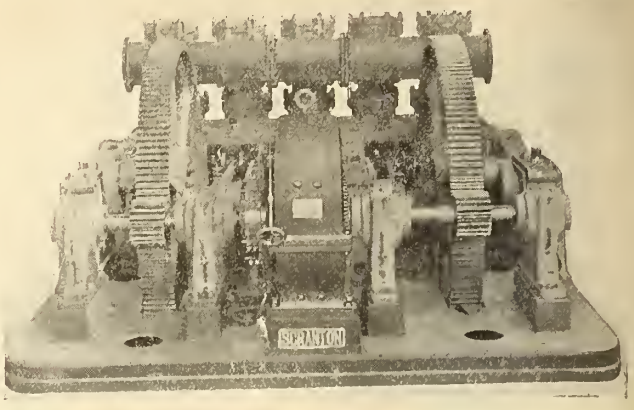

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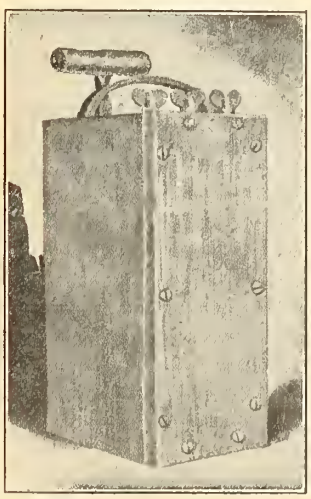

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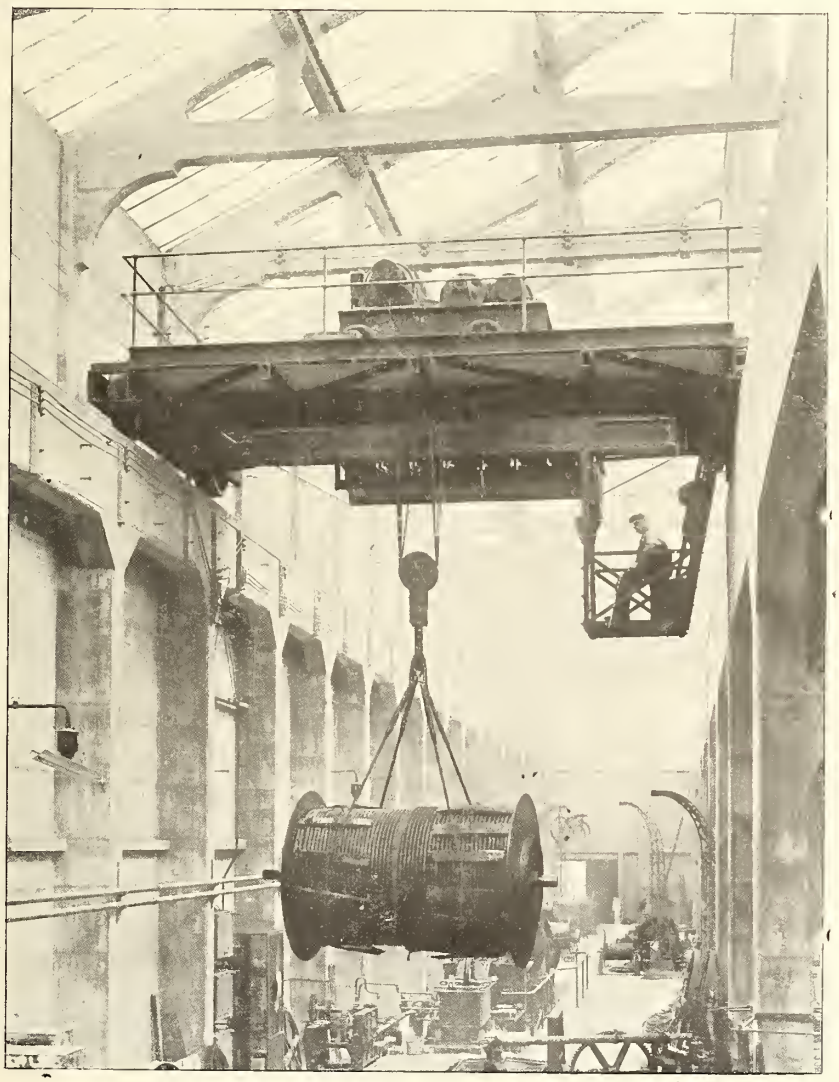

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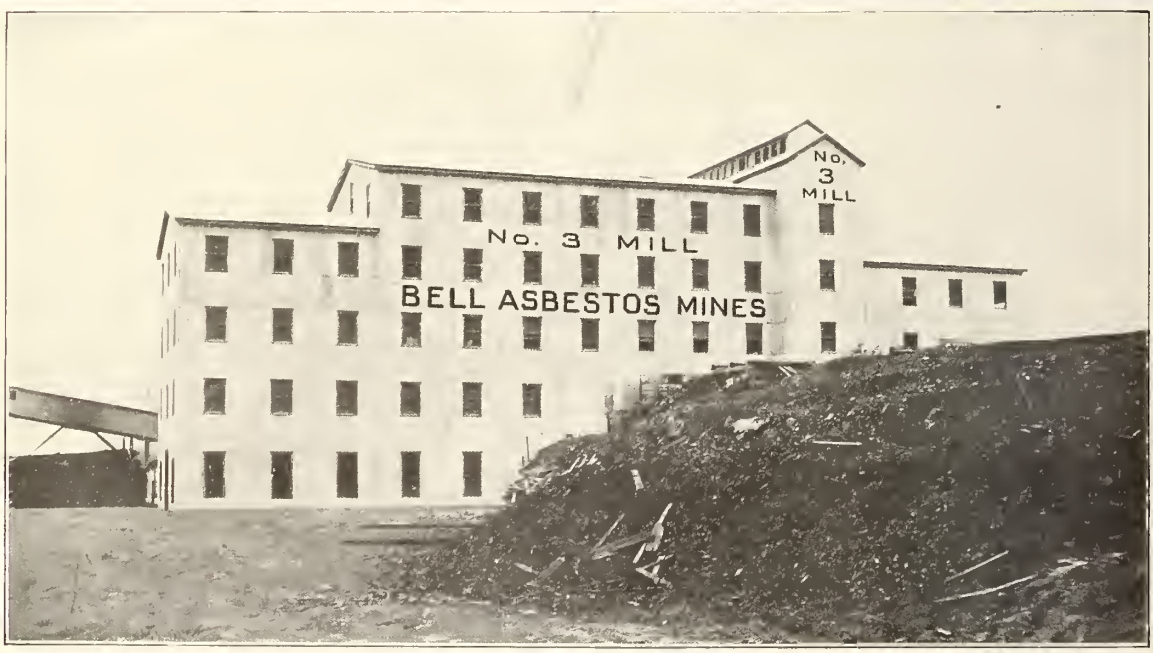

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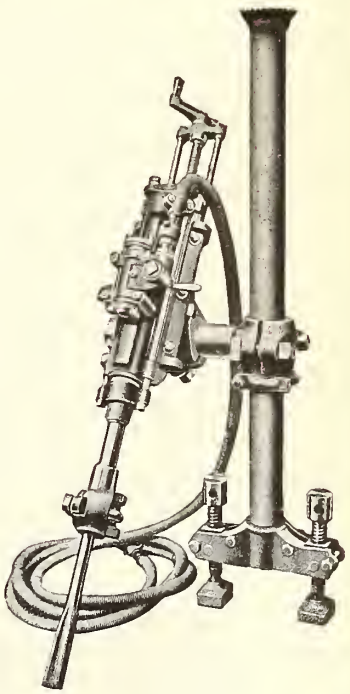

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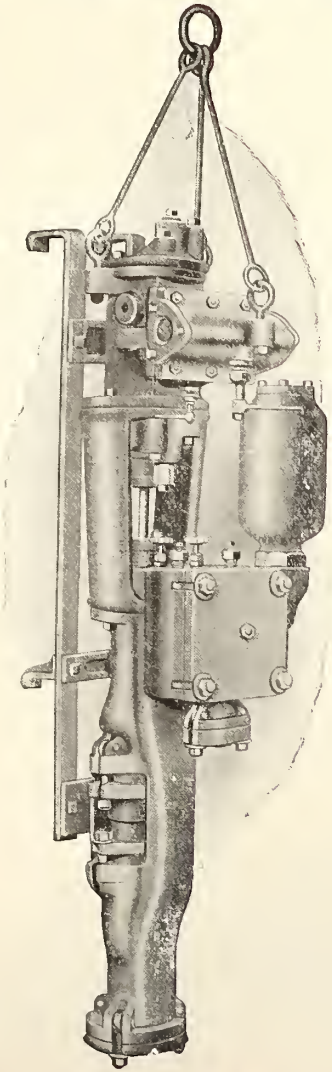

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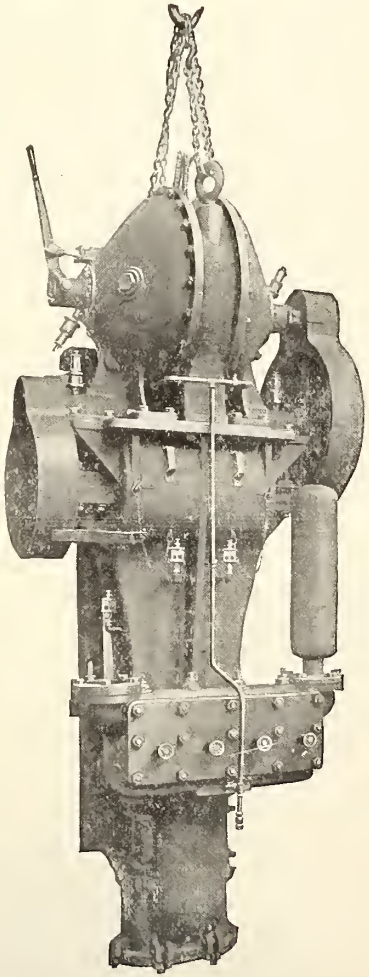

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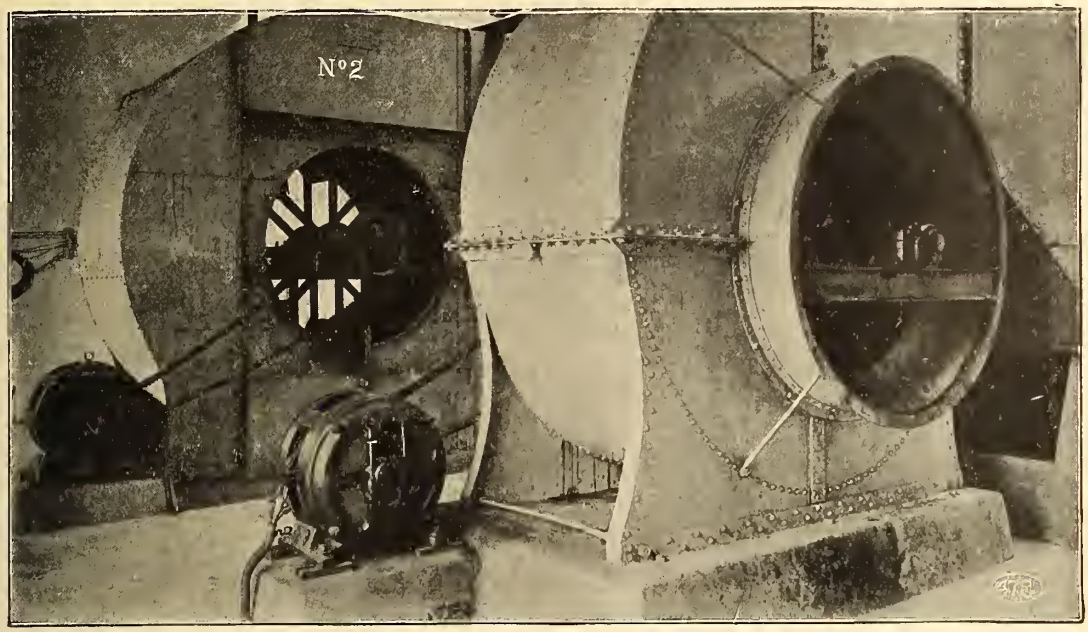

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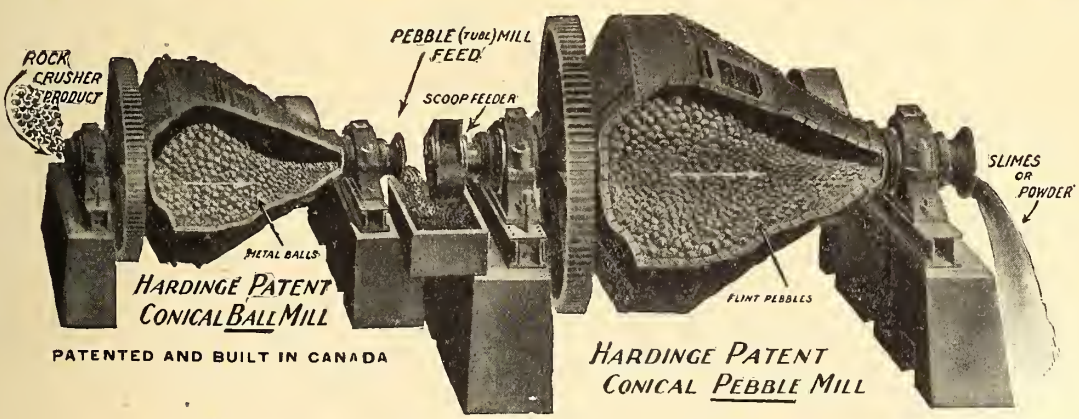

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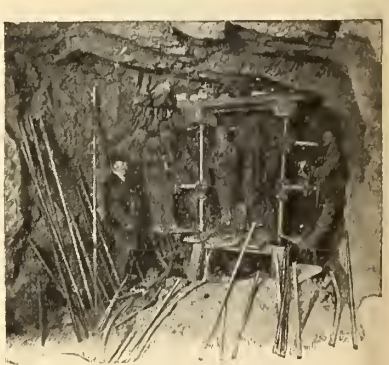

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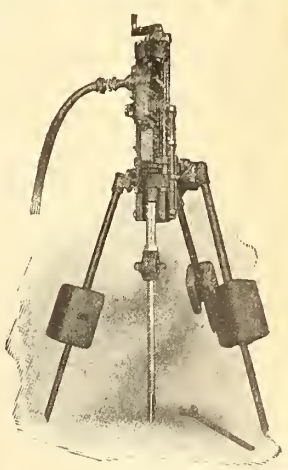

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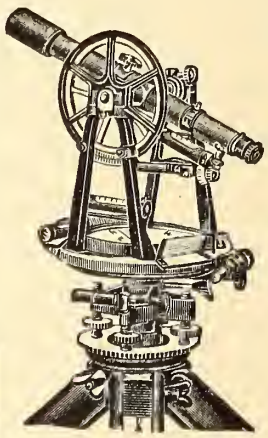

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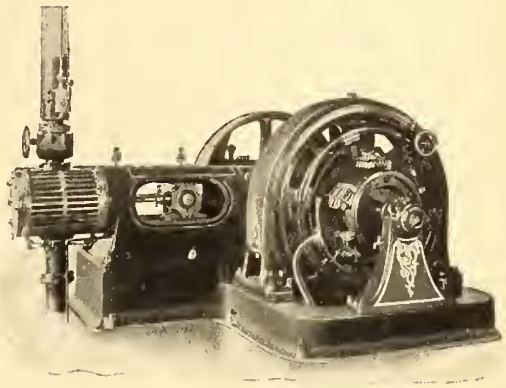

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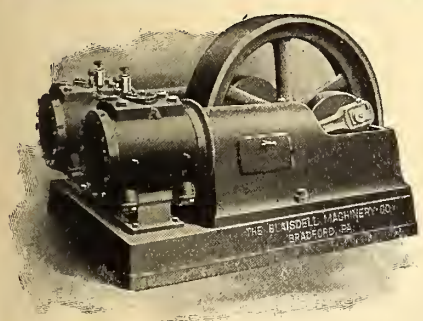

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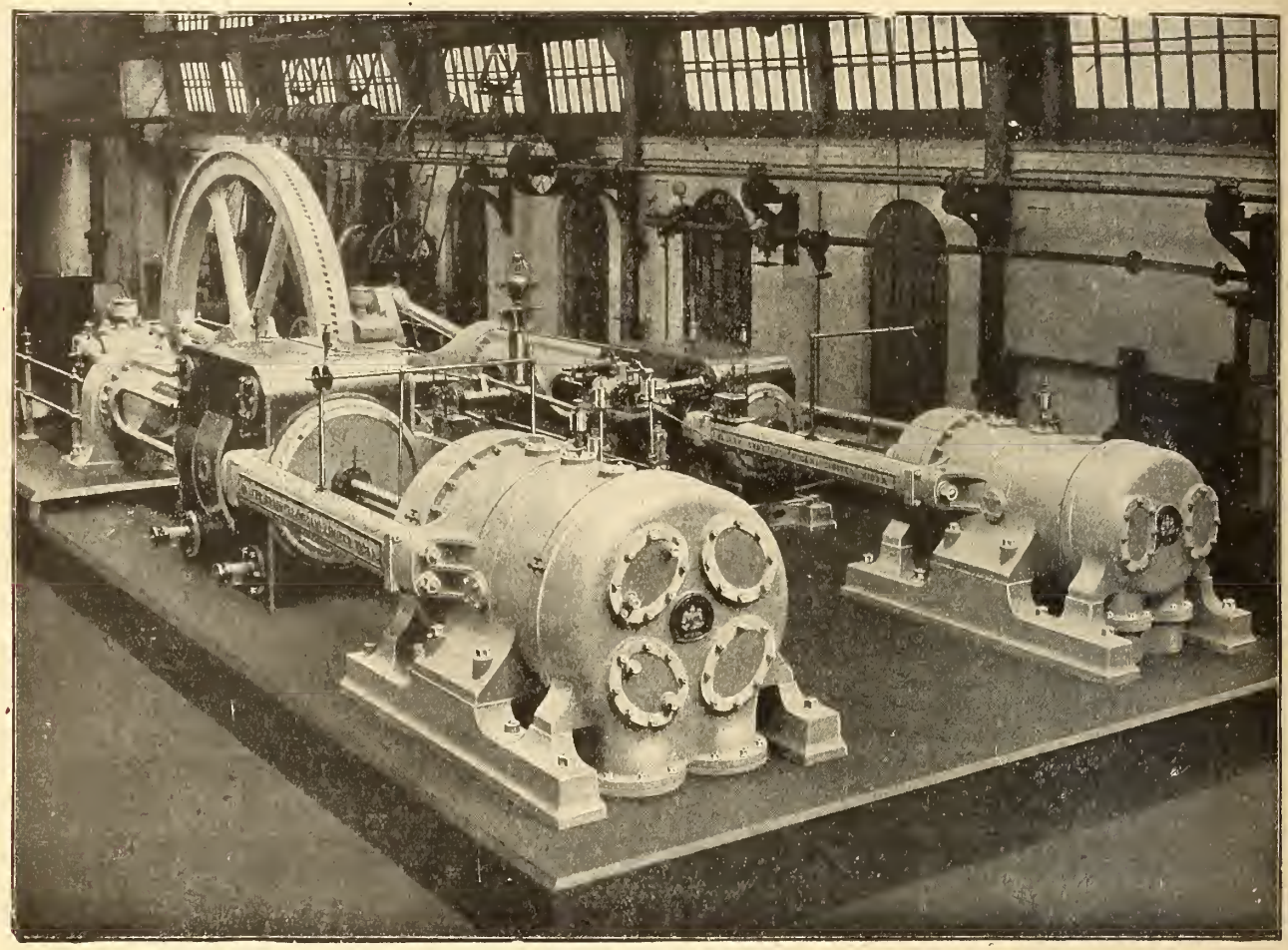

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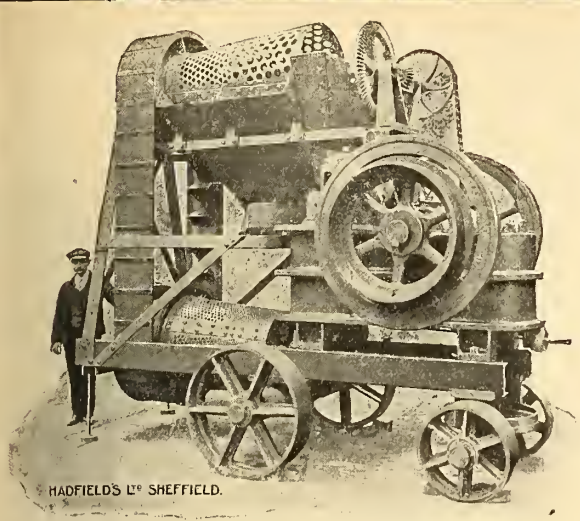

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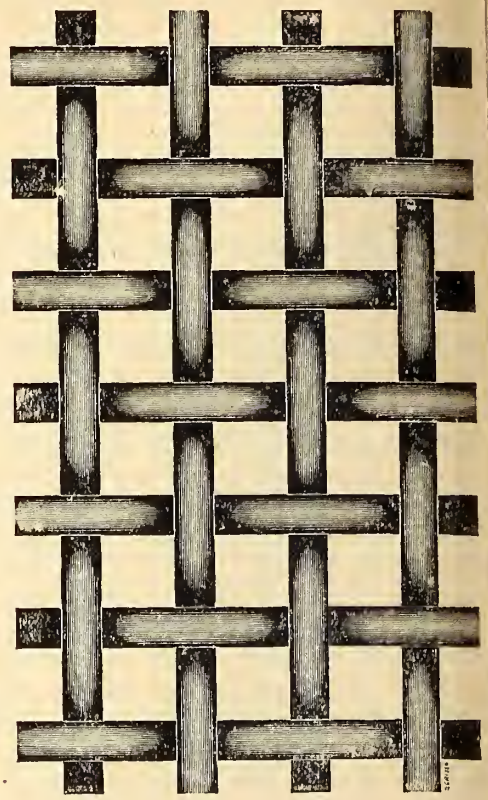

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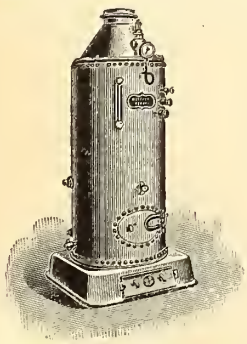

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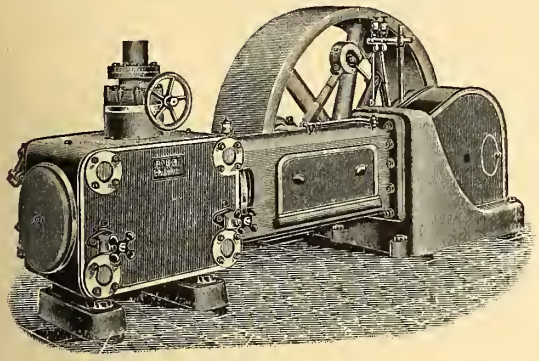

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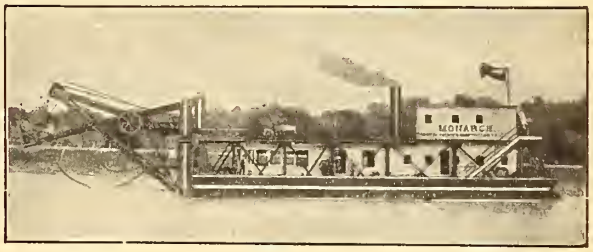

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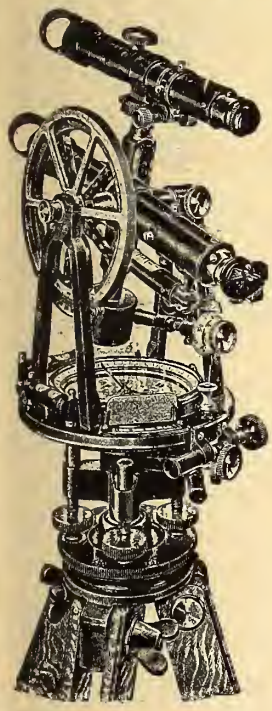

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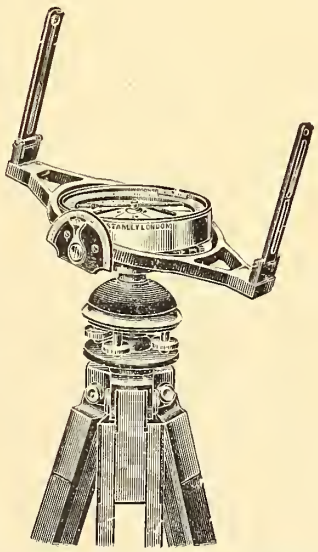

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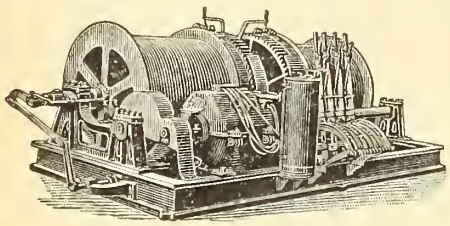

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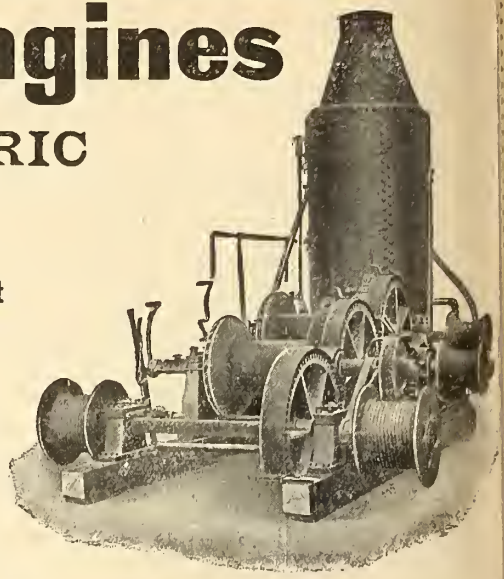

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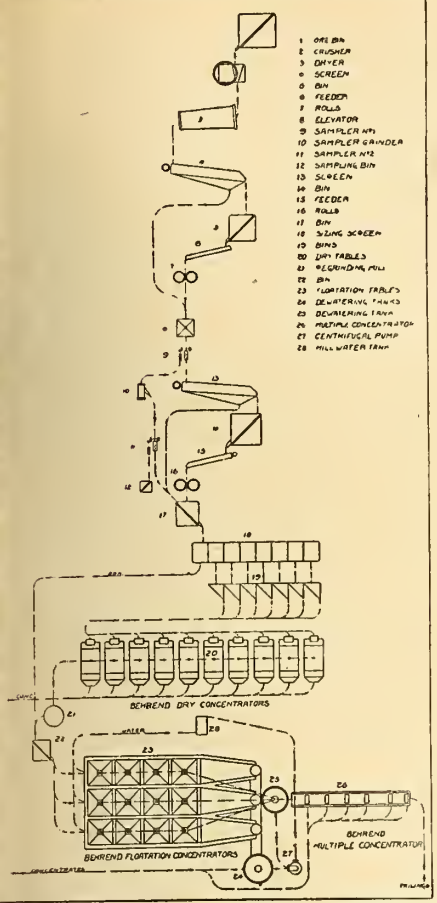

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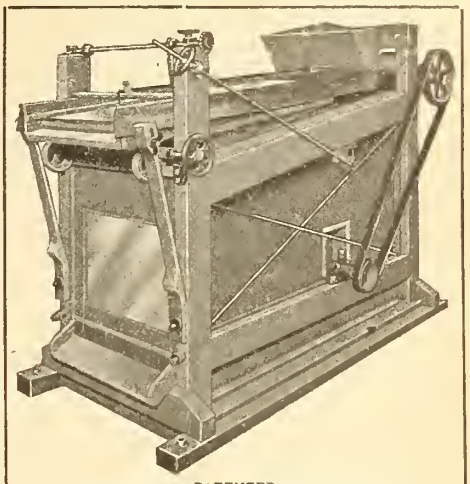

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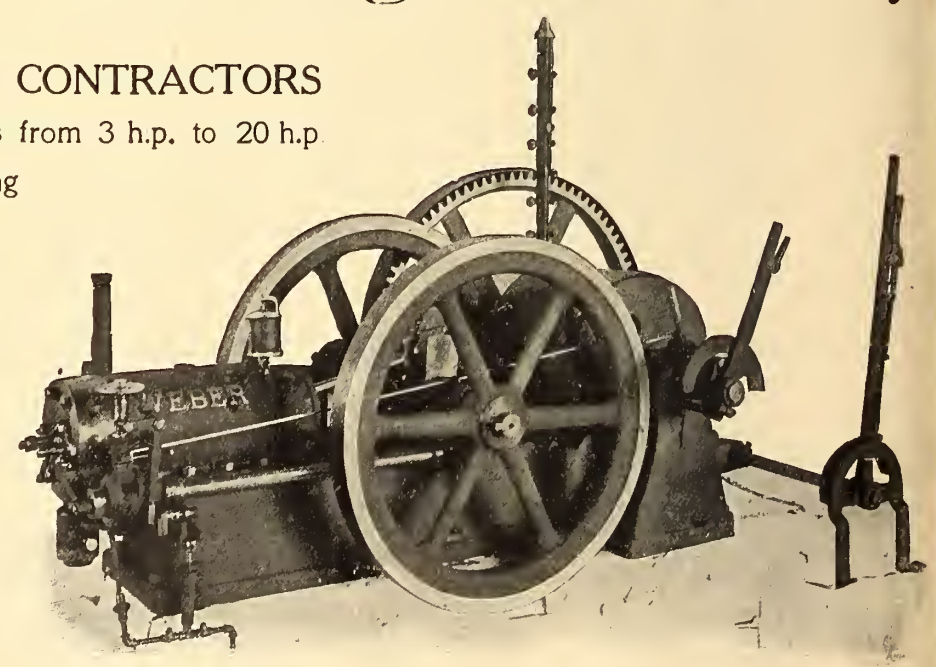

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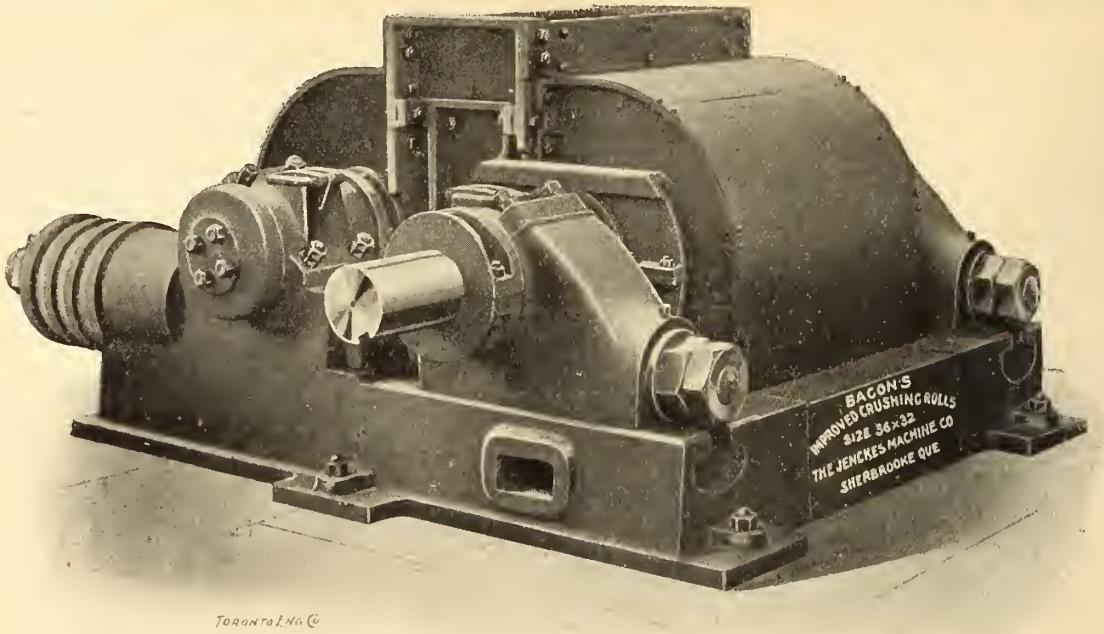

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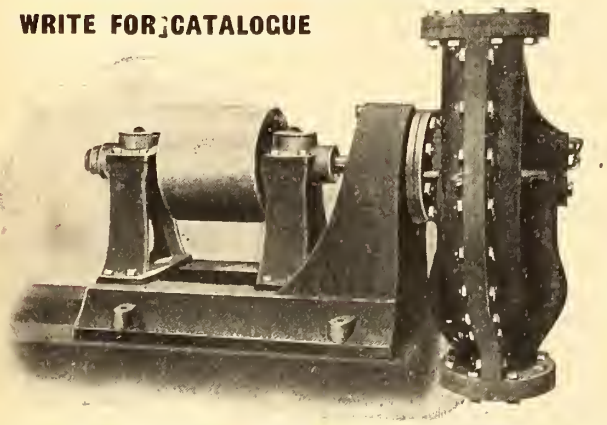

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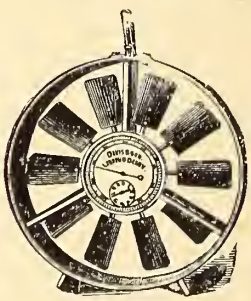

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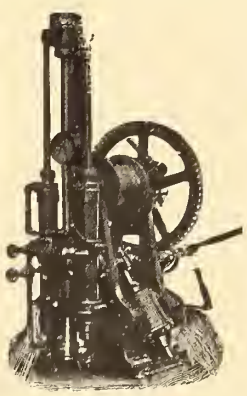

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THE CANADIAN MINING JOURNAL

VOL. XXXII. TORONTO, March 15, 1911 No. 6

The Canadian Mining Journal

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THE MINERAL PRODUCTION OF CANADA.

Most gratifying are the official statistics of Canada's mineral production for 1910. The Preliminary Report, prepared by Mr. John McLeish, Statistician of the Mines Branch, Ottawa, appeared early in March. The revised figures for the year 1909 show a total value of $91,831,441, or $12.82 per capita. The total for 1910 is $105,040,958, or $14.02 per capita. An increase of $13,209,517, or more than 14 per cent., is certainly substantial.

Accepting Mr. McLeish's basis of valuation, we find that Ontario now produces 40.95 per cent. in value of the entire mineral output of the Dominion. British Columbia comes second with 23.37 per cent., and Nova Scotia third with 13.38 per cent. Each of the other provinces contributes less than 10 per cent.

In the list of mineral products, coal shows by far the greatest expansion during 1910, the output for the year being valued at $29,811,750, which is greater by $5,030,514 than the figures reported for the previous year. The next largest leap is in silver. Of this metal $17,106,604 worth was produced in 1910, which exceeds the returns for 1909 by $2,928,100. Nickel production has been augmented by $1,719,433; pig iron, $1,663,766; clay products, $1,149,190; cement, $1,068,513; and gold, $842,680. For products, such as copper, asbestos, stone, gypsum, etc., increases of less than half-a-million dollars are recorded.

The most marked falling off is in the subsidized lead industry. Here a drop of $455,107 is announced. As British Columbia produces all the lead credited to the Dominion, the direct cause of the curtailment was the destructive Slocan forest fires. The only other serious recession was in the output of petroleum. Here again the causes were beyond human control. The oil-fields of Ontario are gradually being exhausted. The 1910 production was less in value by $171,054 than that of 1909. Two other commodities, salt and lime, show very slight drops in value. With these exceptions every mineral product shows gains for 1910. And every province, with the exception of New Brunswick, has augmented its annual production. In fact, nearly every province has had a "record" year.

It is hardly necessary to state that the outlook for the current year is even more cheerful. British Columbia's smelters, mines, and collieries are in better condition than ever. Her smelters are being enlarged, and there is good reason to believe that large iron and steel industries will soon be established on the Pacific coast. Few countries possess such a superabundance of iron ore, fuel, and flux on or near tide-water. All the essentials are there except the initiative of the organizer.

The collieries of Alberta and, in less degree, those of Saskatchewan, will be more active this summer. Manitoba is taking her clay industries more seriously. Ontario expects the first fruits of Porcupine. Gold bars should be not infrequent exports from that camp. Quebec's asbestos industry is shaping up better than could have been hoped a year ago. Her copper industry, also, has been revived. New Brunswick is cheered by the development of an encouraging gas- and oil-field. Nova Scotia's coal outputs are growing steadily. Soon tungsten-ore will be on her regular list of mineral products. Her gypsum trade is waxing. Lastly, there is every prospect of a marked increase in the gold yield of the Yukon.

From almost all aspects, the year 1911 should exceed 1910 by more than 1910 exceeded the preceding year.

THE THIRTEENTH ANNUAL MEETING OF THE CANADIAN MINING INSTITUTE.

The Annual Meeting of the Institute on March 1st, 2nd, and 3rd, at the Chateau Frontenac, Quebec, was undoubtedly pleasant and profitable. It is true that the sessions lacked the piquancy of some previous occasions when the results of hard-fought elections were about to be announced. But ploughshares are more to be desired than poniards. Yet a row is an excellent vent for our spleen. Lacking this vent, we must fall foul of somebody. Hence we have resolved to give some good advice to those who guide the affairs of the Institute.

First, however, we must express our keen sense of the hospitality extended to the delegates by Quebec. Not only was the street-car service placed at our disposal, but all delegates were given the freedom of the Garrison Club. These, and other courtesies, helped decidedly to make every one feel thoroughly at home. But best of all, was the warm greeting vouchsafed by the Quebec Government through the Hon. Mr. C. R. Devlin. That gentleman warmed the cockles of our heart by the unmistakeable glow that marked his welcoming speech. We shall not easily forget either his Celtic exuberance, his Gallic vivacity, or his Canadian shrewdness.

One fact, which should be appreciated by all members, is that we owe a debt of gratitude to the United States visitors who so regularly attend the meetings. To these gentlemen much of the success of every annual convention is to be credited. Not only would their absence rob the regular sessions of a great deal of interest, but the smoker and the dinner would suffer immeasurably. To them, then, we tender our sincere thanks.

We return now to our self-assumed task of offensive criticism. In the first place, a well-organized reception committee is an absolute necessity. At present far too much falls upon the shoulders of the Secretary. It is, naturally, impossible for one person to see that everybody is properly bestowed. Hence arise many annoyances. An active committee of half-a-dozen members could readily smooth the troubled waters. Moreover, there is little effort made to welcome the younger members and to introduce them to their seniors. This is a serious omission, an omission that should not be apparent next year. The suggested committee could best undertake this duty. If this is to be overlooked in the future, there will be grave danger of losing the interest of the younger generation.

Another point, one that hardly assumes the dimensions of a grievance, but one that is a source of some discontent, is the arrangement of the papers. Here, of course, the Secretary has our sympathy. The list of papers is always impossibly long. Until the actual time for reading arrives it is not possible to know of a certainty if the author is or is not to be present. Often also, the person presenting a paper takes up an indecent amount of time, and so dislocates the programme. But these are not insuperable obstacles. We believe that in the main, the programme can be so arranged as to make almost literal adherence to it quite feasible. Long papers are anathema. They should be read by title or, at worst, presented synoptically. The salient and debatable points of any paper can be outlined in a very short time. No one speaker should be permitted to occupy the floor for more than half-an-hour. Discussions should be pointed, apposite, and brief. The chairman should be able to call anyone to order without giving offence. In fact, he might well seize such opportunities as occasions for adding to the humour of the meeting. In any case, we need far better control of our meetings. Energy, time, and patience are wasted as matters now stand.

Again, there is room for criticism of the nature of the papers read. The greater number of these treat of pure geology, or are entirely academic. The fault here lies with the mining men themselves primarily, and secondarily, with the officials of the Institute. But apart from distributing the blame, it is to be remembered that the mining man, per se, is not interested in remote geological problems. He is keenly interested in practical work. And his attention can be held only by papers and discussions that overlap his own experience. Even if stated papers on practical mining are not presented, time should be reserved for dealing with professional mining topics.

These philippics are sufficient to indicate the view of the submerged three-quarters of the Institute. We all hope to make our society mean more and more. We are justly proud of its prominence and activity. But the time has come when younger members should be given a larger share in the proceedings.

One final suggestion remains. There is no adequate reason for holding the annual meetings in March. The summer months would be much more suitable. Short excursions before and after the sessions would thus be made possible. Travelling would be easier, and the attendance larger. In fact, a change of this kind would be most acceptable. One incidental advantage would be the facility with which torrid geological disputes could be settled out of doors.

NOVA SCOTIA'S MINERAL PRODUCTION.

The Report of the Nova Scotia Department of Mines or the year ended September 30, 1910, has reached s just as we are going to press. In our April 1st is- ue we shall give this report the usual extended notice. ust now we can notice only the leading features.

The number of tons (gross) of coal raised was 5,- 77,146. Shipments amounted to 4,896,896 tons, of hich amount the St. Lawrence trade took 1,786,948 ns, and Nova Scotia itself, 1,806,999 tons. Of this st amount, 442,764 tons were consumed at the col- eries. We note that the output per man employed as gone up to 500 tons per year, as against 430 tons uring the previous year.

Gold mining did not hold its own during 1910. The roduction amounted to 10,675 ounces, a slight falling ff as compared with 1909. The average yield per n of ore was $4.09. This figure is, of course, a very ough approximation. The decline in gold mining is fficially attributed to "insufficient capital, scarcity of ood labour, past wildcatting, unintelligent direction f operations, [high] cost of fuel, and lack of pros- ecting." It is to be noted that, whilst this diagnosis sufficiently comprehensive, each and every ailment entioned is remediable.

The only locality at which iron ore is being pro- uced is Torbrook. Here the Canada Iron Corporation ined 52,640 short tons during 1910. Of this quantity out 11,000 tons were shipped to the United States nd to Scotland. Large shipments are to be made this ear. It is possible, also, that ore may be produced at risaig, Antigonish County.

Manganese and tin have not yet emerged from the rospect stage. The mining of scheelite, however, is eing actively pushed at Moose River, Halifax County. shipment of 75 tons of high grade ore was made dur- g the year, and much larger quantities will be sold uring the current year.

Although the Province's gypsum quarries yielded 2,974 tons of that mineral, only 10,50 tons were util- ed by local manufacturers. The remainder was ipped crude to the United States. We believe that the preparation and marketing of finished gypsum oducts, on a suitable scale, there should be consider- le profit. The report draws attention specifically this.

The brick and clay industries have not expanded, nd the building stone trade has diminished to a few ousand tons.

The total impression that remains after glancing rough the report is that Nova Scotia is about as adly in need of prospecting and exploitation as any untry can be.

A BREEZE FROM THE NORTH.

About five hundred men interested in the Elk Lake- owganda districts, which are situated in the Montreal iver Mining Division of Ontario, recently waited on the Government asking that the Charlton Branch of the Temiskaming & Northern Ontario Railway be extended to Elk Lake and Gowganda in order to provide economical transportation to facilitate development work and mining operation in the districts mentioned.

An organization meeting was held on the 14th instant at which a good deal of steam was let off and speakers chosen to present the case to the Government. The deputation was introduced by Mr. R. Shillington, M.L.A., and received by the Honourable Frank Cochrane, Minister of Mines and Forests, and a number of his colleagues.

Many arguments were put forward to prove that the extension of the Government railroad should be made in the interests of mining, lumbering, and farming, and there was evidence of earnestness and feeling in the language of the speakers.

During the progress of the meeting, Premier Sir James P. Whitney honoured it with his presence for a few minutes, repeated the platitudes with which delegations are so familiar, and retired.

The Minister of Mines candidly told the delegation that the policy of the Government was to protect its timber resources in the Temagami Forest Reserve rather than to encourage further encroachment by prospectors, miners, or railroads. He deplored the serious losses that the forest reserve had suffered through fire during the past few years, implying that those engaged in prospecting and mining were responsible. This is a matter of opinion, but no effort was made to controvert it at the meeting. Whilst the Minister's attitude may be commendable, at this late day it is hardly fair to men engaged in the mining industry, when they are seeking to redeem investments already made.

Whether the Province has benefitted financially or not by the sale of mining locations in the sections referred to, the men who have paid the Government for mining locations should meet with its fullest support in their efforts to reap where they have sown. Had the Government closed the Temagami Forest Reserve against prospecting and mining, as they did the Gillies Timber Limit, the present unfortunate situation would not have arisen. It is useless to talk of locking the stable door when the key has been lost.

After reviewing the arguments which had been made by the various speakers, Mr. Cochrane took the position that the claims put forward as to the probable tonnage of ore, pulpwood, and other products that might be produced and shipped from the district, should be investigated and reported upon to the Government before a decision could be reached.

A committee was thereupon appointed at his suggestion, representing the Government, the Temiskaming & Northern Ontario Railroad, and the miners, to carry out the investigation, and the Minister promised that an immediate decision would be given on receipt of its report.

If, as Mr. Cochrane, stated, the Government's answer depends on a question of tonnage, the miners should carry the day. All other considerations being equal (and there is no doubt that there will be more pulpwood and other timber products brought out from the Temagami Forest Reserve than from the Porcupine district) the tonnage of silver-bearing ores which is already being mined and shipped, even under the existing adverse conditions, is infinitely greater than any tonnage of ore that can ever be expected to come out over the new branch line being built by the Government into the Porcupine district. The Porcupine gold ores will be treated in stamp-mills and cyanide plants on the ground, only the resultant product being shipped in the form of gold bars. These will be taken care of through the banks, or brought out in smug suitcases when the successful operators desire reasonable excuses for making periodical trips to civilization. But the receipts of the T. & N. O. will not be greatly enhanced thereby.

EDITORIAL NOTES.

The Hon. Christopher Chisholm, Commissioner of Works and Mines, recently introduced a bill in the Provincial Legislature of Nova Scotia, providing for the compulsory use of locked safety lamps in all the collieries of the province. Certain clauses are added permitting the use of electric lights when approved by the proper authorities. An expression of opinion is to be obtained from the miners of the province.

Diamond drilling was conducted under the auspices of the Nova Scotia Department of Mines, during 1910, at an average cost of $0.93 per foot. Boring by Calyx drill cost on an average $1.44 per foot. The Calyx cores were of 6-inch diameter, the diamond cores from 15-16-inch to 2-inch.

Supplementing our editorial notice of the three lea ing corporations that have invested in Porcupine, may be noted that the firm of Bewick, Moreing & Co pany, which has undertaken the development of ce tain claims in Porcupine, has offices in London, Me bourne, and Kalgoorlie. The firm manages the affai of thirty Australasian and African mining companie

There appears to be no immediate prospect of re dering uniform the statistical methods employed by th Dominion Mines Branch and by the various Provinci Bureaus. Until uniformity is secured there will be en less confusion and duplication.

The Canadian correspondent of the Mining Journ (London, Eng.), in a letter that appears in the Febr ary 11th issue of our contemporary, makes a seriou blunder. In writing of the New Brunswick gas- an oil-fields, which are being developed privately by D J. A. L. Henderson, of London, the correspondent co founds these operations with those of the Maritim Gas and Oil Company, a Nova Scotian concern cap talized at $5,000,000. Dr. Henderson's company is Mar time Oilfields, Ltd., and is, as stated above, compose entirely of private subscribers, who have no intentio of asking anybody for money until the field is prove

The Consolidated Gold Fields of South Africa, Ltd is the corporation that has acquired a large interest i the Rae mine, Porcupine. At a shareholders' meetin in London, on February 22nd, Lord Harris, the chai man, explained the need of the proposed new issue second preference shares. In addition to the Porcupi venture, new enterprises are being undertaken in th United States, Mexico, and Rhodesia. Although th new issue has not found favour with all the shareho ers, the majority have raised no objections.

CANADIAN MINING INSTITUTE, THIRTEENTH ANNUAL MEETING — Held at the Chateau Frontenac, Quebec, Que., March 1st, 2nd and 3rd, 1911.

Early on Tuesday, Feb. 28th, there were signs of activity in the Chateau Frontenac. Several of the councillors, and a sprinkling of other members, had already arrived. But the bulk of the delegates drifted in on Wednesday and Thursday.

The total attendance was large, aggregating about 200. Cobalt, Toronto, Montreal, and Eastern Quebec were heavily represented. The delegation from the United States was exceptionally large. But only one Nova Scotian, and not one Albertan or British Columbian appeared on the scene. Distance is, of course, an adequate excuse for the Westerners; but the lack of maritime mining men is regrettable. More especially is this the case in view of the fact that Ontario and the Dominion are always represented at the meetings of the Mining Society of Nova Scotia.

Wednesday Morning Session.

In the unavoidable absence of the Premier, S Lomer Gouin, the convention was formally opened b the Hon. C. R. Devlin, Minister of Mines, Quebec. M Devlin, in the course of an exceedingly witty and chee ful speech, referred to the good work done by the Ch bougamou Commission. He announced that three ne expeditions would be sent out during the coming sun mer. Another interesting announcement was to th effect that the Quebec grant to the Institute is soon t be increased. Mr. Devlin's speech was received wit hearty applause.

The President, Dr. F. D. Adams, now followed wit a survey of progress made during the past year. H predicted great things for the Province of Quebec, an warmly congratulated the local Government on posses

ng two such officials as the Hon. Mr. Devlin and Mr. Theo. Denis, the present Superintendent of Mines. Alluding to the proposed Canadian meeting of the International Geological Congress in 1913, Dr. Adams urged that all mining men do their utmost to help in making that convention a monumental success.

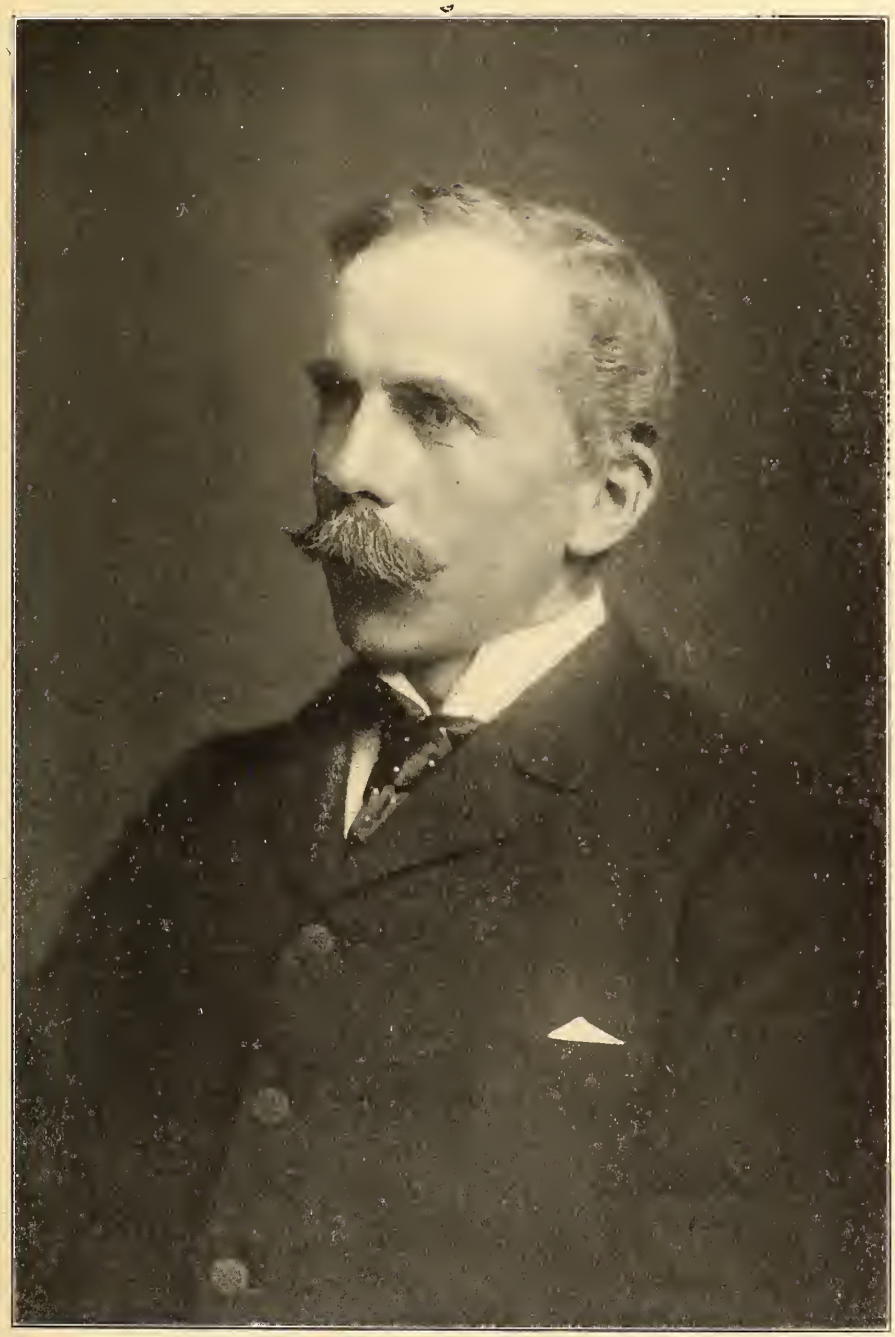
Mr. J. McLeish, Statistician of the Mines Branch, Ottawa, then presented the official figures of mineral production for the Dominion for 1910. These will be found on another page of this issue. Mr. Theo. Denis followed with the 1910 statistics for Quebec, and Mr. T. W. Gibson with those for Ontario. In the absence of Mr. Hiram Donkin, Deputy Commissioner of Mines for Nova Scotia, Mr. H Mortimer-Lamb read a brief statement of the mineral output of Nova Scotia. Mr. Lamb also referred to the mineral statistics of British Columbia, Alberta, Saskatchewan, and New Brunswick, which appear in the last bulletin of the Institute, copies of which were distributed amongst the audience.

Announcement was then made of the results of the election of officers. They are as follows

President, Dr. F. D. Adams.

Vice-Presidents, Dr. A E. Barlow, Mr. Thos. Cantley.

Councillors:—Dr. J. Austen Bancroft, Mr. R. W. Brock, Mr. A. A. Cole, Mr. E. T. Corkill, Mr. Theo. Denis, Mr. John Donnelly, Mr. E. Dulieux, Mr. F. W. Gray, Mr. G. F. Silvester, Mr. J. B. Tyrrell.



President, F. D. Adams,

At this point Col. A. M. Hay rose to move a resolution expressing the Institute's approval of the work of the Conservation Commission. He was seconded by Mr. J. B. Tyrrell. The motion was unanimously carried, and the Secretary was instructed to send a copy of the resolution to the Hon. Mr. Sifton, Chairman of the Commission.

The reading of papers by Mr. Denis, Mr. L. Reinecke, and Mr. H. Mortimer-Lamb, brought the morning

session to a close. These papers were, respectively, "Mining Rights on Quebec Seignories," "The Ore Deposits of the Beaverdell, West Fork of Kettle River, B.C., and "Photography for Mining Engineers and Geologists." The last paper aroused an animated discussion. Certain facts were brought out that would have provided fine material for a representative of the Lord's Day Alliance. After the smoke had cleared away, the situation resolved itself into a battle between the advocates of films and the supporters of plates. Victory perched on the banners of the latter, until the Duke of Abruzzi was called in as a special "film" reserve. It was "lunch or Abruzzi." "Films" had the last word.

Wednesday Afternoon.

No regular session was held on Wednesday afternoon. Many of the members availed themselves of the kindness of the Quebec Electric Railway Company, and visited Montmorency Falls.

Wednesday Evening Session.

The evening was opened by the presentation of one of the most instructive papers ever read before the Institute: "The Engineering Problems of Geological Nature Afforded by the New Catskill Aqueduct of New York City," by Dr. J. F Kemp, Columbia University, New York. Dr. Kemp traced the position of New York's present inadequate water supply from the Croton reservoir, and showed, by means of lantern slides, how the new supply is to be brought from the Catskill Mountains. The enterprise involves the expenditure of many million dollars. From Dr. Kemp's lucid explanations it was evident that he and his staff had been able to save the contractors a considerable percentage in advising through what formations to carry the aqueduct. This successful application of geology to a huge engineering problem is unique. It carries a lesson that may well be taken to heart by Canadian cities. New York not only has saved money, but has very considerably hastened the completion of the tremendous Catskill aqueduct by acting on the advice of qualified geologists.

The second paper of the evening was read by Dr. Barlow. It was entitled "The Economic Geology of the Chibongamou region. Numerous lantern slides illustrative account of his last summer's exploration of the Chibougamou region. Numerous lantern slides lilustrated the lecture. The speaker emphasized strongly the fact that the Commission, of which he was chairman, did NOT damn Chibougamou. The region has possibilities. But these possibilities are yet unproved. There is little ground for the exaggerated reports that heretofore have been circulated. At one point the audience was electrified by the speaker's statement that he lacked the damnatory language anyway. This assertion was modified later.

Thursday Morning Session.

The first paper read at this session was Prof. C. H. Richardson's "Asbestos Desposits of the New England States." This was interestingly discussed by Messrs. Cirkel, Barlow, Dresser, Nason, and Penhale. The last speaker referred to the fact that in manufacturing Russian asbestos fully two-thirds the quantity of Canadian asbestos was mixed with it to bring it up to the desired quality.

Other papers on asbestos were read by Dr. J. A. Dresser, and by Mr. Edward Torrey.

Thursday Afternoon Session.

Dr. A. C. Lane's paper, "The Copper Deposits of the Keeweenaw Peninsula, compared with Similar Canadian Deposits." Then followed papers by Dr. Davi T. Day and Mr. Eugene Coste on the subject of petrole um. These led to a picturesque encounter between th two doughty champions. Had time permitted, ther might have ensued a struggle that would have effaced both. But the President intervened. A paper by Mr D. B. Dowling, "The Undeveloped Coal Resources o Canada," was the last read.

Thursday Evening—The Smoker.

At 9 p.m. most of the visitors had gathered in th capacious tea-room of the Chateau. The usual songs geological and mining vaudeville, and impromptus were rendered. But the event of the even ing was the sensational arrest, trial, an conviction of a prominent Ontario geologis for unconventional behaviour in Sweden. So over whelming was the evidence adduced by the prosecu tion that the accused never stood the remotest chanc of clearing his skirts. One of these latter was on th scene. The tragic tale unfolded by Prosecuting-Attor ney LeRoy brought tears to the eyes of the case-hard ened jury, and perceptiby heightened the colour i Justice Penhale's super-dignified countenance. Twic or thrice in attempting to defend his client's conduc the Attorney for the Defence, Dr. A. R. Ledoux, brok down completely. Indeed the whole audience gave fre vent to wave after wave of emotion throughout th trial. The consistent narrative of Dr. Kemp-Coo carried much weight in convicting the prisoner. contributory cause was the sullen silence of the a cused. The sentenee, though heavy, was just. Som little confusion arose as to the allocation of the fin But this was amicably settled when Justice Penha generously consented to accept a large share of it hin self.

Friday Sessions.

During these sessions, several papers were presente Amongst them were the following: "Quebec Eartl quakes," by Dr. James Douglas; "The Porcupir Gold Area," by Mr. A. G. Burrows; "The Iron O Resources of the World," by Dr. Frank D. Adam "The Wabana Iron Mines of the Nova Scotia Steel Coal Company, Limited," by Thos. Cantley; "Th Clays of Western Canada," by Dr. Heinrich Ries "Some Suggestive Phases of the Iron Mining Indu try of Eastern North America," by Mr. Frank Nason; and "Recent Underground Development Wor at Cobalt," by Mr. C. W. Knight, and "Notes on th Iron Ores of the Metagami River," by Prof. M. Baker.

Mr. Knight's paper was illustrated by slides of u derground photographs taken by Mr. A. A. Cole.

During the afternoon session Mr. Rice, of the Unite States Bureau of Mines, gave a very interesting talk c the work of the Pittsburgh Testing Station. Mr. W. Ingalls led the discussion that followed.

The Dinner—Friday Evening.

The attendance at the annual banquet was larg than usual. Dr. F. D. Adams was chairman. Amon the speakers were the Hon. C. R. Devlin, Mr. F. Con don, M.P., Dr. James Douglas, Dr. A. C. Lane, Dr. F. Kemp, Col. A. M. Hay, Col. Turnbull, Prof. C. Richardson, Dr. W. G. Miller, Mr. F. L. Garrison, M Eugene B. Wilson, and Mr. J. C. Murray.

The menu card, presented by the Asbestos Manufa turing Company, was a tablet of prepared asbestos.

The toast list was commendably short. It was r grettable, however, that several of the United Stat visitors, including Dr. A. R. Ledoux and Mr. W.

Ingalls, were forced to leave on an early train before the dinner was nearly over.

In a broad sense the Quebec meeting was a success. In our editorial columns we draw attention to some details that need attention. But we must not close this correspondence without alluding to the splendid spirit in which the Quebec officials welcomed the delegates.

SOCIETY OF CHEMICAL INDUSTRY.

(Special Correspondence.)

The first joint meeting of the Canadian sections of the above society was held on Friday, Feb. 24th, in the School of Mining, Kingston. The members of the Toronto section travelled in a chartered Pullman to Kingston, where they were joined by representatives from Ottawa and Montreal.

The visiting members were the guests of the School of Mining, and, during the afternoon preceding the meeting, were entertained by the professors of the School. Visits were paid to old Fort Henry, Royal Military College and other points of interest in and about the historic city.

At 6.30 dinner was served in the Red Room of the new Arts Building, at the conclusion of which Dr. Goodwin, on behalf of the School of Mining and the Kingston members of the Society, welcomed the visitors in a felicitous speech. He expressed the desire that this first joint meeting in Kingston would prove to be but the beginning of many similar gatherings. Prof. Lash Miller replied for the different sections represented, and thanked the hosts of the evening for the excellent entertainment provided.

Mr. Alfred Burton, honorary secretary of the Toronto section, read the minutes of the last meetings held in Toronto and Montreal, and letters were read from Messrs. Joel B. Saxe, Wm. Lowrie, Brainerd, and Murray Wilson, regretting their inability to be present.

The paper on "The Use of Permitted Explosives," by Mr. C. J. Coll, Stellarton, N.S., was read in his absence by Dr. Goodwin. As all papers read before the different sections are the property of the parent society until published in their journal, it is not permissible here to report the papers in full.

Mr. Coll, who has had many years' experience in the coal regions of Nova Scotia, traced the change in sentiment of the mine managers regarding explosives from the year 1841, when the use of black powder was universal, to the present day. At present none but explosives on the permitted list in Great Britain are used. Mr. Coll's experience went to prove that explosives, the permitted list in Great Britain, but manufactured in Canada, were not so satisfactory. The reason for this is not apparent; nevertheless the imported article is best. A table was submitted comparing black powder and permitted explosives as to cost and amount used per ton of coal broken, an average for four years being taken for the comparison.

It was found that 28 per cent. more pounds of black powder were used to break a ton of coal, at one and one-half times the cost. The miner working on contract and purchasing his explosives from the company saves 6 cents per day by using the permitted explosive.

Mr. Coll's paper closed with an earnest appeal for better and safer systems of manufacturing, and a closer conformity to the standards required in Great Britain.

Dr. Guttman, Associate Professor of Chemistry at the School of Mining, read a paper on the "Manufacture of Explosives." Dr. Guttman has had a long connection in different countries with the explosives industry, and is thoroughly conversant with every branch of the business, from the designing of the plants for its manufacture to the proper distribution and use of the finished product. In this industry he had the decided advantage of his father's tuition, during his life a leading authority on the Continent on all branches of the explosives industry. Dr. Guttman's paper was largely descriptive of the latest devices and methods used in different places for nitrating the glycerine and testing the product.

His remarks were illustrated by lantern slides of the various plants and machinery in use. Several slides depicted graphically the disastrous results of the frequent explosions which take place in the factories. Dr. Guttman mentioned the fact that on the Continent, gelignite and explosives of that nature were used almost exclusively. In Canada and the United States, dynamite has the largest use, but the increasing cost and scarcity of glycerine will ultimately necessitate the use of more ammonium nitrate compounds. The world's total visible supply of glycerine for the next two years is already under contract for purchase. A comparison was made between dynamite and the ammonium nitrate and starch compounds, as to cost and effectiveness.

Dr. Guttman closed an exceedingly interesting and instructive paper by describing in detail, with illustrations, the construction of an ideal building for the manufacture of explosives.

Mr. E. W. Monk, of the Hamilton Powder Company, Montreal, read a paper on "The Care, Handling, and Use of Explosives." Mr. Monk is probably the best authority on this subject in Canada. Most of his life has been spent in the practical use of all makes and brands of explosives, and he speaks with the knowledge that comes only from experience. What Mr. Monk doesn't know about powder isn't written in the books, or learned in the factory, and still he says himself that when loading holes he is very careful to watch the men beside him, for fear the fool-killer has missed a man or two. This is a good thing for some miners to remember, especially those who think they know all about explosives. Mr. Monk at the very out set of his address wished it distinctly understood that he was relating his own experiences only and expressing in the paper his personal opinions. He described the ideal explosive and divided all accidents into two classes:—

1. Direct. 2. Indirect.

In the first class he placed all accidents due directly to carelessness. These include 95 per cent. of the total. Mr. Monk mentioned the fact that accidents in British Columbia, among the Chinese labourers, were reduced to a minimum, simply because the wily Chinaman does exactly as he is told, no more and no less.

The effects of the gases from intro-glycerine explosions, on the human system, were explained, and the best methods of resuscitation and treatment described.

Different methods of thawing dynamite, which had come under the writer's notice, were outlined, and some of them certainly exhibited the maximum of foolhardiness and ignorance—thawing the cartridges in boiling water, leaving the nitro-glycerine in the shack and loading the holes with water soaked sawdust, was one method ridiculed.

The latter part of Mr Monk's paper described in detail, with the aid of lantern slides, the use of gelignite in the Crean Hill shaft of the Canadian Copper Company. This is a four-compartment incline shaft

8-ft. x 24-ft, with a dip of 67 degrees from the vertical. slides were exhibited showing position of the holes giving best breaking results.

In the discussion which followed the reading of the different papers, Capt. Sedgwick, of the Royal Military College, described the uses of explosives as propellants. The captain is a pleasing speaker. He expressed the opinion that the danger from the use of aeroplanes in war operations is not very great.

Prof. Manley Baker described a visit to the United States Government testing plant for explosives at Pittsburgh, Pennsylvania. The professor showed by blackboard diagrams that black powder is far more dangerous in coal mines than the permitted explosives.

Dr. Milton Hersey, of Montreal, gave some interesting figures as to cost and methods of manufacturing explosives, and suggested that there is a good field in Canada for a nitro-starch plant.

Dr. Ellis, of Toronto University, was in a reminiscent mood, and quoted from a letter to the London Times of many years ago, written by the famous Nobel anent the carelessness exhibited in the handling of explosives. He related one incident where a poor unfortunate greased his waggon with nitro-glycerine, and, strange to say, it ran along smoothly until the wheel struck a boulder, and then kind neighbours wrote his epitaph. This was on a par with the fellow who filled his lamp with the same substance in lieu of coal-oil.

Prof. Lash Miller, on behalf of the officers of the Society, tendered a hearty vote of thanks to all those who had read papers and had taken part in the interesting discussion that followed.

The Kingston meeting was one of the most instructive and interesting that the Society has ever held. In numerical attendance, in the quality of the papers read, and in sustained interest, it surpassed any of the preceding meetings.

Present at the meeting were: Dr. Goodwin, Eugene Haanel, Dean Dupuis, Dr. Guttman, M. F. Connor, Prof. McPhail, R. Harcourt, B. L. Emslie, Prof. Bain, J. A. DeCew, Dr. Milton Hersey, H. H. Miller, N. F. Kalmus, Prof. W. P. Cohoe, J. A. King, C. R. Stauffer, C. W. Drury, John Donnelley, W. O. Walker, F. W. Babington, Dr. Waddell, Geo. T. Richardson, R. J. Manning, A. Neigbhorn, N. C. Polson, Douglas Ellis, John Robertson, Walter D. Bonnur, E. B. Henderson, Prof. Gwillim, Dr. D. B. Dowling, A. McGill, Prof. Lash Miller, Prof. W. H. Ellis, Alfred Burton, Prof. M. Baker, G W. McNaughton, Prof. Kirkpatrick, E. W. Monk, B. Blackhall, J. G. S. Hudson, Geo. Y. Chown, Percy D. Lyman, S. N. Graham, F. G. Stevens, J. A. McRae, R. C. Hammond, R. T. Mohan, J. H. Barrett, E. A. Collins.

PERSONAL AND GENERAL

Mr. P. Kirkegaard has built an office and dwelling in South Porcupine and will in future devote considerable time to private practice in this district.

While returning from the Quebec meeting of the Canadian Mining Institute, Mr. G. H. Gillespie was seriously injured near Madoc, Ont. He is now making substantial progress, but will be confined to the house for some weeks.

Mr. J. McEvoy has just completed a series of lectures on coal-mining before the fourth year mining students of Toronto University. Much appreciation has been expressed by the students. It is hoped that this feature may be incorporated permanently in the mining course.

Mr. Edward W. Parker, of Washington, D.C., statistician in charge, Division of Mineral Resources, U. S Geological Survey, attended the meeting of the Western Branch of the Canadian Mining Institute at Nanaimo, B.C., on February 16.

Mr. Samuel S. Fowler, of Nelson, B.C., paid a business visit to New York last month.

Mr. Howard W. DuBois, of Philadelphia, engineer in charge of the water supply system the Quesnelle Hydraulic Gold Mining Company is constructing, to bring water from Swift River to its gold gravel leases near Quesnel River, Cariboo district, B.C., was in Victoria lately, on his way to Quesnel.

Mr. J. Edgar McAllister, of Greenwood, Boundary district, B.C., general manager of the British Columbia Copper Company, was in New York last month, in connection with the company's annual meeting of shareholders.

Mr. W. J. Elmendorf, manager of the Portland Canal Mining Company, was in Victoria recently, conferring with the directors of the company relative to its mining and concentrating operations at Glacier Creek, Portland Canal mining division, B.C.

Mr. J. L. Parker, of Victoria, B.C., has been examining mining properties at Sheep Creek, in the Nelson mining division.

Mr. F. J. Longworth, of the British Columbia Copper Company's staff, for some time at Greenwood, B.C., is now superintendent of the company's Napoleon mine near Boyds, Washington, U.S.A.

Mr. Wayne Darlington, of Boise, Idaho, has been investigating lode mining conditions in parts of British Columbia, for United States clients.

Mr. Walter H. Aldridge and family left Trail, B.C. on February 22, for Los Angeles, California, where their home will be in future.

Mr. T. H. Kerruish, formerly superintendent at the Copper King mine, near Whitehorse, Southern Yukon, has been spending part of the winter in Victoria and Vancouver, B.C.

Mr. Geo. H Aylard, for six years in charge of the development of the Standard silver-lead mine, near Silverton, Slocan, B.C., has removed, with his family to Victoria for a three months' change.

Dr. J. M. Bell, after occupying the position of Director of the New Zealand Geological Survey since February, 1905, has tendered his resignation. Dr. Bell's work in New Zealand has been most effective. Not only has the survey been reorganized in an administrative sense but numerous important geological reconnaissances have been begun and completed. Dr. Bell will return to England, visiting New Caledonia and Westralia *en route*. Early in August he will visit Canada. He intends to take up private practice in London and Canada.

A press correspondent, writing from Greenwood, B.C., claims that Archie Aberdeen, who is employed at Bergen, Meyer's Creek, Boundary district, where a small seam of coal is being developed, is the oldest working miner in that province. He was 80 years old last June.

A press despatch from Ottawa, dated February 1[illegible] was to the effect that the Honourable the Minister of Labour had received a message from the chairman of the Board of Conciliation and Investigation, stating that the difficulty betwen the Crow's Nest Pass Coal Company and its miners, involving the question of hours and wages, had been amicably adjusted through the offices of the board.

Abstract of Preliminary Report of the Mineral Production of Canada, 1910

(Statistics Subject to Revision.)

Prepared by John McLeish, B.A., Chief of Division of Mineral Resources and Statistics.

Although complete statistics are not yet available, sufficient information is at hand to indicate that the total value of the mineral production of Canada during the past year exceeded $105,000,000. This production is made up from such a great variety of well established mining industries that the record should be particularly gratifying not only to those who are directly interested in the development of the mineral resources of the country, but also the public at large who indirectly profit thereby.

Not only is the increase over the production of the previous year a large one, having amounted to $13,209,517, or over 14 per cent., but an examination of the details of production shows that the increase has been fairly well distributed amongst the more important ores and minerals produced in Canada.

The production of the more important metals and minerals is shown in the following tabulated statement, in which the figures are given for the two years, 1909 and 1910, in comparative form, and the increase or decrease in value shown. Tabulated statements for both years, in greater detail, will be found on subsequent pages of this pamphlet:

The subdivision of the mineral production in 1909 and 1910 by provinces was approximately as follows:

Province	1909	% of total	1910	% of total
Nova Scotia	$12,504,810	13.62	$14,054,534	13.38
New Brunswick	657,035	0.71	585,891	0.56
Quebec	7,086,265	7.72	8,193,275	7.80
Ontario	37,374,577	40.70	43,017,026	40.95
Manitoba	1,193,377	1.30	1,470,776	1.40
Saskatchewan	456,246	0.50	557,806	0.53
Alberta	6,047,447	6.58	7,876,458	7.50
British Columbia	22,479,006	24.48	24,547,817	23.37
Yukon	4,032,678	4.39	4,737,375	4.51
	$91,831,441	100.00	$105,040,958	100.00

It will be observed that there has been an increased production in nearly every province, the only falling off being shown by New Brunswick, in which the gypsum production, and some of the structural products, showed a slight decrease.

In Nova Scotia there was a largely increased production of coal and gypsum. In Quebec, the principal in-

	1909		1910		Increase (+) or decrease
	Quantity.	Value.	Quantity.	Value.	(—) in value.
Copper ..... pounds	52,493,863	$ 6,814,754	56,598,074	$ 7,209,463	+$ 394,709
Gold ..... ounces	453,865	9,382,230	.....	10,224,910	+ 842,680
Pig iron ..... tons	757,162	9,581,864	800,797	11,245,630	+ 1,663,766
Lead ..... pounds	45,857,424	1,692,139	32,987,508	1,237,032	— 455,107
Nickel ..... pounds	26,282,991	9,461,877	37,271,033	11,181,310	+ 1,719,433
Silver ..... ounces	27,529,473	14,178,504	31,983,328	17,106,604	+ 2,928,100
Other metallic products	.....	405,122	.....	559,186	+ 154,064
Total	.....	$51,516,490	.....	$58,764,135	+ 7,247,645
Less pig iron credited to imported ores ..	607,718	7,359,649	695,891	9,594,309	+ 2,234,660
Total metallic	.....	$44,156,841	.....	$49,169,826	+ 5,012,985
Asbestos and asbestic ..... tons	87,300	$ 2,201,775	100,385	$ 2,476,558	+ 274,783
Coal ..... tons	10,501,475	24,781,236	12,796,512	29,811,750	+ 5,030,514
Gypsum ..... tons	439,129	809,632	531,313	939,838	+ 130,206
Natural gas	.....	1,207,029	.....	1,312,614	+ 105,585
Petroleum ..... barrels	420,755	559,604	315,895	388,550	— 171,054
Salt ..... tons	84,037	415,219	84,029	409,624	— 5,595
Cement ..... barrels	4,067,709	5,345,802	4,753,975	6,414,315	+ 1,068,513
Clay products	.....	6,450,810	.....	7,600,000	+ 1,149,190
Lime ..... bushels	5,592,924	1,132,756	5,721,285	1,131,407	— 1,349
Stone	.....	3,127,135	.....	3,499,772	+ 372,637
Miscellaneous non-metallic	.....	1,642,602	.....	1,886,704	+ 244,102
Total non-metallic	.....	$47,674,600	.....	$55,871,132	+$ 8,196,532
Grand total	.....	$91,831,441	.....	$105,040,958	+$13,209,517

creases were in cement and asbestos. Ontario's increases are principally in the metals copper, nickel, and silver.

Manitoba shows an increased production of gypsum and clay products; while in Alberta, clay products, cement, and particularly coal, contribute the chief gains. In British Columbia the increase is mainly due to the coal industry, while the Yukon not only shows a gratifying gain in gold production, but a growing shipment of copper and silver ores.

Of the total production in 1910, $49,169,826, or 46.8 per cent., is credited to the metals, and $55,871,132, or 53.2 per cent., to the non-metallic products. Amongst the individual products, coal still contributes the greatest value, constituting 28.4 per cent. of the total. Silver is next, with about 16.3 per cent.; nickel third, with 10.6 per cent.; gold, 9.7 per cent.; clay products, 7.2 per cent.; copper, 6.8 per cent., and cement, 6.1 per cent.

In valuing the metallic production, the same general practice has been followed as in past years, with one or two slight modifications. Instead of valuing lead at the New York price, the average price at Toronto has been used. This is somewhat lower than the New York price, but higher than that in London.

Nickel has been valued at an average price of 30 cents per pound, although the minimum quotation for the metal in large lots was 40 cents. Considerable quantities of monel metal are now made, the production of which does not require the separation of the nickel metal, and the price of 30 cents is equivalent to valuing two-thirds of the production at 37½ cents, and one-third at 15 cents.

THE MINERAL PRODUCTION OF CANADA IN 1910
(Subject to Revision.)

Product.	Quantity	Value
METALLIC.		
Copper, value at 12.738 cents per pound ..... pounds	56,598,074	$ 7,209,463
Gold	.....	10,224,910
Pig iron from Canadian ore ....tons	104,906	1,651,321
Iron ore (exports) ..... tons	114,449	324.186
Lead, value at 3.75 cts. per lb...pounds	32,987,508	1,237,032
Nickel, value at 30 cts. per lb...pounds	57,271,033	11,181,310
Silver, value at 53.486 cts. per oz.ounces	31,983,328	17,106,604
Zinc ore and other products	.....	235,000
Total	.....	$49,169,826
NON-METALLIC.		
Arsenic, white ....tons	1,502	$ 75,328
Asbestos ....tons	75,678	2,458,929
Asbestic ....tons	24,707	17,629
Coal ....tons	12,796,512	29,811,950
Corundum ....tons	1,870	198,680
Feldspar ....tons	15,719	47,867
Fluorspar ....tons	2	15
Graphite ....tons	1,243	59,087
Grindstones ....tons	3,847	43,936
Gypsum ....tons	513,313	939,838
Magnesite (railway shipments). tons	328	2,493
Mica ....tons	.....	143,409
Ochres ....tons	4,813	33,185
Mineral water	.....	175,173
Natural gas	.....	1,312,614
Peat ....tons	771	1,735
Petroleum, val. at $1.23 per brl.barrels	315,895	388,550
Phosphate ....tons	1,319	11,780
Pyrites ....tons	55,925	192 263
Quartz ....tons	88,205	91,951
Salt ....tons	84,092	409,324
Talc ....tons	7,112	22,308
Tripolite ....tons	22	134
Total	.....	$ 36,438,278
STRUCTURAL MATERIALS & CLAY PRODUCTS.		
Cement, Portland ....barrels	4,753,975	6,414,315
Clay products—		
Brick	.....	5,930,630
Sewer pipe, fireclay, drain tile, pottery, etc.	.....	1,669,370
Lime ....bushels	5,721,285	1,131,40
Sand and gravel (exports) ....tons	624,824	407,97
Sand lime brick	.....	360,89
Slate	.....	18,49
Stone—		
Granite	.....	634,78
Limestone	.....	2,303,80
Marble	.....	158,77
Sandstone	.....	402,40
Total structural materials and clay products	.....	$ 19,432,85
All other non-metallic	.....	36,438,27
Total value, metallic	.....	49,169,82
Total value, 1910	.....	$105,040,95

The average monthly prices of the metals in cent per pound for several years past are shown herewitl

	Cts. 1907	Cts. 1908	Cts. 1909	Cts. 191
Copper, New York.....	20.004	13.208	12.982	12.7
Lead, New York	5.325	4.200	4.273	4.4
Lead, Toronto	5.429	3.894	3.692	3.7
Nickel, New York.....	45.000	43.000	40.000	40.0
Silver, "	65.327	52.864	51.503	53.4
Spelter "	5.962	4.720	5.503	5.5
Tin, "	38.166	29.465	29.725	34.1

SMELTER AND REFINERY PRODUCTION IN CANADA, 1908 AND 1909.

	1908		1909	
	Refined Products.	Metals contained in matte, blister, base bullion and speiss.	Refined products	Metals contained in matte, blister, base bullion and speiss.
Antimony ....pounds	.....	.....	61,207	.....
Gold ....ounces	15,436	203,300	18,241	200,129
Silver ....ounces	11,168,689	3,271,899	14,242,545	4,845,920
Lead ....pounds	36,549,274	1,116,792	41,883,614	3,973,810
Copper ....pounds	.....	51,965,289	.....	53,328,583
Cupper sulphate ....pounds	203,379	.....	51,405	.....
Nickel ....pounds	.....	19,506,251	.....	27,041,957
Cobalt ....pounds	.....	692,170	.....	1,321,083
White arsenic ....pounds	1,431,052	.....	2,258,087	.....
Arsenic ....pounds	.....	436,787	.....	1,074,516

Smelter Production.

General statistics of smelter production were collected by this branch for the first time in 1908, and the aggregate results of these operations during the years 1908 and 1909 are shown in the accompanying table. Unfortunately, complete returns have not yet been received for the year 1910. It should be explained also that the figures include the results of the treatment of a small quantity of imported ores. The results of the operations at the smelter at Northport, Wash., treating chiefly Canadian ores, have also been included:

The total ore charged to the furnaces during each of the past two years is shown as under:—

	1909	1910
Nickel-copper ores	462,336	628,947
Silver-cobalt-nickel-arsenic ores	8,384	9,466
Lead and other ores treated in lead furnaces	53,006	57,547
Copper-gold silver ores	1,850,889	*2,000,000
Total	2,374,615	2,695,960

*Returns incomplete but tonnage probably exceeded the figure given.

Gold.

While statistics of gold production are as yet incomplete, a preliminary estimate shows a production of approximately $10,224,910, an increase of about 9 per cent. over the 1909 production. The production of the Yukon is valued at $4,550,000, the total exports, on which royalty was paid during the calendar year according to the records of the Interior Department, being 275,472.51 ounces. The Yukon production in 1909 was $3,960,000, the exports being 239,766.35 ounces. The British Columbia production in 1909 was: placer gold, $477,000; bullion from free milling ores, $329,655; smelter recoveries, $4,367,924. In 1910 the placer production is estimated by the Provincial Mineralogist as $482,000. An estimate of free milling bullion shipments and smelter recoveries is made of $4,950,000, or a total production for the province of $5,432,000. The Nova Scotia production shows a falling off of about $20,000, while Ontario will probably show a slight increase on account of the gold recovered in development work at Porcupine, of which a record has not yet been received.

Silver.

The silver production of Canada in 1909 showed an increase of 24.5 per cent. over that of 1908, following a series of large increases during the three preceding years. It is very satisfactory, therefore, to be able to report a further increase in 1910 of about 16 per cent. The total production last year, including that produced as bullion and the metal estimated as recovered from ores sent to smelters or otherwise treated, was approximately 31,983,328 ounces, as compared with a production of 27,529,473 ounces in 1909.

The increase is again chiefly credited to Cobalt and adjacent mining districts of Ontario.

There was a slight falling off in the silver production of British Columbia as a result of the decreased production from the silver lead ores of the province.

For the Province of Ontario, complete returns have been received from all the larger operators, while estimates based on railway shipments have been made for two or three of the smaller mines. The net production of recoverable silver is estimated at 29,375,000 ounces, that is after deducting 5 per cent. from the settlement assays of ores to smelters to allow for smelting losses. At the average price of silver for the year this has a value of $15,711,513.

The production, similarly estimated, for 1909, was 24,822,99 ounces, thus showing an increase in 1910 of about 4,552,901 ounces, or over 18 per cent.

The total shipments of ore and concentrates were ounces of silver, in addition to which somewhat over 940,000 ounces were shipped as bullion. The average silver content of ore and concentrates shipped was thus about 865.57 ounces, or $462.96 per ton, as compared with an average of 840 ounces in 1909.

The shipments during 1909 were 27,835 tons of ore, containing 22,349,717 ounces of silver, or an average of 803 ounces per ton; 3,059 tons of concentrates containing 3,627,819 ounces, or an average of 1,186 ounces per ton, and bullion containing 143,440 fine ounces.

The exports of silver in ore, etc., as reported by the Customs Department, were 30,699,770 ounces, valued at $15,649,537.

The price of refined silver in New York varied between a minimum of 50½ cents per ounce on March 2nd, and a maximum of 56¾ cents on October 19th, the average monthly price being 53.486, as compared with an average monthly price of 51.503 cents in 1909.

Copper.

No refined copper is produced in Canada, but the copper ores are mostly reduced to a matte or blister copper carrying values in the precious metals. In Quebec, where the copper is recovered subsequently to the extraction of the sulphur from pyritic ores, there was increased activity during the year. A small quantity of ore was exported from British Columbia coast mines and the Yukon to United States smelters for treatment. In Ontario, where the copper is chiefly recovered from the nickel-copper ores of the Sudbury district, there is a very large increase in production. In British Columbia, the most important events during the year were the acquisition of a controlling interest in the Dominion Copper Company by the British Columbia Copper Company, with the subsequent re-opening of several of the big properties, and the destruction by fire of part of the head works of the Granby Mines at Phoenix, B.C., which noticeably affected the output, although the Boundary district as a whole shows an increased production.

Statistics are not available at the present time to show the total quantity of copper contained in ores shipped from the mines. The total production of copper, however, contained in blister and matte produced and estimated as recoverable from ores exported was in 1910 approximately 56,598,074 pounds. In 1909 the production of copper, estimated on the same basis, was 52,493,863 pounds, an increased production of about 7.8 per cent. being therefore shown in 1910.

Of the production in 1910, Quebec is credited with 957,178 pounds; the production in Ontario was 19,259,016 pounds; and in British Columbia the production is estimated at about 36,000,000 pounds. Ontario shows an increased production of about 3,512,317 pounds, or 22.3 per cent., while British Columbia shows a slight increase, the production in 1909 being estimated at 35,658,952 pounds.

The New York price of electrolytic copper during the year varied between the limits of 12 cents and 13¾ cents per pound, the average being 12.738, as compared with an average of 12.982 cents in 1909.

The total exports of copper contained in ore, matte and blister according to Customs Department returns, were 56,964,127 pounds, valued at $5,840,553. It will be noted that the exports agree very closely in number of pounds with the record of the production which

would be expected since practically all the copper is exported.

Lead.

The total production in 1910 of pig and manufactured lead was 32,987,508 pounds, valued at the average price of refined lead in Toronto, at $1,237,032.

The production of refined lead and lead contained in base bullion exported in 1909 was 45,857,424 pounds. A decreased production in 1910 is therefore shown of 12,869,916 pounds.

The production of both years was entirely from British Columbia. The falling off in the output of that province is due largely to the curtailment of production by several of the important Slocan mines, consequent to the destruction of railway facilities and of several mines buildings by forest fires.

The Blue Bell mine also, one of the leading shippers of lead in 1909, suspended operations early in 1910. Against these decreases may be placed the advent of the Sullivan mine, East Kootenay, into the list of shippers.

The exports of lead in ore during the year were 23 tons, and of pig lead, 3,856 tons, or a total of 3,879.

About 12,614 tons of domestic production were, therefore, available for home consumption.

The imports of lead in 1910 were 8,305 tons, valued at $525,265, in addition to which were manufactures valued at $107,688, and litharge, white and red lead, etc., $200,790, or a total value of $833,743.

The price of lead in Toronto during 1910 averaged about 3.750 cents per pound; in New York, 4.446 cents per pound; and in London, £12.920 per long ton.

The amount of bounty paid during the twelve months ending December 31, 1910, on account of lead production, was $318,308.28, as compared with a payment of $346,527.98 in 1909.

Nickel.

There has been a very large increase in the production of nickel-copper ores in Ontario during the past two years, and it is perhaps not generally realized that the production of nickel in this province is now almost as large, pound for pound, as the production of copper in British Columbia, while the market price of the metal is from two to three times that of copper. A portion of the production is, however, now recovered with copper as monel metal and sold at a much lower price than fine nickel. Active operations are being carried on by the same companies as formerly, viz.: the Mond Nickel Company, at Victoria Mines, and the Canadian Copper Company, at Copper Cliff.

The ore is first roasted and then smelted and converted to a Bessemer matte containing from 77 to 82 per cent. of the combined metals, copper and nickel; the matte being shipped to the United States and Great Britain for refining.

The total production of matte in 1910 was 35,033 tons, valued at the furnace at $5,380,064, an increase of $9,188 tons, or 31.6 per cent., over the production of 1909. The metallic contents were, copper, 19,259,016 pounds, and nickel, 37,271,033 pounds.

The aggregate results of the operations on the Sudbury District nickel-copper ores during the past three years were as follows, in tons of 2,000 pounds:—

	1908	1909	1910
Ore mined	409,551	451,892	652,392
Ore smelted	360,180	462,336	628,947
Bessemer matte produced	21,197	25,845	35,033
Bessemer matte shipped	21,210	.....	.....
Copper contents of matte shipped	7,503	7,873	9,630
Nickel contents of matte shipped	9,572	13,141	18,625
Spot value of matte shipped	$2,930,989	$3,913,017	$5,380,064
Wages paid	1,286,265	1,234,904	1,748,153
Men employed	1,690	1,735	.....

Exports of nickel contained in ore, matte, etc., as compiled from Customs reports, have been, for the twelve months ending December 31, as follows:

	1907	1908	1909	1910
	pounds	pounds	pounds	pounds
To Great Britain	2,518,338	2,554,486	3,843,763	5,335,331
To United States	16,857,997	16,865,407	21,772,635	30,679,451
	19,376,335	19,419,893	25,616,398	36,014,782

The price of refined nickel in New York remained practically constant throughout the year—the quotation being "Large lots, contract business, 40 to 45 cents per pound. Retail spot from 50 cents for 500-pound lots, up to 55 cents for 200-pound lots. The price for electrolytic is 5 cents higher."

Iron.

Iron Ore—Excluding Quebec, for which complete returns have not been received, the production of iron ore in 1910 was 254,915 short tons, valued at $566,109. The shipments may be classified as: magnetite, 124,535 tons; hematite, 130,380 tons. In 1909 the total shipments were 268,043 tons, valued at $659,316, and comprised magnetite, 74,240 tons; hematite, 190,473 tons, and bog ore, 3,330 tons.

Exports of iron ore from Canada during 1910 are recorded by the Customs Department as 114,499 tons, valued at $324,186. This is chiefly from Moose Mountain mine, Ontario, Torbrook, N.S., and Bathurst, N.B.

Although not a Canadian production, it may be of interest to state that the two Canadian companies operating the Wabana mines, shipped during the year 1,259,626 short tons, of which 808,762 tons were shipped to Sydney and 450,864 tons to the United States and Europe.

Pig Iron.—An increase of 5.58 per cent. is shown in the production of pig iron in Canada in 1910 as compared with 1909. The total production in 1910 was 800,797 short tons, valued at $11,245,630, as compared with 757,162 tons, valued at $9,581,864, in 1909. These figures do not include the output from electric furnaces making ferro-products, which are situated at Welland and Sault Ste. Marie, Ontario, and Buckingham, Quebec. Of the total output of pig iron during 1910, 17,164 tons, valued at $333,956, or $19.78 per short ton, were made with charcoal as fuel, and 783,633 tons, valued at $10,911,674, or $13.92 per ton, with coke. The amount of charcoal iron made in 1909 was 17,003 tons, and iron made with coke was 740,159 tons. The classification of the production of 1910, according to the purpose for which it was intended, was as follows: Bessemer, 219,492 tons; basic, 425,400 tons; foundry, including miscellaneous, 138,741 tons.

The amount of Canadian ore used during 1910 was 160,290 tons; imported ore, 1,406,668 tons; mill cinder, etc., 22,671 tons.

The amount of coke used during the year was 993,037 tons, comprising 499,717 tons from Canadian coal and 493,320 tons imported coke or coke made from imported coal.

The consumption of charcoal was 1,615,919 bushels. Limestone flux was used to the extent of 569,355 tons.

In connection with blast furnace operations there were employed 1,403 men and $1,006,727 were paid in wages.

The total daily capacity of 16 completed furnaces was, according to returns received, 2,880 tons.

The number of furnaces in blast, December 31, 1910, was 11.

The production of pig iron by provinces in 1909 and 1910 was as follows:—

Province.	1909			1910		
	Tons	Value	Per ton	Tons	Value	Per ton
Nova Scotia	345,380	$3,453,800	$10.00	300,287	$4,203,444	$12.00
Quebec	4,770	125,623	26.34	3,237	85,256	26.34
Ontario	407,012	6,002,441	14.75	447,296	6,956,930	15.55
Total	757,162	$9,581,864	$12.65	800,797	$11,245,630	$14.04

The exports of pig iron during the year are reported as 9,763 tons, valued at $296,310. Probably the greater part of this is ferro-silicon and ferro-phosphorus, produced at Welland and Buckingham, respectively.

There were imported during the year 227,753 tons of pig iron, valued at $3,122,695; 16,106 tons of charcoal pig, valued at $242,152, and 18,900 tons of ferro-manganese, valued at $464,741.

Steel.—The total production of ingots and castings in 1910 was approximately 822,281 short tons, of which 803,600 tons were ingots, and 18,681 tons were castings. The figures have been partially estimated, the records of the Ontario Iron and Steel Company having been unfortunately destroyed by fire. The production in 1909 was reported as 754,719 short tons, made up of 739,703 tons of ingots and 15,016 tons of castings.

Returns from seven of the principal rolling mills report the production in 1910 of steel in the following shapes; blooms and billets, 635,500 short tons; rails, 399,761 tons; rods and bars, 214,233 tons; miscellaneous rolled products, 23,167 tons.

The total bounty paid on iron and steel during 1910 was $1,344,144.59.

Asbestos.

The total shipments of asbestos in 1910, with one firm still to hear from, are reported as 75,678 tons, valued at $2,458,929, as compared with 63,349 tons, valued at $2,284,587, in 1909, an increase of about 19 per cent. in tonnage and 7.6 per cent. in total value.

The number of men employed in mines and mills is reported as 3,443, at a wage cost of $1,393,856. While the shipments are reported as above, the actual production was returned as 4,815 tons of crude and 91,353 tons of mill stock produced from 1,474,527 tons of asbestos rock, or a total production of 96,168 tons; stock on hand at the end of the year totalled 39,310 tons, as compared with 20,921 tons on hand at December 31, 1909.

The following tabulated statement shows the production and shipments during 1910 and the stock on hand at the end of the year:—

	Production	Shipments.			Stock on hand Dec. 31	
	Tons	Tons	Value	Per ton	Tons	Value
Crude No. 1	1,971	1,688	$ 445,130	$263.70	1,605	$ 426,782
Crude No. 2	2,844	1,732	171,684	99.12	2,842	405,419
Mill Stock No. 1	16,026	12,830	701,681	54.69	69,933	718,765
Mill Stock No. 2	56,321	42,612	997,987	23.42	24,541	591,752
Mill Stock No. 3	19,006	16,816	142,447	8.47	3,389	29,988
Total asbestos	96,168	75,678	$2,458,929	$32.49	39,310	$2,172,706
Asbestic	.....	24,707	17,629	0.71	.....	.....

In the absence of a uniform classification of asbestos of different grades, the above sub-divisions have been adopted purely on a valuation basis. Crude No. 1 comprising material valued at $200 and upwards, and Crude No. 2 under $200. Mill Stock No. 1 includes stock valued at from $45 to $100; No. 2, from $20 to $40. No. 3, under $20.

The shipments of asbestos in 1909 were in detail as follows:—

Crude No. 1, 912 tons, value $246,655, or $270.37 per ton.

Crude No. 2, 2,162 tons, value $328,855, or $152.11 per ton.

Mill stock No. 1, 14,776 tons, value $785,731, or $53.18 per ton.

Mill stock No. 2, 32,417 tons, value $800,728, or $24.70 per ton.

Mill stock No. 3, 13,082 tons, value $122,618, or $9.37 per ton.

Total, 63,349 tons, value $2,284,587, or $36.06 per ton; asbestic, 23,951 tons, value $17,188.

The exports of asbestos during the twelve months ending December, 1910, are reported by the Customs Department as 71,485 tons, valued at $2,108,632, comprising 57,939 tons, valued at $1,505,477 to the United States; 6,700 tons, value $280,452, to Great Britain; 440 tons, value $15,925, to Germany; 2,187 tons, value $94,619, to France, and 1,242 tons, value $43,948, to other countries.

The imports of manufactures of asbestos during the same period are reported as valued at $230,489.

Corundum.

There was an increased production of corundum in 1910. The quantity of corundum ore treated during the year was 37,183 tons, from which was produced 1,686 tons of grain corundum. The shipments were 106 tons sold in Canada and 1,774 tons sold in other countries, a total of 1,870 tons, valued at $198,680.

Coal and Coke.

The total coal production in Canada in 1910, comprising sales and shipments, colliery consumption and coal used in making coke, is estimated at 12,796,512 short tons, valued at $29,811,750. This is an increase of 2,295,037 tons, or nearly 22 per cent. over the production of 1909, and is the largest production of coal yet recorded for Canada.

There has been an increased production from practically all the larger collieries, while in the Province of Alberta many new mines are being opened up and

developed. The largest increases have been in the west—Alberta showing an increase of nearly 42 per cent., and British Columbia over 27 per cent.; while Nova Scotia shows an increase of a little over 13 per cent. The total production is almost equally divided this year between the eastern and western coal fields, while Alberta contributes about 22 per cent. of the whole, as compared with 10 per cent. in 1905 and 5 per cent. in 1900.

The production by provinces was approximately as follows, the figures for 1909 being also given. With respect to Alberta, while the table below shows a production in 1910 of 2,824,929 tons, the Provincial Mine Inspector estimates the output at over 3,000,000 tons.

Province	1909		1910	
	Tons	Value	Tons	Value
Nova Scotia	5,652,089	$11,354,643	6,407,091	$12,871,388
British Columbia	2,606,127	8,144,147	3,319,368	10,373,024
Alberta	1,994,741	4,838,109	2,824,929	6,161,055
Saskatchewan	192,125	296,339	190,484	293,448
New Brunswick	49,029	98,496	53,455	106,910
Yukon Territory	7,364	49,502	1,185	5,925
Totals	10,501,475	$24,781,236	12,796,512	$29,811,750

The exports of coal are reported by the Customs Department as 2,377,049 tons, valued at $6,077,350, as compared with exports of 1,588,099 tons in 1909, valued at $4,456,342.

Imports of coal during the year include bituminous 5,966,466 tons, valued at $11,919,341; slack, 1,365,281 tons, valued at $1,795,598, and anthracite, 3,266,235 tons, valued at $14,735,062, or a total of 10,597,982 tons, valued at $28,450,001.

There was a greater importation of each class of coal than in 1909, when the total imports were 9,872,924 tons.

Coke.—The production of oven coke in 1910 was about 897,273 short tons, as compared with a production of 862,011 tons in 1909. The total quantity of coal charged to ovens was 1,373,793 short tons. By provinces, the production was: Nova Scotia, 507,996 tons; Ontario, 25,959 tons; Alberta, 121,578 tons, and British Columbia, 241,740 tons. The coke is all made from Canadian coal with the exception of that made by the Atikokan Iron Company at Port Arthur, Ontario. All of the coke produced was used in Canada with the exception of 50,922 tons sold for export to the United States, chiefly from Alberta. The quantity sold for export in 1909 was 77,407 tons.

The quantity of coke imported during the calendar year was 737,088 tons, valued at $1,908,725, as compared with imports of 661,425 tons, valued at $1,508,627 in 1909.

Chromite.

No returns of production of chromite have been received, but 619 tons are reported as having been shipped by rail from Colcraine and Black Lake. An export of 15 tons, valued at $150, is also reported by the Customs Department

Petroleum and Natural Gas.

The production of crude petroleum shows another large falling off in 1910, the production being only 315,895 barrels, or 11,056,337 gallons, valued at $388,550, as compared with 420,755 barrels, or 14,726,433 gallons, valued at $559,604, in 1909. The average price per barrel was also less, being about $1.23 in 1910, as compared with $1.33 in 1909.

The above statistics of production have been kindly furnished by the Trade and Commerce Department, and represent the quantities of oil on which bounty was paid, the total bounty payments being $165,845.06 in 1910, and $220,896.50 in 1909.

The production in Ontario by districts, as furnished by the Supervisor of Petroleum Bounties, was, in 1910, as follows, in barrels:—Lambton, 205,456; Tilbury and Romney, 63,058; Bothwell, 36,998; Leamington, 141; Dutton, 7,752, and Onondaga (Brant County), 1,005.

The production in New Brunswick was 1,485 barrels.

In 1909 the production by districts was as follows, in barrels: Lambton, 243,123; Tilbury and Romney, 124,003; Bothwell, 38,092; Leamington, 5,929, and Dutton, 9,513. New Brunswick produced 95 barrels.

While the production has been decreasing, the imports, as might be expected, have been increasing. The total imports of petroleum oils, crude and refined, in 1910 were 67,949,643 gallons, valued at $3,133,449, in addition to 1,362,235 pounds of wax and candles, valued at $80,106. The oil imports included crude oil, 53,604,053 gallons; refined and illuminating oils, 7,656,727 gallons; lubricating oils, 3,071,257 gallons; other petroleum products, 2,607,606 gallons.

The production of natural gas was valued at $1,312,614, being $68,568 for the Province of Alberta and $1,244,046 for Ontario. These values represent as closely as can be ascertained the value received by the owners of the wells for gas produced and sold or used and do not necessarily represent what the consumers have to pay for the gas, since in a number of instances the gas is re-sold once or twice by pipe line companies before reaching the consumer. In Alberta, also, some gas is being used by brick manufacturers for which no estimate has been obtained as to quantity or value. The total quantity of gas used in Ontario exceeded 7,036 million feet, and in Alberta over 450 million feet. A considerable flow of gas is reported from the new wells of the Maritime Oil Company, Limited, in Albert County, New Brunswick, which it is proposed to pipe to Moncton.

Salt.

Complete returns of salt production show total sales of 84,092 tons, valued at $409,624 for the salt alone. Packages used were valued at $173,446. Stock on hand at the end of the year was reported as 2,474 tons. Two hundred and eight men were employed and $112,909 paid in wages. The production was about the same as in 1909.

Imports of salt during the calendar year were: salt in bulk and bags, dutiable, 20,174 tons, valued at $97,326, and salt free of duty, 108,794 tons, valued at $364,735.

Cement.

Complete statistics have been received from the manufacturers of cement, covering their production and shipments during the year 1910. These returns show that the total quantity of cement made during the year including both Portland and slag cement, was 4,396,282 barrels, as compared with 4,146,708 barrels in 1909, an increase of 249,574 barrels, or 6 per cent.

The total quantity of Canadian Portland cement sold during the year was 4,753,975 barrels, as compared with 4,067,709 barrels in 1909, an increase of 686,266 barrels, or 16.87 per cent. The total consumption of Portland cement in 1910, including Canadian and imported cement, and neglecting an export of Canadian cement valued at $12,914, was 5,103,285 barrels, as compared with 4,209,903 barrels in 1909, or an increase of 893,382 barrels, or 21.22 per cent.

The average price per barrel at the works in 1910 was $1.34, as compared with an average price of $1.31 reported for 1909, and $1.39 in 1908.

The imports of Portland cement into Canada during the twelve months ending December 31, 1910, were 1,222,586 cwt., valued at $468,046. This is equivalent to 349,310 barrels of 350 pounds, at an average price per barrel of $1.34. The imports in 1909 were 142,194 barrels, valued at $166,669, or an average price per barrel of $1.17.

The imports from Great Britain during 1910 were 23,880 barrels, valued at $130,951; from the United States, 168,972 barrels, valued at $253,463; from Belgium, 19,027 barrels, valued at $20,618, and from other countries, 37,431 barrels, valued at $63,014.

The estimated consumption of Portland cement in Canada for 1910 is 5,103,285 barrels. 93 per cent. of this was Canadian made.

THE MINERAL PRODUCTION OF CANADA IN 1909.

(Revised.)

Product.	Quantity	Value (b)
METALLIC.		
Antimony ore ..... tons *	35	$ 1,575
Antimony, refined ..... pounds	61,207	4,285
Cobalt (k) ..... pounds	.....	94,609
Copper (c) ..... pounds	52,493,863	6,814,754
Gold ..... ounces	453,865	9,382,230
Pig iron from Canadian ore (d) tons	149,444	2,222,215
Iron ore (a) ..... tons	21,956	61,954
Lead (e) ..... pounds	45,857,424	1,692,139
Nickel (f) ..... pounds	26,282,991	9,451,877
Silver (g) ..... ounces	27,529,473	14,178,504
Zinc ore ..... tons	18,371	242,699
Total	.....	$44,156,841
NON-METALLIC.		
Arsenic ..... tons	.....	$ 67,446
Asbestos ..... tons	63,349	2,284,587
Asbestic ..... tons	23,951	17,188
Chromite ..... tons	2,470	26,604
Coal ..... tons	10,501,475	24,781,236
Corundum ..... tons	1,491	162,492
Feldspar ..... tons	12,783	40,383
Graphite ..... tons	864	47,800
Graphite, artificial ..... tons	257	.....
Grindstones ..... tons	4,275	54,664
Gypsum ..... tons	473,129	809,632
Magnesite ..... tons	330	2,508
Mica ..... tons	369	147,782
Mineral pigments—Barytes ... tons	179	1,120
Mineral pigments—Ochres .... tons	3,940	28,093
Mineral water	.....	175,173
Natural gas (h)	.....	1,207,029
Peat ..... tons	60	240
Petroleum (i) ..... barrels	420,755	559,604
Phosphate ..... tons	998	8,054
Pyrites ..... tons	64,644	222,812
Quartz ..... tons	56,924	71,285
Salt ..... tons	84,037	415,219
Talc ..... tons	4,350	10,300
Total	.....	$31,141,251
Structural Materials and Clay Products.		
Cement, Portland ..... barrels	4,067,709	$ 5,345,802
Clay Products—		
Bricks, common ..... No.	539,228,708	4,212,424
Bricks, pressed ..... No.	57,264,656	630,677
Bricks, paving ..... No.	3,759,803	67,408
Bricks, moulded and ornamental...	.....	8,866
Fireclay and fireclay products	.....	78,132
Fire-proofing and architectural terra cotta	.....	113,886
Pottery	.....	285,285
Sewer pipe	.....	645,722
Tiles, drain ..... No.	27,571,097	408,440
Lime ..... bushels	5,592,924	1,132,756
Sand lime-brick ..... No.	27,052,864	201,650
Sand and gravel (exports) .... tons	481,584	256,166
Slate ..... squares	4,000	19,000
Stone—		
Granite	.....	454,824
Limestone	.....	2,139,691
Marble	.....	158,441
Sandstone	.....	374,179
Total, structural material, etc....	.....	$16,533,349
Total, all other non-metallic....	.....	31,141,251
Total, non-metallic	.....	$47,674,600
Total, metallic	.....	44,156,841
Total value, 1909	.....	$91,831,441

*Short tons throughout.

(a) Exports.

(b) The metals, copper, lead, nickel and silver are for statistical and comparative purposes valued at the final average value of the refined metal. Pig iron is valued at the furnace, and non-metallic products at the mine or point of shipment.

(c) Copper content of smelter products and estimated recoveries from ores exported, at 12.982 cents per pound.

(d) The total production of pig iron in Canada in 1909 was 757,162 tons, valued at $9,581,864, of which it is estimated 607,718 tons, valued at $7,359,649, should be credited to imported ores.

(e) Refined lead and lead contained in base bullion exported at 3.690 cents per pound, the average price for the year in Toronto.

(f) Nickel content of matte produced at 36 cents per pound (the average minimum quotation for nickel in New York less 10 per cent). The value of the nickel contained in matte was, as returned by the operators, $2,810,748, or an average per pound of 10.7 cents.

(g) Estimated recoverable silver at 51.503 cents per ounce.

(h) Gross returns for sale of gas.

(i) Quantity on which bounty was paid and valued at $1.33 per barrel.

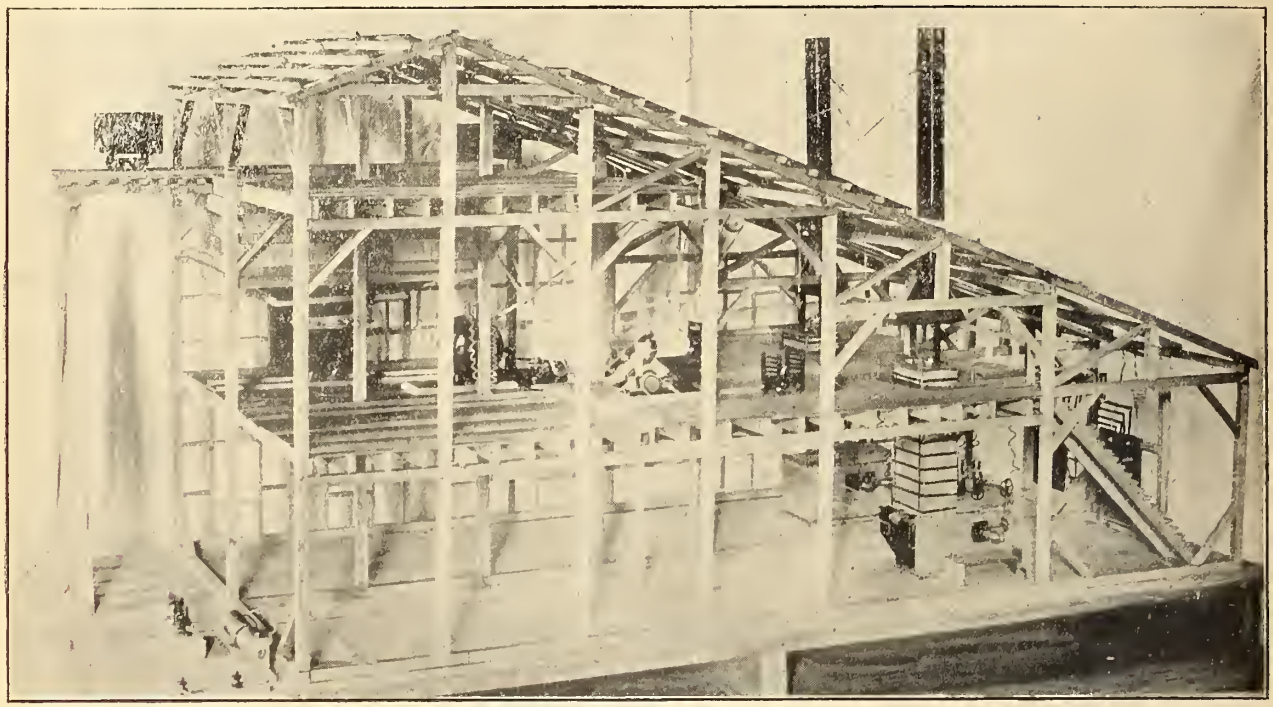
(k) Value received by shippers of silver cobalt ores for cobalt content.

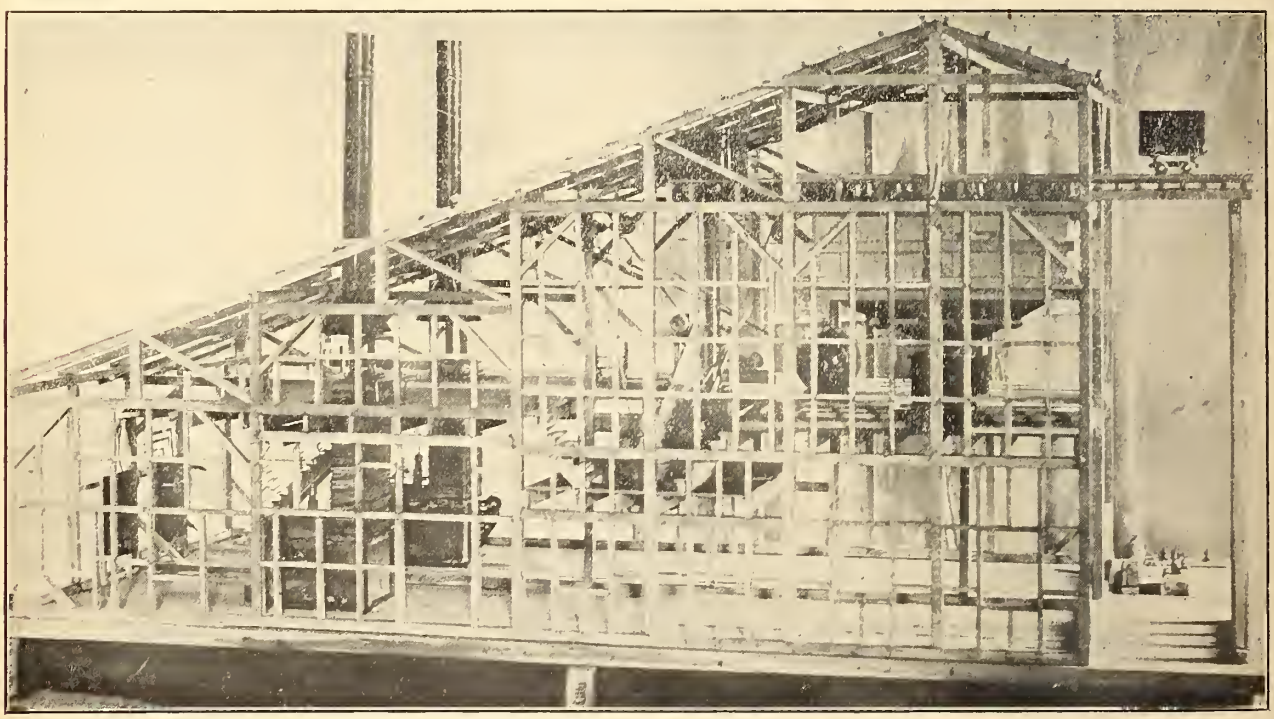
ANNUAL MINERAL PRODUCTION IN CANADA, SINCE 1886

Year	Volume of production.	Value per capita.
1886	$10,221,255	$2.23
1887	10,321,331	2.23
1888	12,518,894	2.67
1889	14,013,113	2.96
1890	16,763,353	3.50
1891	18,976,616	3.92
1892	16,623,415	3.39
1893	20,035,082	4.04
1894	19,931,158	3.98
1895	20,505,917	4.05
1896	22,474,256	4.38
1897	28,485,023	5.49
1898	38,412,431	7.32
1899	49,234,005	9.27
1900	64,420,877	12.04
1901	65,797,911	12.25
1902	63,231,836	11.55

1903	61,740,513	11.03	1907	86,865,202	13.35
1904	60,082,771	10.36	1908	85,557,101	12.32
1905	60,078,999	11.35	1909	91,831,441	12.82
1906	79,286,697	12.55	1910	105,040,958	14.02

The Evans 5-ton Direct Electric Smelting Steel Plant.





The accompanying photographs give two views of the very ingenious model exhibited by Mr. J. W. Evans, of Belleville, Ont., at the Quebec meeting of the Canadian Mining Institute. The model is a complete working miniature of one 5-ton capacity unit of the J. W. Evans' Direct Electric Smelting Steel Plant.

The ground ore, limestone, charcoal, and fluorspar are brought in from the grinding building and dumped into their respective bins. All four bins empty over the portion of track connected to the weigh scales, s that the full charge can be weighed into a car belo without moving the car. It is then taken to the mixin machine, into which the charge is dumped. Lime-wat is added after the dry charge is mixed, and the mixir is continued for a few minutes. Then the moveab blades of the mixing machine are turned so as to mo the material towards the outside of the mixing m chine, a door in the side is opened, and the charge

nptied upon a belt-conveyor which takes it to the briquetting machine. The briquettes are then moved to he pre-heater and are fed into the furnace, as required, by an adjustable power feeder. The steel from he furnace is tapped into moulds the size of large lathe nd plane tools, or into billets for forging.

Mr. Evans' model attracted a large amount of attenion during the convention. It will probably be secured y the Geological Survey for the new museum in Otawa.

MINERAL PRODUCTION OF ONTARIO, 1910

Product.	Quantity.	Value.
METALLIC:		
old .....ounces	3,246	$ 60,918
ilver ..... "	30,558,825	15,436,994
obalt .....tons	378	54,597
ickel ..... "	18,636	4,005,961
opper ..... "	9,630	1,374,103
ron ..... "	231,453	513,538
ig Iron ..... "	447,351	6,975,418
inc Ore ..... "	576	5,760
		$28,427,199
Less Ontario iron ore (143,284 tons) smelted into pig iron		317,804
Net metallic production	.....	28,109,395
NON-METALLIC:		
ctinolite .....tons	32	320
rsenic .....pounds	3,047,699	70,709
rick, common .....No.	304,988,000	2,374,287
ile, drain ..... "	21,028,000	318,456
rick, pressed, etc. ..... "	44,204,295	458,596
rick, paving ..... "	3,799,025	70,648
uilding and crushed stone .. "	.....	761,112
alcium carbide .....tons	3,072	184,323
ement, Portland ....barrels	2,471,837	3,144,343
orundum .....tons	2,692	171,994
eldspar ..... "	16,374	47,518
luorspar ..... "	2	15
raphite ..... "	992	55,637
ypsum ..... "	10,043	17,825
ron pyrites ..... "	33,812	98,353
ime .....bushels	2,889,235	474,531
ica .....tons	513	85,294
atural gas	.....	1,490,334
eat .....tons	851	1,284
etroleum ....Imp. gal.	11,004,357	368,153
ottery	.....	51,485
uartz .....tons	90,685	87,424
alt ..... "	84,071	414,978
ewer pipe	.....	359,087
alc .....tons	7,112	16,713
Total non-metallic production	.....	$11,123,419
Add net metallic production	.....	28,109,395
Total production	.....	$39,232,814

METALS.

Gold—The production, $60,918, though small, is nearly double in value that of 1909. More than half the yield came from the new camp at Porcupine, where active developments are in progress, and where large stamp mills are being erected at the Hollinger and Dome mines. A branch of the Temiskaming and Northern Ontario Railway—the Ontario Government line—is being built into Porcupine from the main line at Mileage 224, near Kelso. At Long Lake, on the Sault branch of the Canadian Pacific Railway, gold is being obtained by the Canadian Exploration Company from an arsenical ore. The old Mikado mine at Shoal Lake, Lake of the Woods, and the Havilah, formerly the Ophir, in the township of Galbraith, have been reopened. In Hastings county the Cordova or Belmont mine, long idle, has recently changed hands, and it is understood will soon go again into commission.

Silver.—The entire production, with a trifling exception, comes from the mines of Cobalt, including in that term not only Cobalt proper, but Gowganda and South Lorrain. Shipments comprised 27,394 tons of ore and 6,845 tons of concentrates, in all 34,316 tons, bringing the total shipments from the camp since the beginning up to 112,965 tons, of which 10,930 tons were concentrates. The total silver contents of the shipments for 1910 were 30,558,825 ounces, or an average of 890 ounces per ton, taking ore and concentrates together. For the whole period since the mines were opened Cobalt has produced 93,977,833 ounces of silver, which brought the mine-owners the sum of $48,327,280. The average tenor of the shipments fell from 1,309 ounces per ton in 1904 to 677 ounces per ton in 1907, in which year low-grade ores began to be shipped in considerable quantity, concentration plants not then having been introduced. In 1908 the effects of concentration, now a well-developed feature of the camp, began to be noticeable, and the average contents per ton rose to 758 ounces, in 1909 to 844 ounces, and in 1910 to 890 ounces. The improvement would have been still greater were it not for the large quantities of low-grade ore or rock which have been shipped to Denver and other smelting points for use largely as a flux, much of it containing less than 60 ounces silver per ton.

The extension of concentration processes—there being now 14 concentrating mills at work—the shipment of bar silver from several properties, and the introduction and universal adoption of hydraulically developed electrical power, were noticeable features of the Cobalt camp in 1910. The power transmitted from the falls on the Montreal and Matabitchewan Rivers has materially reduced the cost of operations, the price being lowered from about $150 per horse power when using steam to $50.

The prineipal producers at Cobalt were Nipissing, which led with a production of 5,584,742 ounces; Crown Reserve, 3,158,156 ounces; Kerr Lake, 2,877,299 ounces; Coniagas, 2,621,681 ounces; McKinley-Darragh-Savage, 2,607,071 ounces; Temiskaming, 1,887,127 ounces, and Buffalo, 1,514,895 ounces; others with large outputs were La Rose, O'Brien, Hudson Bay, Trethewey, Right of Way, etc.

In the newer fields of Gowganda and Elk Lake, six mines in the former shipped 480 tons of ore, containing 481,523 ounces of silver, and two in the latter 233 tons, containing 221,233 ounces.

Much the greater portion of the high-grade ore from Cobalt is now treated by refineries in Ontario. These are three in number, at Copper Cliff, Deloro, and Thorold. All produce merchantable bars for the London market. The quantity of silver recovered at these plants during the year was 14,574,837 ounces.

It may be pointed out that Ontario now ranks third among the silver-producing communities of the world, being surpassed only by Mexico and the United States. In 1910 her output was only one and a half million ounces short of the combined production of Montana,

Utah, and Nevada, the three largest silver states of the Union.

That silver-mining at Cobalt as a whole is a profitable undertaking may be deduced from the fact that the dividends declared in 1910 amounted to $7,275,240, or nearly one-half the total returns from the silver produced. Up to the end of the year the total dividends distributed amounted to $21,802,180, not including the profits made by two or three mines, either individually owned or close corporations.

Cobalt.—The quantity of cobalt shown in the table is only that part of the output for which the mining companies were paid by purchasers of ore. A much larger quantity was shipped out, but for the most part brought no returns. No assays of it are made or records kept, consequently no exact data are available. The price of cobalt oxide has fallen to 75 or 80 cents per pound, and further reductions seem inevitable, if the law of supply and demand is allowed to have its natural effect.

Nickel.—The nickel-copper mines of the Sudbury region, now the most important source of nickel not only in America but in the world, were operated vigorously in 1910, and the output of nickel—18,636 tons—exceeds that of 1909, previously the largest on record, by 5,495 tons. The matte product of the Bessemer furnaces was 35,033 tons, and the value of the nickel contents was returned at $4,005,961, or 10.7 cents per pound. Valued at 40 cents, the price quoted for refined nickel in New York, the output of nickel was worth $14,908,800, but credit is taken herein at the smaller figure only, which represents, or is supposed to represent, the value of the nickel in the matte, when it leaves the smelters for the United States or Wales, where the final separation and refinement take place.

There are two companies mining and producing nickel, the Canadian Copper Company, whose works are at Copper Cliff, and the Mond Nickel Company at Victoria Mines. Both operate well-equipped plants, first smelting the ore and then converting it into a Bessemer matte containing approximately 80 per cent. of nickel and copper. The Canadian Copper Company draws its supplies of ore principally from the Creighton and Crean Hill mines, the former being richer in nickel than in copper, and the latter vice versa. Hitherto the Victoria Mines have been the chief sources of supply for the Mond Company, but latterly the Garson mine has been largely drawn upon, and the company has under consideration the removal of its furnaces to a point east of Sudbury and nearer the Garson ore body. Both companies operate their mines and works by electrical power, the Copper Company utilizing falls on the Spanish River, and the Mond Company falls on the Vermilion. The Dominion Nickel-Copper Company, formed to work large deposits of ore on the northern range, has not yet reached the stage of production.

The nickel contents of the silver-cobalt ores, which yield nothing to the mine owners, are not here included in the output of nickel.

Copper.—Most of the copper produced in Ontario is found accompanying the nickel in the ores of Sudbury, consequently the yield rises or falls with that of the principal metal. The copper contents of the matte produced in 1910 amounted to 9,630 tons, valued at $1,374,103, or at the rate of 7.1 cents per pound. If reckoned at the average value of electrolytic copper in New York for 1910, viz.: 12.73 cents per pound, the value would be $2,451,798. A small part of the copper is to be credited to Bruce Mines, from which a quantity of silicious ore was shipped to Victoria Mines and used for converter linings.

Iron Ore and Pig Iron.—Four iron mines were in operation in 1910, producing 231,453 tons of ore, which is a falling-off as compared with 1909, when the output was 263,777 tons. Of the ore 119,207 tons was magnetite from Moose Mountain, Atikokan and Bessemer; 112,246 tons was hematite from Helen mine. The ore was returned as worth $513,538, or $2.21 per ton. The Lake Superior Corporation has been developing an iron prospect called the Magpie mine in Michipicoten district, and has ascertained by borings that it contains a large body. The ore is sideritic, but preliminary roasting will reduce the sulphur contents and raise the percentage of metallic iron. At Moose Mountain it is proposed to increase the capacity of the magnetic concentrator plant.

There were eight blast furnaces at work producing pig iron last year, the total yield being 447,351 tons. The total quantity of ore charged into the furnaces was 822,174 tons, of which 143,284 tons was of domestic and 678,890 tons of foreign origin. The value of the pig product was $6,975,418. Steel produced amounted to 331,321 tons, valued at $7,855,407.

Non-Metals.

Building Materials.—The raw materials for building purposes are plentiful in Ontario, including clay for making brick, etc., limestone for lime and construction work, sandstone and granite, Portland cement, etc. Building operations were brisk and called for an increased production of brick and lime as compared with 1909. The Portland cement industry is steadily growing, the production being 2,889,235 barrels, as compared with 2,633,500 barrels in 1909. The aggregate value of products which may be classed as construction materials, including brick and other clay products, stone, Portland cement, and lime, was $7,961,060. Part of the stone, however, was for use as flux in blast furnaces and road-making.

Petroleum.—Of late years the production of petroleum has been declining. In 1910 the yield amounted to only 11,004,357 Imperial gallons, which is about one-third the production of 20 years ago. The diminution is most marked in the newer field of Tilbury, but is also going on in the older districts of Petrolea and Oil Springs. The average production per well is now very small, averaging only a few gallons daily. A new oil pool was located during the year in Onondaga township, Brant County, but the production has not yet been important.

Natural Gas.—On the other hand, the flow of natural gas is increasing year by year, in 1910 amounting in value to $1,490,334, at a low rate per thousand cubic feet, as compared with $1,188,179 in 1909. The gas fields are confined to the Lake Erie counties, but the gas finds a ready market not only in the localities in which it is produced, but also in the cities, towns and villages of southwestern Ontario. Several wells have been drilled in the shallow water along the shore of the lake, and a new field is being exploited in the township of Bayham, Elgin County.

Minor Products.—The list of Ontario minerals is long and varied, and a number of other substances in the table of production constitute the basis of industries of considerable importance. Among these are salt, corundum, iron pyrites, feldspar, quartz, graphite, talc, gypsum, arsenic, etc. It is not, however, necessary in a summary statement of this kind to refer to these at length.

Preliminary Statement of the Mineral Production of the Province of Quebec, during the year 1910.

(Subject to revision.)

	1910 Quantity.	1910 Value.	1909 Value.
og iron ore .....tons	7,601	$ 24,773	$ 4,668
chres ....tons	4,812	33,185	28,093
aromite ... .tons	619	6,190	26,604
opper & sulphur ore, tons	24,040	145,690	215,580
sbestos ....tons	77,875	2,535,664	2,296,584
sbestic ....tons	24,716	17,613	20,468
ica ....pounds	241,429	57,617	27,034
hosphate ....tons	1,291	13,905	4,800
raphite	.....	8,865	10,339
ineral waters .. .. ..gallons	356,096	72,420	17,246
itaniferous iron ore ..tons	3,596	5,394	.....
ate ....squares	3,959	18,492	24,000
ement ....barrels	1,563,716	1,954,646	1,314,551
agnesite ....tons	322	2,160	2,508
arble	.....	151,103	130,000
lagstone	.....	890	8,500
ranite	.....	251,447	149,064
ime	.....	236,948	105,489
mestone	.....	483,447	457,143
ricks ....M	123,077	946,011	584,371
ewer pipes, tiles and pottery.	.....	103,771	125,000
uartz ....tons	805	2,013	.....
Totals		$7,072,244	$5,552,062

The above table presents the preliminary figures of he mineral production of the Province of Quebec, as ompiled from the returns so far received from the roducers, for the year ending December 31st, 1910. he total will be seen to be $7,072,244, an increase of 1,520,132 over the total of the revised production for he preceding year 1909, which is given in the adjoin ng columns.

At first sight the increase may appear very large. ut it must be said that to a certain extent it is more pparent than real, and is in a measure due to a more horough collecting of data of such products as struc ural materials, mineral waters, etc. Nevertheless a omparison of the various individual items for 1910 ith those for 1909 will show substantial increases in lmost every case, indicating on the whole a very grati ying state of the mineral industry in the province.

The following table gives the annual value of the ineral production of the province for the last decade:

Year	Value.
1901	$2,997,731
1902	2,985,463
1903	2,772,762
1904	3,023,568
1905	3,750,300
1906	5,019,932
1907	5,391,368
1908	5,458,998
1909	5,542,062
1910	7,072,244

Asbestos.

The asbestos and asbestie sold and shipped during he year amounted to 102,591 tons, representing a alue of $2,553,277, as follows:

	Tons.	Value.
Crude Asbestos, No. 1, No. 2 and No. 3	3,529	$ 620,186
Mill Stoek	74,346	1,915,477
	77,875	$2,535,664
Asbestic	24,716	17,613
	102,591	$2,553,277

This is a substantial increase over the preceding year, but is slightly below the value of the asbestos and asbestie produced in the banner year 1908, when it reaehed $2,577,302.

The asbestos industry in 1910 was very aetive; mueh more so than the figures given above seem to indicate, for at the close of the year eonsiderable stoeks remained on hand. There was, in faet, an over-produetion and the market could not absorb all the output of the mills. From this cause the asbestos industry is at present undergoing a slight crisis, but everything points to this as being only a temporary embarrassment, and there is no doubt that within a short time there will be a readjustment between eonsumption and production.

The mines themselves and the mills are in exeellent condition. At the depths reached, over 200 feet in some cases, there is no apparent decrease in the contents of asbestos of the rock.

Iron Ores.

The returns reeeived from pig iron producers give a quantity of 7,601 tons of bog iron ore, to which they assign a much higher value per ton than in past years. This is perhaps due to the fact that formerly the iron producers worked some iron deposits themselves, and their retnrns properly gave the actual cost of mining. Whereas at present the bog iron ore used in the furnaces is obtained from numerous small producers, and the price assigned to the ore represents its value delivered at the furnaee.

We do not include in the total production the value of the pig iron made. There was in 1910 a quantity of 2,890 tons, valued at $91,000. This is high grade wood-eharcoal pig iron, which brings a high price in the market.

The titaniferous iron ore was mined from the St. Urbain deposits. Part of it was used in the manufaeture of steel, and the rest in the manufacture of a eertain grade of eleetrodes. All was exported.

Mica and Phosphate.

Both products show very substantial increases in sales and shipments. A large proportion of these were made from stocks carried over from the previous year, and the actual mining of these substances was not very active throughout the vear. The market is, however, markedly improving and everything points to a greater activity during the eoming year. The greater part of the phosphate was used in the manufacture of phosphorus.

Copper and Iron Pyrites.

The largest producer is still the Eustis Mining Company, but a new mine, operated by the Eastern Canada Smelter Company at Weedon, has also made substantial shipments.

Cement.

The products of this industry in the Provinee of Quebee show an inerease in value of $640,095, whieh is a proportionate increase of 48 per cent. over the valne

of the production of the preceding year. Such increases are significant and indicate the preponderating part which cement is taking among the building materials. It is sufficient to recall that in 1904 the total production of cement in the province was slightly over $50,000, while two years later it was $625,000. It is now nearly $2,000,000.

OTHER STRUCTURAL MATERIALS.

All of the other building materials show very large increases as compared with the previous years. Part of these increases, as was mentioned before, is undoubtedly due to a more thorough collecting of figures, but, nevertheless, there has been a much greater building activity throughout the province than ever before.

It will be noticed that the item sewer pipes, tiles and pottery on the other hand has decreased from $270,000 in 1908 and $125,000 in 1909, to $103,000 in 1910. This is not to be taken as an indication of a decrease in the manufacture of these clay products, but is owing to the fact that the production of several important manufacturers of sewer pipes, tiles and pottery, which was included in previous years was eliminated this year, on discovering that they use clay imported from New Jersey. The value of such products would have amounted this year to over $350,000.

OUR LONDON LETTER

Mining Advances in 1910—Interesting Rand Developments—Treating Refractory Ores in West Africa—More About Nigerian Tin and the Tin Boom—Electricity in British Collieries—Russian Platinum Developments.

(Exclusive correspondence of CANADIAN MINING JOURNAL.)

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Last year was an extremely interesting period for the miner. Especially it saw great advances made in metallurgy, accompanied by substantial improvements in mechanical appliances and chemistry. This tide of progress has swept ever up towards the practicability of profitable treatment of very low grade ores, especially gold and copper. On the Rand four-pennyweight stuff can now be dealt with.

The increasing use of tube mills as aids to the stamp battery was another feature of the year. The new heavy stamps of the East Rand Proprietory with tubes succeeded in crushing 24 tons per stamp in 24 hours. Most of the Rand companies proceeded strongly in the direction of adding tube mills where they wished to increase the capacity of their reduction works rather than by adding further stamps. The heavier stamps of the year were about 1,800 pounds, but soon 2,000-pound stamps will be in operation easily crushing 20 tons or more per stamp per 24-hour day, the limit being set by the coarseness of screen employed. Generally, the lines of mining improvement of the year may be summarized as larger mining areas, fewer shafts, greater tramming distances, larger scale of handling ore, and freer and wider ideas in the laying out of underground workings.

In ore breaking, day shifts only are now worked in many mines, making each contractor solely responsible for his own stope. This results in narrower stopes (less waste being broken down) and more effective supervision of the natives employed. The question of the employment of small rock drills, whilst not finally settled, has made considerable progress. The 100-pound weight drill has been found too light for the rough work in the mine, but 150-pound drills, with two natives to each, are giving satisfactory results. In this direction lie possibilities of finding an efficient substitute for the many thousands of hammer-boys employed on the Rand, permitting this labour to be otherwise employed. The view largely obtains that we are on the eve of securing a practical small stope drill which will liberate a large number of the natives employed underground for other work, and so relieve the pressure of the demand for more native labour.

Overhead mechanical transport on the Rand has made substantial advances also and a wire rope railway over the Brakpan mine has been invented to operate on 2,000 tons per day of 10 hours at a total cost of $35 per day. Sand filling of stopes from the tremendous waste heaps of the Rand came into practice during 1910 and plants are at present under construction to deal with sands at the rate of 4,000,000 tons per annum. Ventilation in the deep mines also came to the front owing to the adoption by the Cinderella Deep of a Capell fan having a discharge capacity of 50,000 feet of air per minute. The necessity for this movement is clear when we consider that in the deepest mines of the Rand the temperature rises at the rate of one degree Fahr. for every 25 feet vertical, as compared with one degree for 65 feet in the deepest mines of the European Continent.

The much discussed Marriott square fathom system for attaining better results has not yet secured wide adhesion on the Rand, although the Ecksteins have adopted it. It is claimed that this system, although it would raise working costs, would yield higher profits on a given block of ore. Other new Rand methods of mining deal with the flat reefs in the Far Eastern section. These place the levels as much as 1,000 feet apart independent of the variations of the reefs, which makes for cheaper haulage.

In the West African goldfields the treatment of refractory ores made a distinct advance in the past year, especially on the property of the Ashanti goldfields. These ores are quarried in the Justice's Find property. In former days the process employed was ordinary wet stamp milling, followed by cyaniding, but as this ore contains graphite material and small quantities of various sulphides only 60 per cent. of the gold was recovered. The new process consists of dry crushing, followed by roasting and cyaniding, which has resulted in the extraction being raised to 90 per cent. The cost of treatment by the new process is $1.50 per ton higher, but the increased extraction on 15 pennyweights ore amounts to $3.12 per ton. The ore, after being broken in a rock breaker, is fed as 2½-inch cubes into Krupp ball mills. It is then roasted in Edwards' furnaces and finally treated in the cyanide vats. On leaving the furnaces the ore loses about 12 per cent. of its weight being deprived of its graphite and most of its sulphur and arsenic contents. For the year ended 30th June 1910, 47,091 tons of Justice's ore gave $10.84 per ton with a 90 per cent. extraction.

Your correspondent's articles last year contained reference to the birth of tin mining in Northern Nigeria. The Government in control of that British territory is seeking to do all that it can to prevent investors here from being robbed by wild-cat schemes and are and 16 feet deep. Strenuous efforts are being made

rush on the railway, especially to the Bouchi field. At the present time there is a twelve to fifteen days' march between the present rail head and the tin mines.

Especial interest is, of course, given to the discoveries by the persistent rise in the price of the metal. At the time of writing the figure is $950 per ton and users are at their wits' ends. For six months prior to last August the price of tin remained steady in the neighbourhood of $750 per ton. This rise, of course, is largely attributed to the cornering operations of a strong Continental syndicate. At the same time the tinplate trade of this country has been persistently active during the past year, as it has also been in America. In 1903 the tinplate mills dropped to 360. That was the minimum and since then the trade has recovered so rapidly that there are now over 500 mills in operation, more than produce evidence of substantial financial resources before concessions and mining rights are granted. Returned prospectors told glowing stories of the huge extent of the tin-bearing area with its black sands 15 insisting that every concessionaire or company shall before the McKinley tariff came into operation. Thirty-five mills were built last year and 59 more are in course of erection. Quite 1,500 tons more tin is already required to keep pace with the contracts now coming forward, many new mills having been opened in South Wales. At the end of 1910 visible tin supplies were under 18,000 tons, a decline of nearly 4,500 tons on the year.

In its way, the rubber boom, by attracting labour from the Straits Settlements' tin mines, has reduced production there. The offer of double the old rate of wages to the native labourers has recently failed to attract sufficient men.

Rapid advances in the use of electricity in British collieries are the order of the day. Additions are being made more rapidly to the series of overhead and underground cables which now extend throughout the area of the North of England collieries. The system of electric supply in these districts consists of the generation of power at 6,000 volts at a number of generating stations, some of which utilize the waste heat of blast furnaces and coke ovens. The power is transmitted to various sub-stations at this pressure, where it is transformed to 3,000 and to 440 volts, and also to 11,000 and 20,000 volts. At the majority of the collieries and works the power is employed at 3,000 volts; in some cases 440 volts, 3-phase, is utilized, while at others it is transformed to direct current and used at 600 or 480 volts. In the Cleveland area a new 11,000-volt pole line is being laid. The poles have a span of 80 yards, and carry three .05 square inch copper conductors, as well as pilot and telephone cables suspended from the catenary.

The recent high level prices touched for platinum ($40 per ounce) is attributed to the same cause that occasioned the similar advance in 1906. Consumption of the mineral expands steadily and new uses are continually being discovered. The world's annual consumption is estimated now at about 360,000 ounces, about one-third of this being metal recovered from scrap and re-marketed. France absorbs about 40 per cent. of the production, Germany and America each about 26 per cent., and Great Britain 7 per cent. The remainder is absorbed in Russia, which is the sole source of supply. In that country the bulk of the metal is obtained by placer mining from the alluvial sands of the Ural Mountains. Small quantities are obtained from time to time in other Continental countries, but the largest producer outside of Russia is Colombia, South America, with an output of between 6,000 and 7,000 ounces per year.

Official Russian figures show that the annual production has averaged in recent years about 175,000 ounces, but illegal trading probably accounts for quite one-third more than this. The platinum yielding sands are now comparatively exhausted, much of the alluvium now worked yielding not more than one pennyweight per ton, whilst even the richer sands do not yield more than three pennyweights.

Until 1898 the producers in Russia were absolutely in the hands of big refining firms abroad, who purchased the output years ahead, practically all the metal produced being exported in a crude state for refining abroad in the principal consuming markets. In the year mentioned Russian producers controlling 60 per cent. of the output were formed into one concern at the instigation of French financiers. Thus, the Compagnie Industrielle du Platine, which has since taken a leading part in the industry, was then established. The "tied" condition of the majority of the producers as regards their output accounts in a large measure for the continued falling off in the production, notwithstanding the high prices which have ruled. As their output is sold ahead for years to come at prices said to average less than $15 per ounce, producers have not benefitted to any extent from the high prices which have ruled, and accordingly not only is the incentive lacking to increase the production, but there is distinct encouragement to conserve the remaining but steadily-dwindling supplies in the hope that advantage may be obtained later on of the higher values now ruling.

At the beginning of last year the discontent of producers crystallized into an active propaganda for the establishment of a Government monopoly, or the passing of legislation which would free the smaller miners from the grip of the foreign refining houses. At a meeting then held, proposals were formulated and pressed on the Government, but after a time seemed to have been shelved indefinitely. Quite recently, however, the Russian Minister of Trade and Industry has come forward with proposals for regulating the industry on lines somewhat similar to those suggested by the producers last year. Briefly, it is proposed to prohibit the export of crude platinum and to provide for its treatment in Russia by means of a State refinery should private enterprise fail to prove equal to the task. The crude platinum would be sold to the Russian Imperial Bank on certain specified terms—the price suggested by the producers last year was $19.86 per ounce troy or crude 83 per cent. platinum—and the marketing of the refined product would be left in the hands of the Bank, which would account to the placer owners for the balance of the price, less commission. The production, refining, and distribution of the metal would be strictly governed by hard-and-fast regulations, any breach of which would bring upon the offenders condign punishment in the shape of heavy penalties.

To transmit a given volume of compressed air through a 1-inch pipe of given length requires over three times as much pressure as is required to pass it through a 2-inch pipe of the same length.

A volume of 500 cubic feet of free air per minute, at 5-lb. gauge pressure, can be transmitted 1,000 feet, through 3-inch pipe, with a loss of only 4.1-lb. If a 5-inch pipe be used, the loss is reduced to 0.25 lb.

MINE ACCOUNTS AND COST SHEETS

(From the Bulletin of the Institution of Mining and Metallurgy.)

(Continued from last issue)

In pursuance of the objects stated, therefore, the following suggestions are put forward merely as broad principles, which the Committee consider should be adhered to as far as possible by all metalliferous mines in framing their general accounts, cost sheets and working statements, after the various amounts spent on Wages, Stores, Materials, Power, Repairs, Maintenance, etc., have been segregated and allocated as much as may be necessary for the intermediate working accounts of each mine, which are required for the information of the mine officials and for the preparation of the final Working Costs.

Capital Expenditure.

Before the producing stage is reached, all expenditure should be charged to Capital Account and grouped as follows:—

Property.
Main vertical shafts or main adits.
Machinery and plant.
All shafts which develop ore, and underground development.
Buildings.
Surface works (reservoirs, water service, railway sidings, roads, etc.).
General expenditure.

Sundry Revenue during this stage should be deducted from General Expenses, Head Office Charges, etc., and the balance distributed proportionately over the remaining heads of expenditure since the acquisition of the property.

All vertical deep-level shafts, and shafts sunk to reach the plane of the orebodies, should be charged to Capital Account. All incline shafts in ore and shafts which assist development, as they progress, should be considered as part of the expense of development, the latter being either—

(a) Placed to a Temporary Development Account; or
(b) Charged to Capital Account finally.

Theoretically, the cost of vertical shafts should be written off under the heading of Depreciation, i.e., a proportion for each year over an average life; but in practice this is seldom found to be desirable.

After the producing stage is reached, all expenses of development, including deepening main shafts, sinking incline shafts, cutting stations, drives, cross-cuts (including main cross-cuts), winzes, raises, etc., should be charged—

(b) To the Development Redemption Account.
(a) Direct to the Working Costs; or

In the latter case, working costs should be regularly debited with a rate of Development Redemption per ton milled, slightly in excess of the average cost at which the total, fully-developed and payable ore reserves stand in the books—the object being to extinguish gradually the temporary account, and thereafter to charge all current development and shaft-sinking to Working Costs, or to provide funds for securing a gradual and automatic increase in the ore reserves. The quantity of ore developed cannot, it is true, be well ascertained at short intervals, but it can be determined annually more or less closely, and a fair rate can then be fixed as the price per ton under (b).

After the producing stage is reached, no expenditur should be debited to Capital Account, except for larg special items, such as:—

Purchase of additional property.
Increase of machinery or plant, to increase power, ou put or extraction.
Erection of additional buildings, dams, etc.
Sinking of new main shafts to reach orebodies.
Excess development of payable ore that can be clearl proved to be excess development, guarding carefull against abuse.

Such items of capital expenditure should bear the proportion of the administration and general expenses

No small items, repairs, maintenance, or merely r placement of worn-out machinery, should be charged t Capital Account, which should be considered as close except for heavy expenditure specially authorized whe funds are specially raised, or allocated for the purpos Each additional large installation should be shown se arately in the Balance Sheet if possible.

In cases where a new deep shaft, with its equipmen takes the place of an old shallow shaft, or an old mi is replaced by a new one, the old shaft or the old pla should be written off from Capital Account again Revenue, either at once or by means of instalmen spread over a short period. Alternatively, if no depr ciation is written off, the cost of the new plant shou be charged direct to Revenue, by instalments if nece sary.

Temporary Accounts.—In addition to the Develo ment Account, there are other temporary accoun which cannot always be avoided, especially in rega to annual payments, a portion of which has to l charged up each month; but they should be avoid wherever possible, and extinguished at a more rap rate than would appear to be necessary. Such tempo ary accounts might include such items as:—Insuranc licenses, native recruiting fees, conveyor-belts, haulir ropes, etc.

Valuations for Balance Sheet.—The cost of or reserves and dumps of payable ore should automatical appear at first as an asset in the Balance Sheet, unt extinguished by Redemption. The gross or net val of such ore-reserves should not be considered as Rev nue, or as an asset. Unfinished products, when tak into account, should be reckoned only at cost. pr vided such cost does not exceed market value. Bu lion, concentrates, or other marketable products rea for shipment, should be shown as assets in the Balan Sheet, and included as Revenue, after deducting a possible returning or other realization charges.

Realization charges should be preferably included costs, rather than deducted from yield of mineral, et so that the value may correspond to the extraction a that costs may duly reflect varying charges for realiz tion and smelting charges, freight, etc.

Depreciation.—Under the head of Capital Accour reference has been already made to this question as r gards depreciation of main shafts with their equipmer and milling plants which are becoming or have becon obsolete.

Depreciation of property (i.e., mining claims, etc.) is also correct in theory, especially in the case of mines with fixed vertical boundaries and limited orebodies, the approximate rate of exhaustion of which is therefore ascertainable. Similarly, it would be logically correct to write off systematically the cost of main shafts sunk to orebodies before the development stage is reached. In most cases of mining enterprise, however, it would be impossible to make an accurate allowance for depreciation of either property or main shafts, and even in cases where such a course is possible it appears to be never carried out. The result of such a course, when depreciation is written off Profit and Loss Account, is only to accumulate cash for future shareholders whilst reducing the rate of dividends for existing shareholders. Mining is looked upon usually, and perhaps to some extent rightly, as being on a different footing from most kinds of commercial enterprise, and shareholders in mining companies, as a rule, prefer to take their proportion of the gross profits in the form of dividends, and make their own allowance for depreciation.

As regards machinery and plant, buildings and surface works, auditors in England insist on annual depreciation of machinery, plant, etc., which is, of course, theoretically correct, and to some extent it is useful for reducing Income and Profit Taxes and Fire Insurance Premiums; and, when carried out on a very liberal scale, would in some cases give shareholders a rough idea of the value of such assets.

Auditors abroad, on the other hand, do not always insist on Depreciation on machinery and plant, buildings, etc., being allowed for, and a large number of companies registered abroad do not write off the plant at all.

After all, depreciation of plant on mines is often in practice unnecessary—new and improved plant is erected almost continually—the old plant has to be well maintained or replaced for efficient work.

The important object is to make, by some means, adequate provision out of revenue for such new machinery, plant, buildings and surface works, as are almost certain to be required before the mine is worked out, and, provided this object be attained, the means employed would appear to be of minor importance. Depreciation is, of course, the more usual method, and appears to be more generally preferred.

Other methods, however, are to include regularly in working costs a monthly or quarterly allowance for a fund to be called "Provisions for Additions to Machinery and Plant," or to appropriate each year a certain proportion of the profits to a special reserve fund. These alternative methods tend to simplify accounts and, when ample cash reserves are kept in hand, such simple methods of obtaining the principal object aimed at by Depreciation appear to work well.

Too much stress cannot be laid upon the fact that the accuracy of accounts depends very largely upon the accuraey of the data obtained through careful surveying, sampling, and assaying, and upon the correct allocation of all items of expenditure.

Working Accounts, Cost Sheets, and Reports.

The main sub-divisions of the ordinary Profit and Loss Accounts usually presented to the shareholders of a company should correspond with the main sub-divisions of the Cost Sheets. The accurate determination of Working Costs is, obviously, greatly complicated by the inherent difference in the nature of Capital and Revenue charges, the results of the former class of expenditure being frequently deferred for a considerable time, whilst the latter lead to results that can be closely estimated at once.

Working Costs may be, and frequently are, based on different units, such as the ton of ore, foot of progress, cubic foot or fathom of ore mined, ton or pound of metal produced, and in the case of base metal mines it is generally most important to ascertain and keep records of the last-named factor, in order to arrive at the financial results of the undertaking.

The ton is, however, the commonly recognized unit employed for administration purposes.

In this connection it is very important to determine the actual weight of the ore per unit of measurement, i.e., the number of cubic feet to the ton (taking cavities, moisture, etc., into account) for making "tonnage cost" calculations.

The Committee recommend that all statements of cost calculated upon a unit of this kind should state clearly the unit referred to, thus:—"Based on tonnage milled:" "tonnage of concentrates treated," etc., and that all statements of Working Costs presented in the ordinary accounts should be based on the cost per ton milled or treated, and not on ore mined, as is sometimes done. At the same time, cost per ton of ore mined and per ton of products specially treated are necessary for departmental supervision and returns.

In figuring out Working Costs, the charges that lie on the border-line between various primary and different sub-headings of expenditure are sometimes difficult to locate; and finally, a stage is reached where further detail in the dissection of expenditure becomes merely a refinement of little practical value, which does not justify the cost of collecting it. An accurate knowledge of the distribution of important "supplies used underground," such as timber and explosives, is, obviously, of the first importance; but minor supplies, such as steel, candles, picks and shovels, cannot be apportioned to particular levels and stopes without an expense and strain upon foremen and storekeepers rarely worth the information gained except under special circumstances; this applies more particularly to large mines.

The Committee feel that the consideration of various forms of detail cost sheets would widen the scope of their Report too much, and render it impossible to make any recommendations; but they submit that, in their opinion, the following general principles should be observed in the preparation of all cost sheets, since they consider that these are applicable in most, if not all cases, and are capable of being expanded or modified in detail to meet the special requirements of any particular case.

The Committee think it is possible and desirable to classify all expenditure under the following main heads, which may sometimes be extended to cover such special items as "removal of overburden" and "prospecting for new orebodies."

1. Development.
2. Extraction of Ore (i.e., mining).
3. Sorting at Surface, Preliminary Crushing and Transport.
4. Reduction Costs (i.e., ore treatment).
5. Administration Charges and General Charges at Mine.
6. Realization Charges on Products.
7. Taxes and Royalties of all kinds, shown separately.
8. Head Office Charges.

The total Capital Expenditure should also be shown on all General Expenditure sheets.

The sub-division of these main heads into sub-heads must necessarily depend somewhat upon the conditions, but the advantages of adhering as closely as possible to one form, and departing from it only where necessary, are manifest. The following may be suggested as desirable sub-divisions:—

1. DEVELOPMENT COSTS as charged may be either the actual expenditure on shaft-sinking, station-cutting, drives, cross-cuts, winzes, raises, diamond drilling, maintenance, etc., or a liberal rate of redemption for those charges. Development should be charged its proper proportion of surveying, sampling and assaying costs, pumping and hoisting costs, and be credited with the ore won in development at the average stoping cost, the amount being charged to mining. In the general Cost-sheet, Development Costs need only appear in one total, but a detailed sheet should be prepared, showing the total expenditure and cost per foot in shaft-sinking, driving, cross-cutting, raising, winzing, and plat (or station) cutting separately, as well as the proportions of the expenditure which are for labour and for materials respectively.

2. EXTRACTION OF ORE may be usefully divided into:—
   (a) Stoping or breaking of ore, including under sub-heads:—Compressed air, hand drilling, and rock-drill costs, labour and supplies, shovelling, etc.
   (b) Timbering, filling excavations, and sorting of ore in stopes.
   (c) Hoisting.
   (d) Pumping.
   NOTE.—In cases where a mine is only just beginning to come into partial production, and is still carrying on heavy capital expenditure, the cost of pumping may be divided between Capital and Revenue in any desired proportion.
   (e) Underground tramming.
   (f) Sampling, assaying and surveying.
   (g) General underground maintenance.

It is suggested that these sub-divisions of the main head, Mining or Extraction of Ore, should be set out in detail in the general cost sheet, because mining is at once the principal item of working cost and offers the greatest scope for economies.

3. SURFACE TRANSPORT, SORTING AND COARSE CRUSHING.—The conditions of these vary so much at individual mines, that for standardization and comparative purposes a separate heading should be given for these three items combined, so as clearly to divide "Mining" and "Reduction" charges.

4. REDUCTION CHARGES (ORE TREATMENT).—These should include all costs from the time the ore is delivered at the mill or reduction works until the bullion or marketable product is obtained, and may be sub-divided to suit circumstances, as, for instance, at a gold mine into:—
   (a) Milling (crushing with stamps or any other appliances).
   (b) Fine Grinding.
   (c) Concentrating.
   (d) Roasting.
   (e) Cyanide Works.
   (f) Slimes Works, etc.

Other metal mines call for special sub-divisions, such as smelting, leaching, etc.

A detail cost sheet should, of course, be prepared for each department.

5. ADMINISTRATION AND GENERAL CHARGES.—Owing to the great variations in items debited to other account the Committee recommend:—

That all possible expenditure at the mine be allocate to the different departments concerned, including suc items as Power (strictly on the basis of units of stea consumed), Stores, Sampling, Assaying, Surveyin Maintenance and Repairs, Native Recruiting Fees, an Salaries of Staff up to and including Mine, Mill o Works Managers, and be spread over the different a counts in proportion to the total expense of each depar ment, so as to show the amount that should properly b charged to it.

"Maintenance" or "Repairs," for instance, shoul not appear as separate primary headings, but should b segregated for the different departments, e.g., min maintenance to be included in "Mining," mill-mainter ance in "Milling," etc., either on the basis of actua shop returns, or in proportion to the labour employed i each department, as is sometimes done.

The Committee recommend that General Charge should, as far as possible, include such items as:—
   (a) Consulting Engineer's and General Manager' Fees.
   (b) Office Staff.
   (c) Stationery, Postages, Telegrams.
   (d) Medical and Sanitary Charges.
   (e) Travelling Expenses.
   (f) Fire Insurance.
   (g) Employer's Liability Insurance.
   (h) Transport, Stabling.
   (i) Local Bank Charges.

6. REALIZATION CHARGES ON PRODUCTS.—These may in clude:—
   (a) Transport to Railway.
   (b) Railway Freight.
   (c) Shipping Charges, Agency and Commission.
   (d) Sea Freight, Insurance, etc.
   (e) Selling Expenses, Returning Charges, etc.

7. PROFIT TAX, INCOME TAX, ROYALTIES AND OTHE TAXES.—An estimated allowance for these taxes shoul be included in working costs.

8. HEAD OFFICE CHARGES.—These may include, in ad dition to expenses inseparable from a Head Office, suc items as:—
   (a) Auditors' Fees.
   (b) Bank Charges.
   (c) Legal Expenses.
   (d) Directors' Fees.
   (e) Office Rent.
   (f) Foreign Agency Expenses and Advertising.
   (g) Interest on Loans or Debentures.

The Committee also think that an estimated averag amount for Head Office charges can in most cases be included with advantage in the monthly cost sheets though it is sometimes thought preferable not to include them in local costs, on the ground that they can only be ascertained at irregular intervals, and are outside the control of the manager on the spot. If not included, this should be stated clearly.

The Committee recommend that all statements as to the quantities and values of stores, ores and products on hand should be certified by the responsible officials, countersigned by the manager of the mine. An independent audit of stores, etc, is advisable from time to time.

The Committee also recommend that annual or semi-annual Reports of Consulting Engineers or Managers, which are usually published, should contain the following information:—

(a) The total Development footage, total expenditure and cost per foot in shaft-sinking, driving, cross-cutting, raising, winzing and platcutting, shown separately.

(b) The total quantity of ore extracted from the stopes of each level separately, when practicable, as well as the ore won in course of development, from all parts of the mine; all of which should be added together.

(c) The total tonnage of ore dealt with, and gold, etc., won, during the year in each separate branch of treatment, with the relative recovery per ton milled and treated in each department; the recoveries to be stated, at gold and silver mines, in percentage and sterling value of "fine" gold or silver, and the cost per ton treated and milled shown as far as possible in each case.

(d) A detailed summary of working costs sub-divided to correspond with the main headings and sub-headings of the cost sheets.

(e) A short tabulated statement of the nature of and expenditure upon new Plant and Equipment, showing sales of old plant, if any.

It is proposed, with the approval of the Council, to le for reference, in the Library of the Institution, copies f working accounts and cost sheets which are in use at arious important mines; and the help of members, with view to making this collection as representative as ossible, would be much appreciated.

In the past, the difficulty in standardizing mine acounts has largely arisen from the fact that Directors r Accountants, and Consulting or Managing Mining ngineers have considered that questions which concerned both belonged to their particular sphere exclusively; ut the Committee hope that the recommendations they ave here formulated, which specially concern their own de of the business in a greater or less degree, will be arefully considered by Directors and Mine Accountnts, and will, as far as possible, be generally adopted y them at mines under their control, and be approved y the senior members of the mining profession.

(Sgd.) A. G. CHARLETON,
Chairman of Sectional Committee "E"—
Mine Accounts and Cost Sheets.

Reciprocity with Canada in Lead.

How It Would Benefit the Idaho Producer.

Written by GEORGE HUSTON.

Lead mining in British Columbia, the province proucing nearly all the lead in Canada, was started by ie hardy American prospector. For a considerable me the ore was shipped to the United States plants r reduction.

Lead smelting, refining and manufacturing owes its stablishment to the high tariff imposed on lead in re into the States and to the effort of the Canadian acific Railway, in its fight against the aggressions of ie American lines feeding the United States smelters. he smelting, refining and manufacturing concerns ad a hard row to hoe for years, but are now in point f equipment, shrewd management, and honest capitaliation, equal to anything on this side of the boundary ne.

Mine labour in British Columbia is paid about the ame as in the Coeur d'Alene region, while smelter labour receives a higher compensation than in any of the plants taking Idaho ore.

The lead production of the Coeur d'Alene region may be classed as custom ore, that is, it is mined for sale to the highest bidder under time contract. The interests of the region are best served when the greatest number of smelting centres compete for the product, and the economic facts governing the competitors are such as to prevent combination. Local smelting is out of the question as we are short the supplementary ores.

The ores of the region are shipped to smelting centres, having need for the lead contained therein, to act as a furnace collector for the values of dry ores, and a single interest dominates the ore purchasing competition. The latter is heavily capitalized, much of it representing nothing but well irrigated good will. The Coeur d'Alene ore production is peculiarly sensitive to this capitalization, as the rates for treatment in the States where the plants are located have been repeatedly lowered, with few or no reductions here. The region is paying an unjust return on an inflated capitalization, to which there has recently been added an alarming increase highly prejudicial to the future of its lead mining. No relief is possible unless competition can be obtained from plants outside of the States, as the monopoly is almost complete.

If the British Columbia smelters could enter the United States market on terms of equality, through a well-considered scheme of reciprocity all through the lead schedules, the monopoly now existent in ore purchase in the Coeur d'Alene region could be broken. It is exactly the type of competition needed to correct the present abuses, and there could be no combination, owing to the transportation policy of the powerful railway system, backing the smelters.

Reciprocity in lead products would tend to stimulate the production of a great tonnage of supplementary ores on both sides of the line, a tonnage now mined in Colorado and adjoining states to go with the Idaho lead ore in furnace work. It would probably put another transportation line into the Coeur d'Alene, while the benefit to the Inland Empire would be very great.

At a convention of miners, held at Lethbridge, Alberta, on February 18, it was decided to ask the Government to have established at different mines, stations equipped with Draeger mine-rescue apparatus.

In the course of a speech he made recently in the Provincial Legislature, in support of a bill authorizing the Lieutenant-Governor-in-Council to grant certain lands near the city of Vancouver as a site for the University of British Columbia, the establishment of which was determined upon several years ago, Hon. Dr. Young, Minister of Education for the province, said: "There will also be in the new university a College of Mining, in connection with which the Government is determined that there shall be secured one of the foremost faculties identified with university work." The Minister also made appropriate reference to the vastness and variety of the mineral wealth of British Columbia, and said that with such a resourceful mineral province, and the best professors to give them instruction, it is expected with confidence this department of the university will turn out, as its graduates, students who will hereafter take their places among the foremost mining men of the world.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Halifax—The recently issued annual report of the Department of Mines gives the figures of mineral production for the year ended September 30th, 1910. The principal items are: Coal raised (gross tons), 5,477,146 tons; domestic iron ore, 52,640 net tons; pig iron, 341,674 net tons; coke, 493,167 net tons; limestone, 483,100 net tons; gypsum, 322,974 gross tons; bricks, 21,305,500; gold, 10,675 ounces; sulphate of ammonia, 3,622 net tons. The revenue from coal royalty amounted to $554,491.48. The total Mines Office revenue came to $614,576.10.

The Springhill disturbance is still troublesome. It is hoped that the striking miners will be brought to their senses without more violence.

The bill, now before the Legislature, providing for the compulsory use of safety-lamps, will meet with opposition from some of the miners. But the majority, it is believed, especially native-born miners, will be strongly in favour of it.

Mr. Robert Bryce, well known in Cobalt and Porcupine, is actively working several gold claims in Molega. Results to date have been encouraging.

Mr. A. L. McCallum is pushing work on his tin prospect near New Ross, Lunenburg County. Within a few miles of this prospect, Dr. Cain, of Windsor, is continuing work on his manganese property.

Work at Scheelite, Halifax County, is progressing satisfactorily. Mr. Blount, of Ottawa, has assumed direction of affairs. Regular production will be commenced during the summer. A good deal of territory has been taken up adjoining or in line with the original tungsten leases.

The annual meeting of the Mining Society of Nova Scotia will be held in the last week of March.

ONTARIO.

Cobalt—All last month and so far this month, the two power companies supplying air to the mines have been giving inadequate pressure. After the Cobalt Hydraulic had made good the break at the plant at Ragged Chutes, the flow of water, owing to a very severe winter with no thaws, fell to away below normal. Many of the smaller customers had to shut down while the larger consumers are running some of their drills with their own compressors.

Last week the British Canadian Power Company had trouble from the same cause. The Beaver and Temiskaming are working with greatly reduced forces and other properties still using air are operating at much higher cost. An early break up will sa Cobalt operators many thousands of dollars.

An optimistic report was presented at the annual meeting of t Bailey Cobalt by the president, Mr. E. A. Benson. He states th there was on hand and ready for shipment a car of concentrat 143 pounds of nugget silver, and 7 bars of bullion silver. As t Standard Cobalt had settled for its claim of $32,810.23, the was a considerable surplus on hand.

Some good ore was struck in a vein on the Lumsden property Brady Lake at the 250-foot level; but as it appeared to be t top of an ore shoot the shaft was continued down to 400 fe where a level is now being opened up in the diabase.

The Moosehorn, at Elk Lake, is sinking a winze below the 12 foot level on a strong vein of niccolite. The company is also doi a considerable amount of crosscutting to pick up several vei that showed high grade on the surface.

The Devlin property at Elk Lake is now cross-cutting for vei at the 200-foot level. There are three short shoots of good ore the surface. Below, some leaf silver is showing up in one of t calcite veins already cut.

For the month of February the Savage mine of the McKinle Darragh-Savage group made a record, producing 80,000 ounces silver. It is predicted that this property will produce three-qua ters of a million this year.

Some promising indications have been discovered at the 100-fo level of the Green Meehan. A two-inch vein of smaltite giv silver assays and there is some leaf in the wall rock.

At the annual meeting of the Cobalt Lake Mining Company was decided to reduce the capitalization to $3,500,000. The pres dent's statement included a report that the company had on ha $59,343, to which was to be added about $25,000 for a car the smelters. The veins at depth have in the main shown very di appointing values.

The Buffalo has declared another dividend of 5 per cen regular and 3 per cent. extra. When this amount has been pa the company will have disbursed $1,097,000, or 113 per cent. issued stock.

Millerett

At a meeting of the Cobalt branch of the Canadian Minin Institute, Mr. Cyril Knight advanced some very interesting theo ies in regard to the formations as they will be discovered in dee workings in the camp. He declared that according to the dip o the diabase as seen at the Lumsden and other mines where th Keewatin has been cut through, the diabase should give place t the Keewatin again at 1,200 feet. The deduction of Mr. Knigh

Miller Lake O'Brien

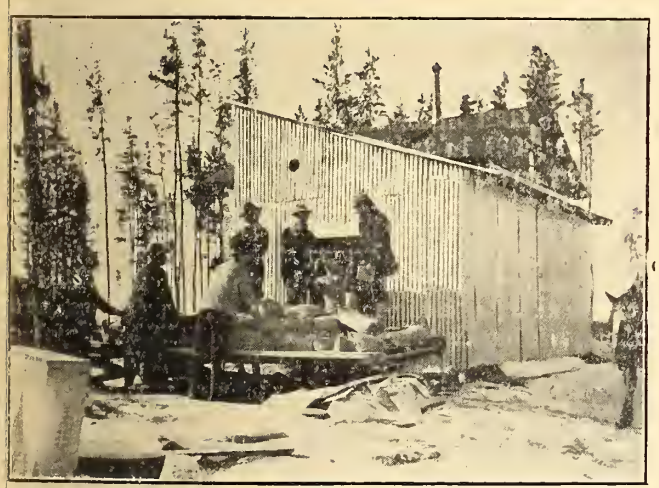
as caused a very lively interest among engineers and mining men
n the camp.

ORCUPINE AND OTHER GOLD AREAS.

It is probable that between four and five hundred stakers
ushed into Bartlett township and the Sudbury division south of
in order to stake round Jim Nelson claim near what is already
nown as Telluride Lake. Nelson has a 20-foot wide vein of
uartz from which he had assays running between two and forty
ollars. The report that gold tellurides were found probably
aused the largeness of the stampede.

It is stated that from the first run at the Swastika's new five-
amp mill nineteen ounces of gold were recovered. The capacity
the mill is between ten and twelve tons per day.

Since their advent into the Porcupine camp Messrs. Bewick,
oreing & Company have shown every disposition to discover the
alue of their holdings as soon as possible. They have taken over



Sacking Ore, Millerett

claims of the Timmins McMartin Dunlap syndicate, all of it
rgin territory. Two six-drill Rand compressors and four boilers
ith complete camp outfits are now on their way in from the
eel, and two camps in north and south Tisdale have already been
tablished. Mr. Hollow, the former manager of the Arroyo-
rownhill mine in Western Australia, will be in charge, with Mr.
illiams, another Bewick-Moreing man, as his assistant, and Mr.
ll Cooper to see to the construction end of the project.

Extraordinary progress is being made with the power scheme at Sandy Falls, where a syndicate controlled by the Timmins is now putting in water wheels and generators. A 36-foot head of water can be obtained and the plant now installed will be able to supply three thousand horse power. It is confidently expected that everything will be ready by June 1.

The Thelma Gold Mines in Bryce township is installing a compressor, three boilers, and a five-stamp mill to treat its ore. The shaft is now down 35 feet.

It is stated that, as an indirect result of the interest in Porcupine, an English syndicate has taken over the Harris Maxwell claim at Larder Lake, and will endeavour to make a mine out of these holdings.

Much interest has developed in northern Whitney as the result of spectacular finds on the Hughes, Mulholland and other claims, nearly all, if not all, on the continuation of the big vein the Scottish Ontario is now working in at a hundred feet.

The Hollinger mine has yet 500 or 600 tons of supplies to get in over the winter road; but all the heavy machinery and the mill equipment has gone over the roads into the camp. The Dome has an even greater tonnage to handle yet. There are over 300 teams in the road; but it is certain that a very considerable amount of the machinery and supplies ordered will have to remain for the railway to haul. Taken as an average, 400 tons per day have been taken out of Kelso yards since the winter roads became good.

BRITISH COLUMBIA.

The new Coal Mines Act has been passed by the Provincial Legislature. A number of amendments were offered by the two Socialist members of the House, who, by the way, respectively represent Vancouver Island constituencies, in which are situated large producing coal mines. Some of these were accepted by the Honourable the Premier (who is also Provincial Minister of Mines), but others were not. Apropos of this measure, Mr. Wm. Blakemore, a well-known coal mining engineer, writing editorially in "The Week," published in Victoria, recently observed, in part: "The Premier as Minister of Mines is to be congratulated on the admirable measure which is now before the House and on the able and exhaustive speech in which he introduced it. It is not a little surprising that a man of so many activities and responsibilities should have been able to acquaint himself to such a remarkable extent with the technicalities of mining and the details of the Bill. 'The Week,' with some practical knowledge of the subject, has no hesitation in saying that when this Bill shall come into force, British Columbia will have the best coal mining laws in the world, not perfect, but perfect as conditions will admit of.

The Bill is conceived mainly in the interest of the miner and for his protection, and if honestly lived up to will tend greatly to minimize the dangers of this most hazardous calling. . . . . On the whole, there can be nothing but praise for an admirable measure, and for the exceptionally able manner in which it was expounded by the Premier.''

In the course of his presentment of his Budget to the Provincial Legislature on February 13, the Hon. the Minister of Finance gave the House some information concerning mining in British Columbia in 1910, taken from the pamphlet issued early in January by the Provincial Bureau of Mines, and to which the CANADIAN MINING JOURNAL on February 1 made editorial reference in kindly and appreciative terms. Later in his speech the Finance Minister said: ''I shall venture to give the following estimate of production of last year, based upon the best available information:

Manufactures	$35,000,000
Mining	26,183,505
Timber	17,160,000
Agriculture	14,399,090
Fisheries	8,000,000
Total	$100,742,595

or an increase of nearly $14,000,000 over the previous year. As actual production is a test of a people's potentiality, we have the largest per capita production in the world. The outlook is promising in every respect.''

The general prospects for mining in the province appear encouraging. Some notes of progress in various districts follow:

CARIBOO—Reports received at the Coast from this district indicate that the outlook for a plentiful supply of water for the ensuing season's gravel washing is excellent, more snow having fallen during the winter of 1910-1911 than in that preceding last season. A larger total recovery of placer gold is, therefore, looked for. Beside an increased yield expected to result from the provision of additional facilities for hydraulicking in Cariboo mining division, it is probable the Quesnelle Hydraulic Gold Mining Company will have its construction work sufficiently advanced towards completion to admit of gravel-washing being commenced about the middle of next summer, in which case there should be an appreciably large addition to the output of gold from Quesnel, in which mining division this company's placer leases are situated.

ATLIN—The quantity of placer gold recovered by the North Columbia Gold Mining Company last season was the largest it has yet obtained from one season's operations. Last season this company worked the property known as the Guggenheims', as well as its own, and it is understood that results from both properties were satisfactory and profitable. The coming season's operations and results may be expected to be larger than those of last year, for the company has an abundant supply of water, and its hydraulicking plant is equal to handling a greater quantity of gravel than has yet been washed in any one season. Other hydraulic operators in this camp expect a good run this year. Lode mining will also have more attention than in the past, and should add to the year's production of gold.

EAST KOOTENAY—The St. Eugene, Sullivan, and Society Girl are the several producing metal mines of this district at the present time. The production of the St. Eugene during the two expired months of the year has totalled about 10,000 tons of ore, which has been concentrated to approximately 1,400 tons of shipping product. The output from the Sullivan during the same period has been a little more than 5,000 tons of ore, shipped crude to the smeltery at Trail. Shipments from the Society Girl are small as yet—only about 250 tons since the beginning of the year. It is expected the yield of placer gold from district mines will be larger this year than for several years, a Vancouver firm of contractors having made preparations for hydraulicking on Perry Creek, in the Fort Steele mining division, and, for the more expeditious removal of the gravel, has put in a steam shovel. With four collieries shipping coal, the 1911 output of this mineral may exceed last year's total of approximately 1,615,000 short tons, gross. A larger production will be dependent chiefly upon (1) continued freedom from labour difficulties, and (2) a sufficient demand for coal to keep the miners fully employed.

AINSWORTH AND SLOCAN—The finding of a new shoot of ore in No. 1 mine, Ainsworth, has been reported. The sale of several mineral claims, also in this camp, took place lately. The Utica, in another part of Ainsworth division, is likely to become one of the most important properties in the district.

In the eastern part of Slocan mining division, development work is being continued at the Lucky Jim, while the Rambler Cariboo is making shipments of ore at the rate of more than 50 tons a week. An important recent development in the last-mentioned mine was the widening of the oreshoot on the 1,050-ft level to 6 feet, practically all ore of high average grade, running 170 ounces of silver per ton. About Sandon, the Richmond Eureka and Hope are the only mines sending ore to the smeltery. Of the properties above Cody Creek, the Noble Five lately sent out a carload of ore for the first time in recent years, development work late in 1910 having resulted in the finding of more ore in this mine. Near New Denver, the Mollie Hughes and Sweetgrass are both being worked, and have recently made small shipments. On Four-mile Creek, near Silverton, the Standard, Van Roi, and Hewitt-Lorna Doone mines are together employing many men. Smelter receipts from the Standard during eight weeks to February 26 were about 300 tons of silver-lead ore, but the output has been small in comparison with the large quantity of shipping ore now easily accessible in the mine. Machinery for the Van Roi concentrating mill is being delivered at the mill site, where the mill building has already been erected. The plant will be put in place as quickly as shall be practicable. Meanwhile production has been suspended, awaiting the provision of concentrating facilities. The Hewitt has shipped between 100 and 200 tons this year, and has beside much ore in reserve. In Slocan City division, ore has been found in the Enterprise lower tunnel, driven by Mr. S. S. Fowler, since he took the mine under lease a few months ago, and the Ottawa has shipped one car of ore. While the total output of ore from the Slocan has not been large for the two expired months of this year, the outlook for the district is distinctly good.

NELSON—The Kootenay Gold Mines, Limited, a company organized to acquire the Granite-Poorman group of mines, is expected to increase the output of gold from these properties, which have been steadily producing for years. A lately published statement was to the effect that during February some $10,000 worth of gold had been received in Nelson from the Athabasca mine. The discovery of a new shoot of ore in the Fern mine has been reported. This mine was well known in past years as a profitable producer. Silver-lead ore is being hauled from lower terminal of the Molly Gibson tramway to Kootenay Lake for shipment to Trail.

The Yankee Girl, at Ymir, is again shipping freely, about 500 tons of ore having been sent out during January and February. The chief value in this ore is gold. The Wilcox stamp mill has been running on ore from that mine and a few hundred tons have been crushed since the beginning of the year. The Emerald, near Salmo, which is the only mine in Nelson mining division shipping ore having lead as its chief marketable constituent, has shipped between 500 and 600 tons this year. In Sheep Creek camp, the Queen and Nugget are the most productive mines, there being little gold coming from other properties in this locality, though several give promise of becoming important producers.

ROSSLAND—The Centre Star group is maintaining an output of 12,000 to 13,000 tons of ore per month, while that of the Le Roi No. 2, including ore milled, is about 3,500 tons, and of the Le Roi approximately 1,000 tons. The Nickel Plate sends an occasional carload of ore to Trail, while two or three other properties make a very small production. The total output from Rossland mines is now between 16,000 and 17,000 tons per month.

BOUNDARY—For some reason that was not published there was a falling off in the quantity of ore shipped by both the Granby and British Columbia Copper Companies during the latter half of

February, but this was probably attributable to temporary disablement of plant or weather conditions. The aggregate production for the district for the two expired months was about 90,000 tons, of which, approximately, 186,000 was from the Granby Company's mines, 83,000 tons from those of the B. C. Copper Company, and 21,000 tons from those of the Consolidated Company. The last-mentioned company is now shipping copper ore to Trail from its Phœnix Amalgamated group, a commencement having been made in February. Prior to this only about 250 tons of ore had been sent out from this property, some eight or nine years ago. The B. C. Copper Company expects to shortly augment the ore supply for its smeltery at Greenwood by 3,000 tons a month from its Lone Star mine, construction of an aerial tramway from which to the railway at Boundary Falls, a distance of 29,000 feet between terminals, being nearly completed. The Granby Company is proceeding to replace, at No. 3 tunnel outlet, the surface works that were destroyed by fire last summer. Several cars of coal have been shipped from the small mine opened near Midway, and another cropping of coal at Meyers Creek, a few miles away, is being prospected. Steel is being laid on the Kettle Valley Railway westward from Midway, and there seems reasonable probability to look for railway transportation facilities being this year provided for the West Fork of Kettle River district, in which are situated several small gold and silver mines.

SIMILKAMEEN—Metalliferous mining in this district, so far as production is concerned, continues to be confined to the Hedley Gold Mining Company's property. Much other development work has been done on various properties in each of several camps, but no production of importance has yet followed it. Coal mining bids fair to soon come into more prominence about Princeton and Granite Creek than mining for any other class of mineral. In addition to that of the Princeton Coal & Land Company, which last year entered upon production on a commercial scale and shipped about 12,000 tons of coal, there are several coal development enterprises, including the Princeton Collieries, the Osoyoos Coal Company, and the Columbia Coal & Coke Company. The last-mentioned has done much development work on its valuable property at Granite Creek, and is preparing to put in plant and other facilities for considerable production whenever railway transportation facilities shall be available, which will probably be within a year.

COAST—At the Britannia mine, Howe Sound, developments are being continued. On Texada Island, the Tacoma Steel Company is maintaining production of gold-copper ore from its Marble Bay mine, while the Tyee Copper Company is developing the Cornell. Reports from Portland Canal district state that there has been satisfactory improvement in regard to quantity of silver-gold ore opened for extraction, in both Nos. 2 and 3 levels of the Portland Canal Mining Company's mine, while at Goose Bay, where the Granby Company is developing, under option of purchase, the Hidden Creek Company's copper mine, both cross-cut driving and diamond drilling have disclosed the existence of more ore than was previously known to be in the mine.

GENERAL MINING NEWS.

NOVA SCOTIA.

SYDNEY, N.S., March 1—Fire broke out this afternoon in the Dominion Steel Company's temporary office in the I. C. R. station. The two upper storeys of the building are already badly gutted.

HALIFAX, February 28—A writ of foreclosure has been issued by the Eastern Trust Company as trustee under a debenture mortgage against the North Atlantic Collieries, of Port Morien, C.B., claiming $930,351 on behalf of the bondholders of the company. This will necessitate the closing down of the mine and throwing several hundred men out of work.

SPRINGHILL, March 1—The first break occurred to-day in the history of the strike which has now extended for twenty months. Twelve of the leading mechanics, who have stood shoulder to shoulder with the strikers throughout the strike, presented themselves at the company's office this morning and were given places in the working staff and two of the active miners also returned to work in the pit.

SPRINGHILL, March 4—Following the riot of Thursday, comparative quiet prevails at the mines. Men are standing in groups discussing the situation, but no disturbance took place. Of the twelve strikers who returned to work at the first of the week, five stayed at home, three of them because they would not face the hostile demonstration to which they were subjected, and two because of injuries sustained at the hands of the crowd.

The charge against Manager Sharp, who was arrested by the town police, was "inciting to riot." The case against him and the other men arrested comes up this morning before Stipendiary Hunter at Springhill.

There will be a requisition for tropps to be sent to Springhill. The force now on the scene numbers 35 men, under Major Grey, and reinforcements are being asked for. The general opinion that further men will not return to work in the mines unless protection is afforded, something that yesterday's events apparently showed, does not exist. The strike has now continued for eighteen months.

HALIFAX—News has reached Halifax to the effect that the suit brought by Phil H. Moore against J. Thomas Reinhardt, broker, of New York, for $250,000, has been decided in favour of Mr. Moore, by the Supreme Court of fthe Unitedetaoishrdlutaoin means the probable early reopening of the Micmac, Jackpot, North Star, and Lincoln gold mines.

ONTARIO.

HAILEYBURY, February 28—The first run on the new five-stamp mill at the Swastika was satisfactory to the management. From 20 tons of ore put through the battery, 19 ounces, 5 pennyweights of gold were saved. This means that the ore runs about $20 per ton. The capacity of the mill is between ten and twelve tons a day.

COBALT—Some 300 feet from shaft No. 122 of the Nipissing, high-grade ore from two to five inches wide has been struck at a depth of 170 feet.

TORONTO, March 6—The British Columbia Steel Corporation, to whom a charter has just been granted by the Dominion Government for the establishment of a $10,000,000 steel plant near Vancouver, has received a communication from the American Car & Foundry Company, in which they signify their intention of establishing large works in connection with the former steel plant.

The British Columbia Steel Company has its headquarters in Toronto, and the exact location of the site has not yet been decided upon, although Port Mann, the proposed C.N.R. terminus, has been under consideration for some time.

The full plant, when in operation, will employ five thousand skilled workers, and have a capacity of nearly 1,000 tons of steel daily.

ALBERTA.

FRANK, March 1—Miners of this district who have been away from work for two weeks on account of differences with the operators, have returned to work under orders from the district president pending the completion of the agreement which is to go into effect on April 12.

BRITISH COLUMBIA.

FERNIE, B.C., March 1—By a large majority the miners at Michel voted to return to work last night, thus clearing the slate of grievances to be considered before going to Calgary to go into negotiations for a new agreement.

The Crow's Nest Pass Coal Company has agreed to install a telephone system in the Michel mines by means of which quick communication can be had with any part of the mines in which ventilation might go wrong. This amicable action upon the part of the men and company clears the way for the Calgary convention which takes up the task of deciding upon a scale of wages and other details which enter into the making of the agreement which is to govern the working of the mines during the next two years.

Trail—The operations of the Consolidated Mining & Smelting Company's smelter at Trail for January make a very favourable showing, according to a statement just issued by the company. During the month the company received 34,500 tons of ore and smelted 32,958 tons. The gross output for the month was about $349,000, of which 58 per cent. of the values was gold.

The January statement is very nearly a duplicate of that for December. In December, 35,000 tons of ore were received and 36,360 tons were smelted. The gross output was $351,000, of which 53 per cent. of the values was gold.

During the seven months ending with January 31, the company has produced about $2,645,000 gross value of metals.

Victoria, March 3—The long vexed question of the restoration of the Kaslo & Slocan Railway has now reached a stage in the negotiations when a definite arrangement is expected within a few weeks. The Great Northern is considering the offer of $25,000 made by a syndicate of Kaslo, who plan to restore the line and either themselves operate it or to secure future operation by the C.P.R. The offer, although the Great Northern regards it as inadequate, will probably be accepted.

Nelson, March 7—Under the weight of five feet of heavily packed snow on its roof, the stamp mill on the Sno Sio claim on Sheep Creek, owned by A. H. Tuttle, of Ymir, caved in on Monday night or yesterday morning. The exact amount of damage done is not yet known, but the loss must amount to some thousands of dollars, even if the machinery is not injured to any extent.

The Tuttle mill had batteries comprising 14 stamps, and at different times in recent history milled ore from the Columbia, the Mother Lode, and the Kootenay Belle gold mines, being practically a custom mill, though most of the ore was milled under lease. The mill site is directly opposite the Kootenay Belle mine, with which the mill was connected by aerial tram, and is on the opposite side of the creek from the mine. At the sessions of the board of provincial water commissioners at Nelson last fall, the water record attached to this mill was confirmed and converted into a license under the new act, though opposing parties asked for its cancellation.

COMPANY NOTES

BUFFALO MINES DIVIDEND.

The Buffalo Mines Company has declared the regular quarterly dividend of 5 per cent., payable April 1; also the customary extra dividend of 3 per cent., payable May 15.

AMALGAMATED ASBESTOS.

The annual meeting of the Amalgamated Asbestos Corporation was held in Montreal on March 8th. The report submitted was for seven months ending December 31, 1910, the date of the fiscal year having been changed. The addition and improvements to plant and property during the 19 months of operation have been paid for out of working capital.

To reimburse the working capital for expenditures made for capital account, the company sold $300,000 treasury bonds at 85, and has arranged for a further sale of $200,000 at the same price. Expenses of management have been reduced by about $47,000 per annum.

Profits for seven months were $195,424.53, against $221,825.33 bond interest and $32,812.50 preferred stock dividend, a deficit of $59,213. From the previous year $93,232.24 was brought forward, leaving the sum of $288,656.77 available to meet the $254,637 charges and preferred dividend. The balance of profit and loss as at December 31, 1910, to be carried forward, was $34,018.91.

Owing to exigencies of the asbestos trade, and as a result of the accumulation of material on hand, the company decided to close its mills and quarries on November 15, so that the income period was practically for 5½ months, although the statement covers seven months.

The general financial statement shows $74,031 in cash, $44,540 accounts receivable, and $900,633 asbestos on hand. Against this are bills payable, $575,922, and accounts payable and interest accrued, $125,782.

YUKON GOLD.

Yukon Gold Mining Company has declared the seventh regular quarterly dividend of 2 per cent.

The dividend is payable March 31 to stock of record March 15. Books close March 13 and re-open April 1.

CROW'S NEST PASS.

The directors of the Crow's Nest Pass Coal Company met on Friday, March 10th, at Toronto, and decided to pay the usual 1 per cent. dividend on March 20th to shareholders of record on March 15th. The stock is offering at 77, without bids.

At the annual meeting it was shown that the total amount available for distribution was $334,950.28, out of which were paid two dividends of one per cent each, making a total of $124,216.

There is carried forward to the credit of profit and loss $210,734, as against $156,025 similarly treated a year ago.

The coal mined during the year amounted to 1,209,762 tons. The coke produced during the year was 194,498 tons. The production of coal shows a steady and satisfactory increase each month over the corresponding months of 1909; the total increase for 1910 being 310,717 tons.

The amount spent on improvements during the year was $144,314.48, as against $215,839.15 the previous year. The amount charged to mine development during the year 1910 was $19,316.29 as against $98,115.37 in 1909, or per ton of coal produced, .0160c in 1910 as against .1091c. in 1909.

HILLCREST COLLIERIES.

At the annual meeting of the Hillcrest Collieries, Limited, the old board was re-elected. C. B. Gordon and C. Meredith were re-elected president and vice-president respectively, and J. M. Mackay secretary-treasurer. This was the first annual meeting, being for a ten-month period.

The secretary reports a considerable cash balance in treasury and the purpose is to spend on plant and equipment so as to put company in a position to double its output in the course of the next six months.

Nothing relating to merger plans was discussed at the meeting.

STATISTICS AND RETURNS

TORONTO MARKETS.

March 9—(Quotations from Canada Metal Co., Toronto):

Spelter, 5.60 cents per lb.
Lead, 3.65 cents per lb.
Antimony, prices unsettled.
Tin, 44 cents per lb.
Copper, casting, 13.15 cents per lb.
Electrolytic, 13.15 cents per lb.

Ingot brass, 8 to 12 cents per lb.

March 9—Pig Iron (Quotations from Drummond, McCall Co., Toronto):

Summerlee No. 1, $23.00 (f.o.b. Toronto).
Summerlee No. 2, $22.50 (f.o.b. Toronto).
Midland No. 1, $20.00 (f.o.b. Toronto).
Midland No. 2, $19.50 (f.o.b. Toronto).
Hamilton No. 1, $18.50 (f.o.b. Hamilton).
Hamilton No. 2, $18.00 (f.o.b. Hamilton).
Clarence, $20,00 (f.o.b. Toronto).
Cleveland, $20.00 (f.o.b. Toronto).

GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.

COKE.

March 7—Connellsville Coke (f.o.b. ovens):

Furnace Coke, prompt, $1.55 to $1.60 per ton.
Foundry Coke, prompt, $2.00 to $2.15 per ton.

March 7—Tin (Straits), 40.00 cents.
Copper, Prime Lake, 12.65 cents.
Electrolytic Copper, 12.40 cents.
Copper wire, 14.00 cents.
Lead, 4.45 cents.
Spelter, 5.67½ cents.
Sheet zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 9.50 cents.
Aluminium, 21.00 to 21.50 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $38.50 per ounce.
Platinum, hard, $41.00 per ounce.
Bismuth, $2.00 to $2.10 per lb.
Quicksilver, $52 per 75-lb. flask.

SILVER PRICES.

	New York. cents.	London. pence.
ebruary 22	Holiday	24 1/16
" 23	52½	24 3/16
" 24	52⅞	24 3/8
" 25	53	24 7/16
" 27	52¾	24 5/16
" 28	52⅝	24¼
arch 1	52¾	24 5/16
" 2	53	24 7/16
" 3	52¾	24 5/16
" 4	52¾	24 5/16
" 6	52⅝	24¼
" 7	52⅝	24¼

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

MISCELLANEOUS.

	March 9, 1910. Bid.	Ask.
Amalgamated Asbestos	..	..
Black Lake	15	17
Dominion Coal	..	..
Dominion Steel	..	..
Dominion Steel Corp.	57½	57¾
Granby	33	35
Consolidated Mining	45	55
Nova Scotia Steel	95	95½
Crow's Nest Pass	..	77

COBALT STOCKS.

Bailey	.05½	.06
Beaver Consolidated	.37¼	.37¾
Buffalo	2.15	2.40
Chambers-Ferland	.10	.12
City of Cobalt	.19½	.20
Cobalt Central	.07	.09
Cobalt Lake	.17½	.18
Coniagas	6.90	7.20
Crown Reserve	2.55	2.68
Foster	.06	.08
Gifford	.02½	.03¼
Great Northern	.14¾	.15
Green Meehan	.03¼	.03½
Hargraves	.19	.20
Hudson Bay	90.00	105.00
Kerr Lake	6.30	6.55
La Rose	4.46	4.50
Little Nipissing	.04½	.04¾
McKinley	1.59½	1.60
Nancy Helen	.01½	.03½
Nipissing	10.65	10.90
Nova Scotia	.14	.16½
Ophir	.10	.12
Otisse	.01¾	sellers
Preston East Dome	.45	.46
Peterson Lake	.12¼	.13
Right of Way	.08½	.09
Rochester	.04⅜	.05
Silver Leaf	.04½	.04¾
Silver Bar	...	...
Silver Queen	.03	.05
Temiskaming	.80½	.81
Trethewey	.90	1.00
Wettlaufer	.85	.87
Hollinger	8.00	8.35

NEW YORK CURB.

	March 9th, 1911. Bid.	Ask.
Brit. Col. Copper	6	6¼
Butte Coalition	17½	18½
Chino Copper	21¼	21½
Davis-Daly Copper	1 7/16	1½
Giroux Mining	5 13/16	5⅞
Ely Consolidated	.25	.27
Goldfield Consolidated	6	6⅛
Greene-Canadian	6⅞	7⅛
Harcuvar Copper	...	...
Inspiration Copper	7¾	8
Miami Copper	19¼	19⅜
New Baltic Copper	...	...
Nevada Con. Copper	18⅝	18⅞
Ohio Copper	1 7/16	1 9/16
Rawhide Coalition	.03	.04
Ray Central	1⅝	1 1/16
Ray Consolidated	17	17½
Union Mines	¼	⅜
Yukon Gold	3 13/16	3 15/16

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending Feb. 24, and those from Jan. 1, 1911, to date:

	Ore in lbs. Feb. 24	Ore in lbs. Since Jan. 1
Barber	6,000	6,000
Beaver	121,276	431,796
Buffalo	62,570	430,700
Chambers-Ferland	64,000	192,900
Cobalt Lake	181,510	562,050
Cobalt Townsite	40,000	289,740
Coniagas	123,740	628,190
Crown Reserve	64,000	340,540
La Rose	63,710	871,130
McKinley-Darragh-Savage	188,080	941,150
Nipissing	65,760	1,388,880
Wettlaufer	60,022	60,022

The shipments for the week were 1,040,668 pounds, or 520 tons.

The shipments from Jan. 1 to Feb. 24 were 8,020,702 pounds, or 4,010 tons.

Following are the shipments from the Cobalt camp for the week ending March 3, and those from Jan. 1, 1911, to date:

	March 3 Ore in lbs.	Since Jan. 1 Ore in lbs.
Beaver	119,717	551,513
Buffalo	63,800	494,500
City of Cobalt	60,000	186,280
Cobalt Lake	397,750	959,800
Coniagas	178,240	806,430
Crown Reserve	52,900	393,440
Hargraves	41,100	41,100
La Rose	86,800	957,930
Kerr Lake	60,173	721,592
McKinley-Darragh-Savage	118,360	1,059,510
Nipissing	99,500	1,488,380
Silver Cliff	50,260	98,180
Standard Cobalt	44,813	44,813
Temiskaming	80,224	363,419

The shipments for the week were 1,453,637 pounds, or 726 tons.

The shipments from Jan. 1 to March 3 were 9,474,339 tons, or 4,737 tons.

Following are the shipments from the Cobalt camp for the week ending March 10, and those from Jan. 1, 1911, to date:

	March 10 Ore in lbs.	Since Jan. 1 Ore in lbs.
Barber	.....	6,000
Beaver	.....	551,513
Buffalo	62,620	557,120
Chambers Ferland	64,000	256,900
City of Cobalt	.....	186,280
Cobalt Lake	125,770	1,085,570
Cobalt Townsite	.....	289,740
Coniagas	58,350	864,780
Crown Reserve	50,250	443,670
Hargraves	.....	41,100
Hudson Bay	.....	122,350
La Rose	86,390	1,044,520
Kerr Lake	.....	721,592
King Edward	.....	40,000
Nipissing	117,860	1,606,240
McKinley-Darragh-Savage	188,240	1,247,760
O'Brien	66,110	271,320
Peterson Lake (Little Nip)	.....	58,430
Right of Way	124,710	318,260
Silver Cliff	.....	98,180
Standard Cobalt	.....	44,813
Temiskaming	.....	363,419
Trethewey	42,350	181,600
Wettlaufer	.....	60,022

The shipments for the week were 986,880 pounds, or 493 tons.

The shipments from Jan. 1 to March 10, were 10,461,160 pounds, or 5,230 tons.*

*Note—The present small shipments are due to a shortage of power. See Special Correspondence.

BRITISH COLUMBIA ORE SHIPMENTS.

The following are the figures of the ore production and movement for the past week, ended March 3rd, and for the year to date:

Boundary Shipments.

Granby	16,338	192,664
Mother Lode	5,964	51,997
Snowshoe	959	18,493
Rawhide	1,909	32,528
Jack Pot	749	4,344
Number Seven	61	563
Phoenix Amalgamated	785	1,755
Other mines	.....	240
Total	26,765	302,584

Rossland Shipments.

Centre Star	3,822	30,831
Le Roi No. 2	424	4,611
Le Roi No. 2, milled	300	2,700
Le Roi	98	2,455
I. X. L.	7	21
Nickel Plate	50	174
Other mines	.....	22
Total	4,701	40,814

Slocan-Kootenay Shipments.

Sullivan	664	5,581
St. Eugene, milled	2,775	24,975
Richmond-Eureka	26	522
Ruth	33	165
Rambler-Cariboo	59	474
Hewitt	22	154
Queen, milled	420	3,570
Granite-Poorman, milled	250	2,250
Nugget	110	990
Wilcox	75	675
Emerald	63	689
Standard	30	328
Evening	19	34
Knob Hill	90	133
Athabasca	20	20
Molly Gibson	22	22
Kootenay Belle	32	32
Other mines	.....	1,803
Total	4,710	42,417

The total shipments for the week, including the estimated mil ing, were 36,176 tons, and for the year to date, 385,815 tons.

B. C. COPPER COMPANY'S RECEIPTS.

Greenwood, B. C.

Mother Lode	5,964	51,997
Rawhide	1,909	32,528
Jack Pot	749	4,344
Other mines	.....	240
Total	8,622	89,109

GRANBY SMELTER RECEIPTS.

Grand Forks, B. C.

Granby	16,338	192,664

CONSOLIDATED COMPANY'S RECEIPTS.

Trail, B. C.

Centre Star	3,822	30,831
Snowshoe	959	18,493
Sullivan	664	5,581
Le Roi No. 2	424	4,611
Le Roi	98	2,455
Number Seven	61	563
Richmond-Eureka	26	522
St. Eugene	35	1,210
Ruth	33	165
Rambler-Cariboo	59	474
Hewitt	22	154
Emerald	63	689
Standard	30	328
I. X. L.	7	21
Nickel Plate	50	174
Queen	67	413
Evening	19	34
Knob Hill	90	133
Phoenix Amalgamated	785	1,755
Athabasca	20	20
Molly Gibson	22	22
Kootenay Belle	32	32
Other mines	.....	1,957
Total	7,388	70,637

The total receipts at the smelters for the week, including co centrates, were 32,348 tons, and for the year to date, 352,410 to

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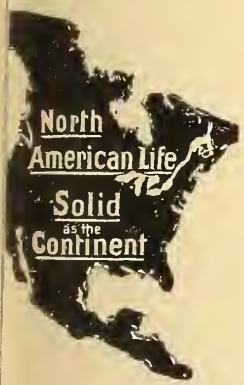

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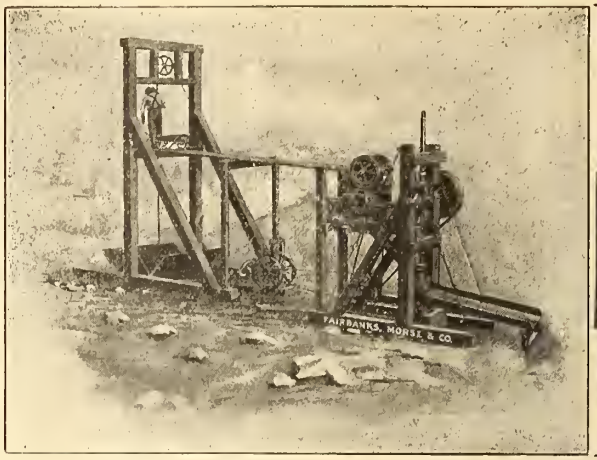

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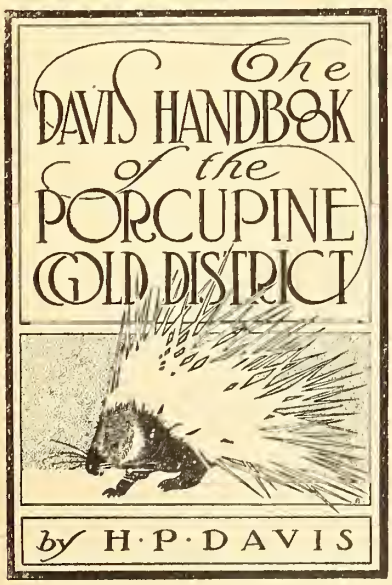

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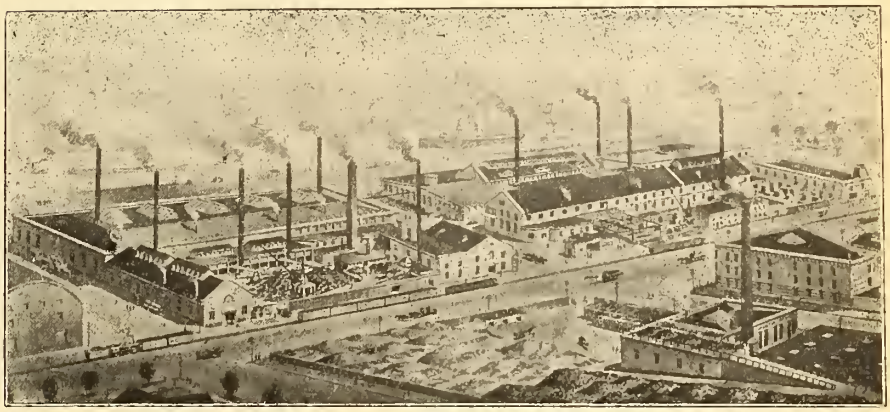

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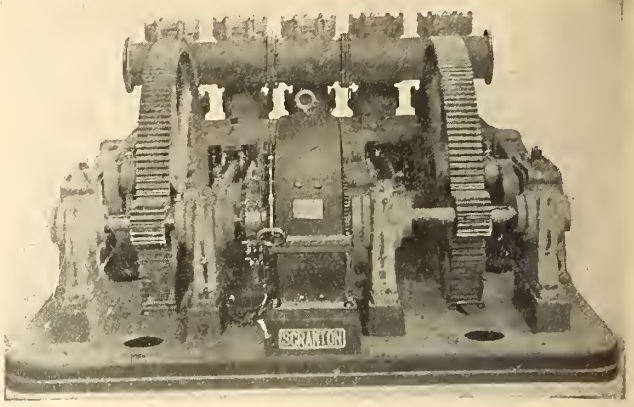

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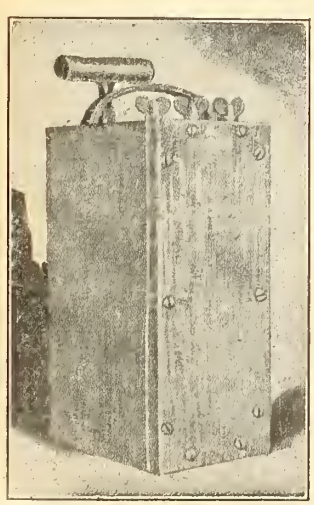

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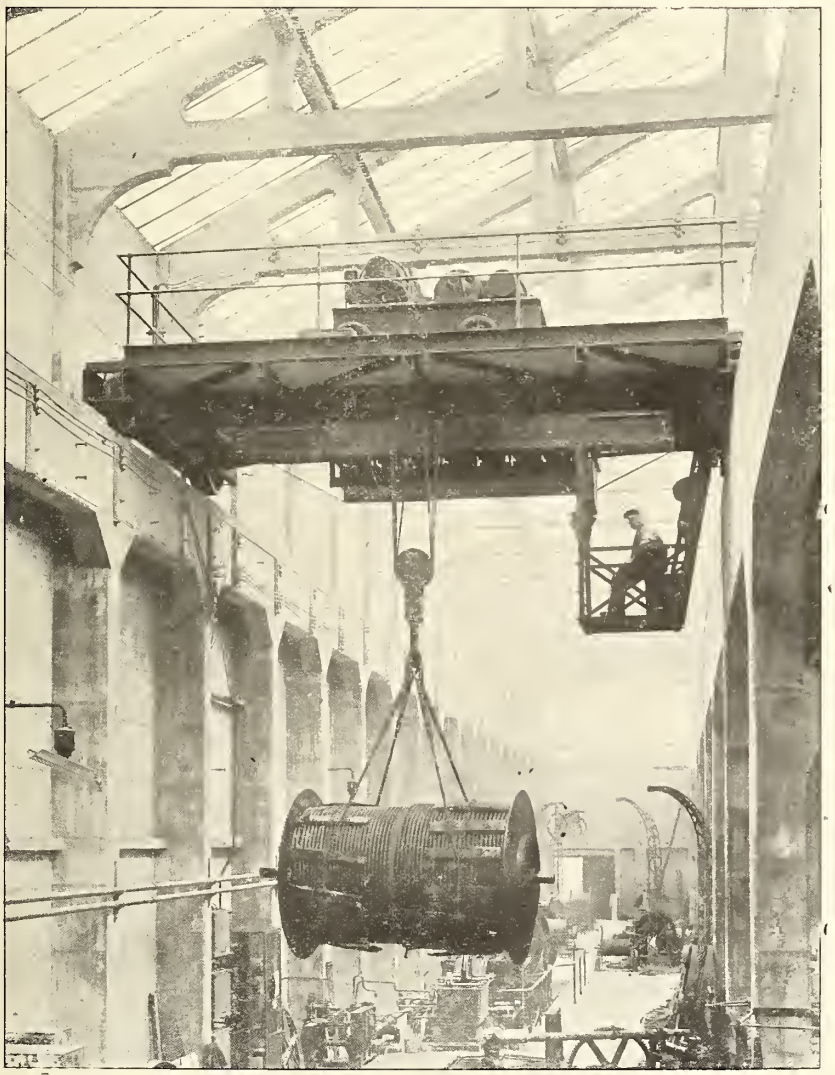

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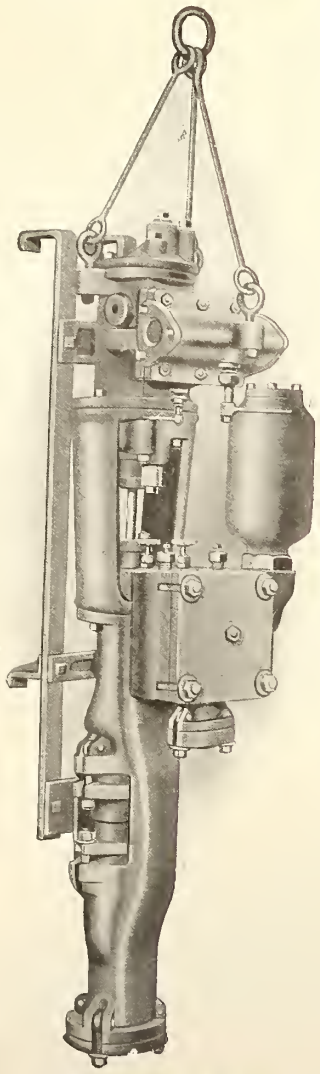

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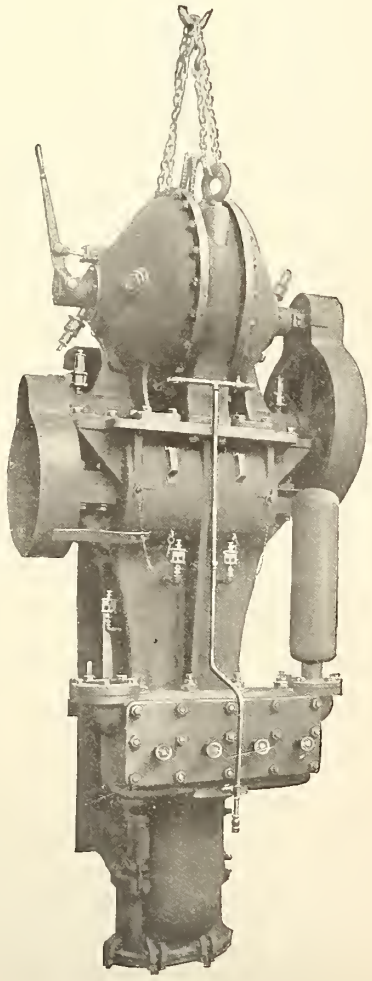

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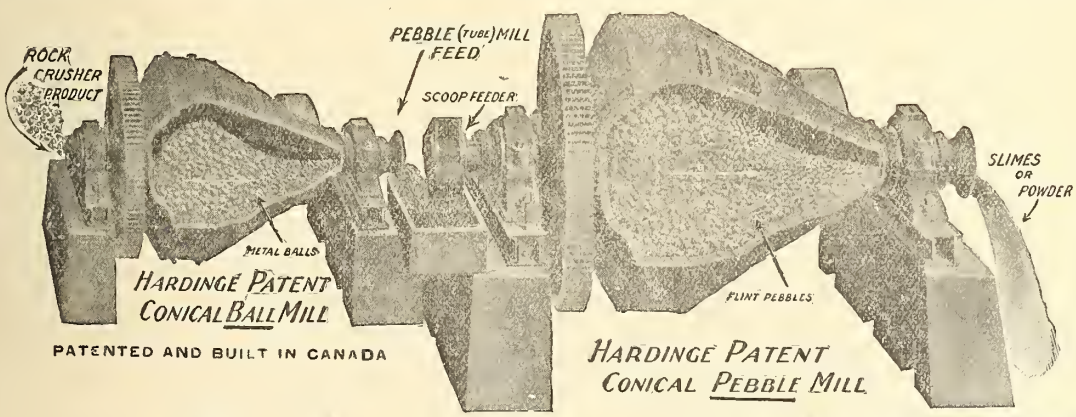

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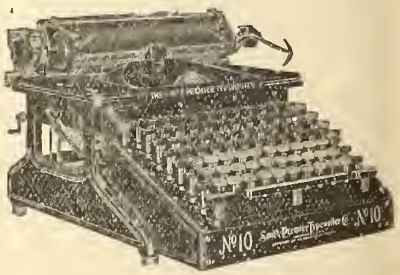

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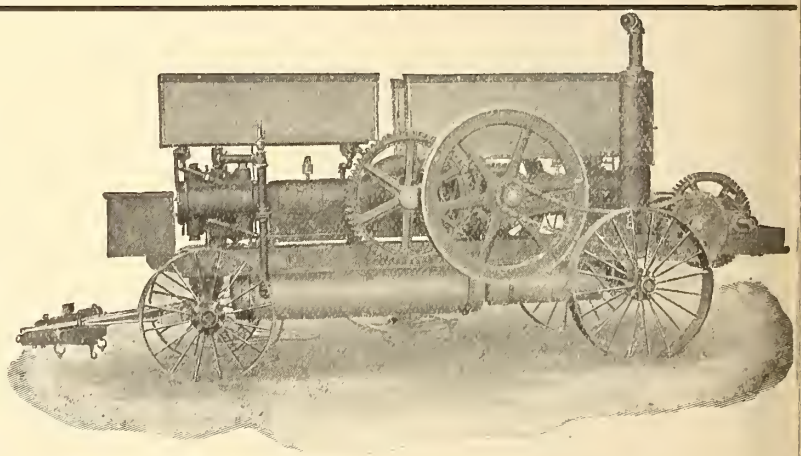

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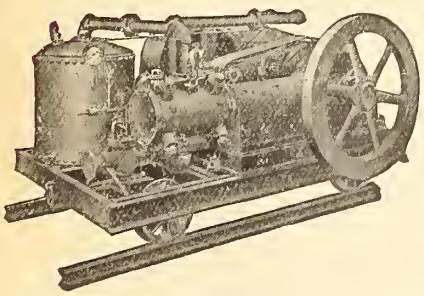

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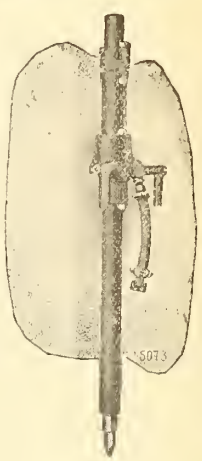

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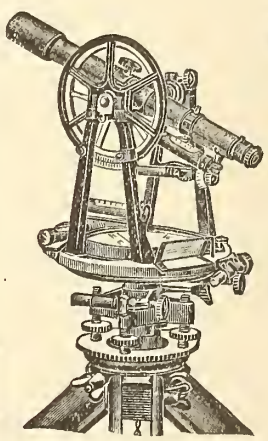

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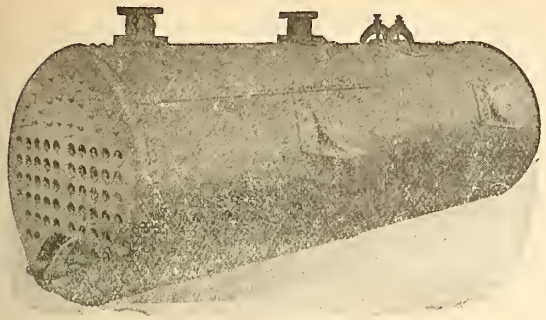

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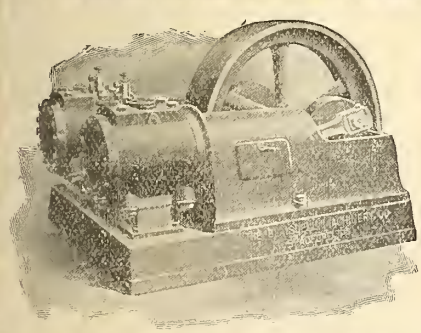

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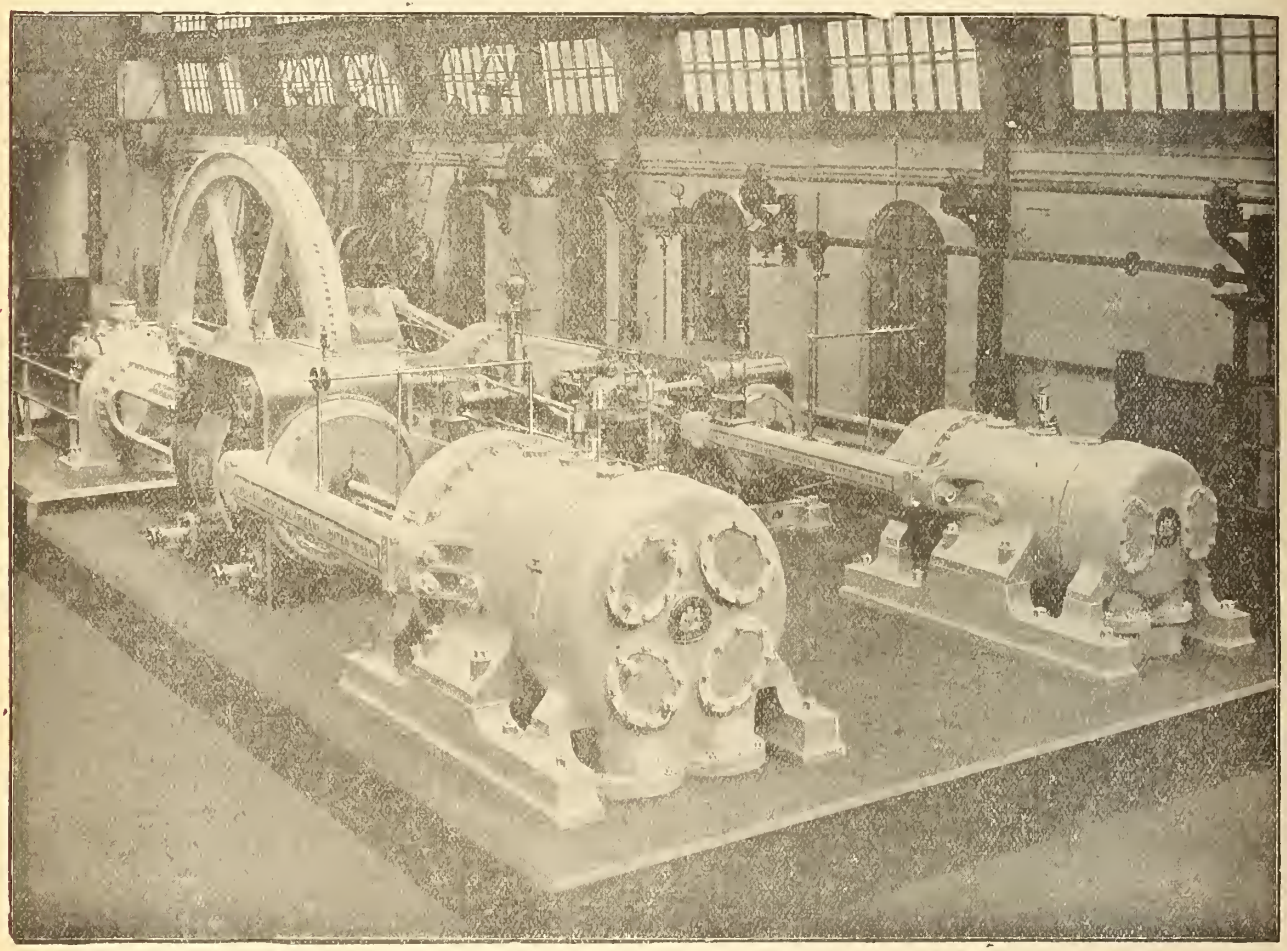

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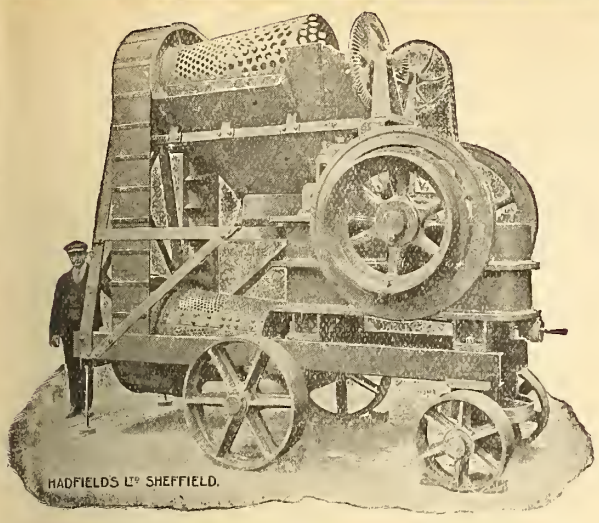

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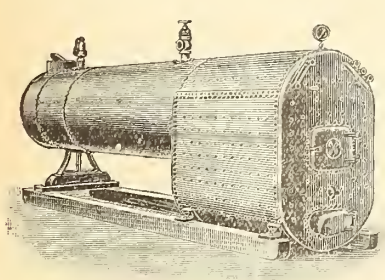

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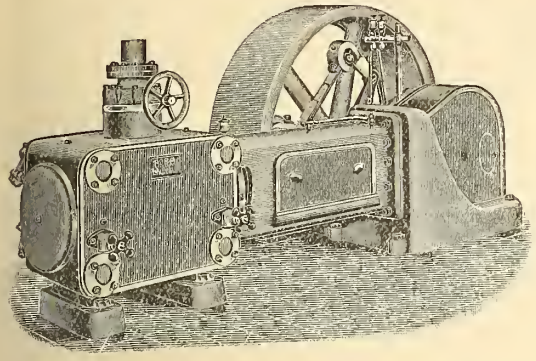

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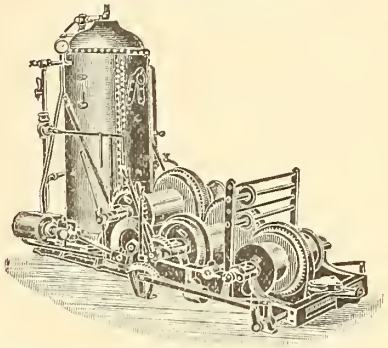

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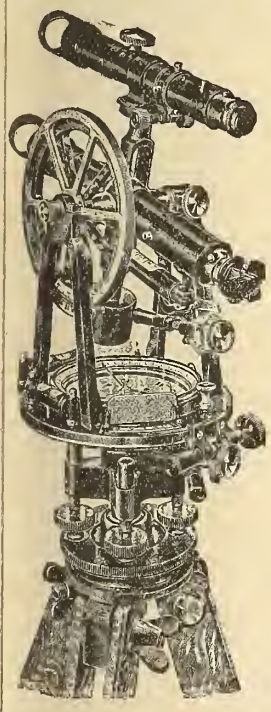

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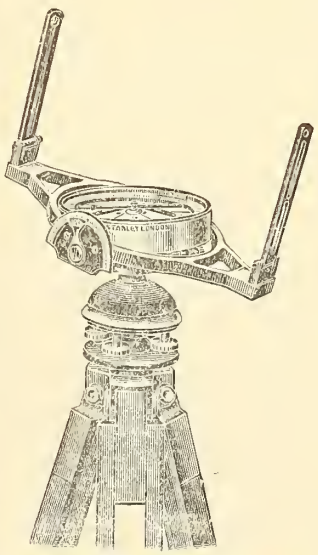

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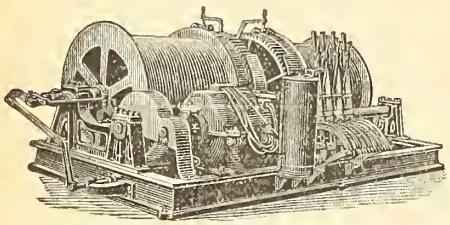

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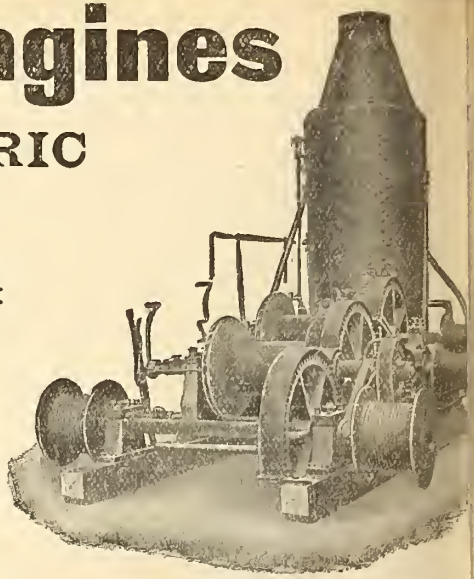

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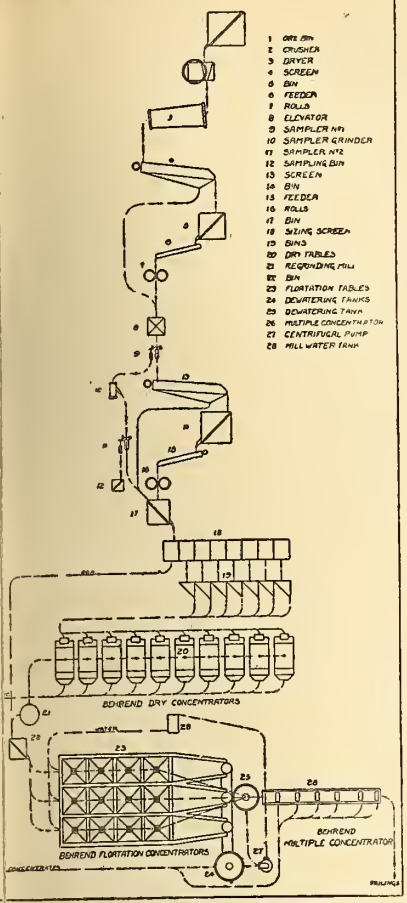

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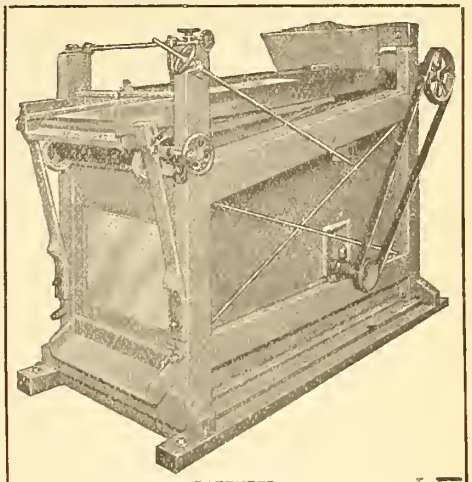

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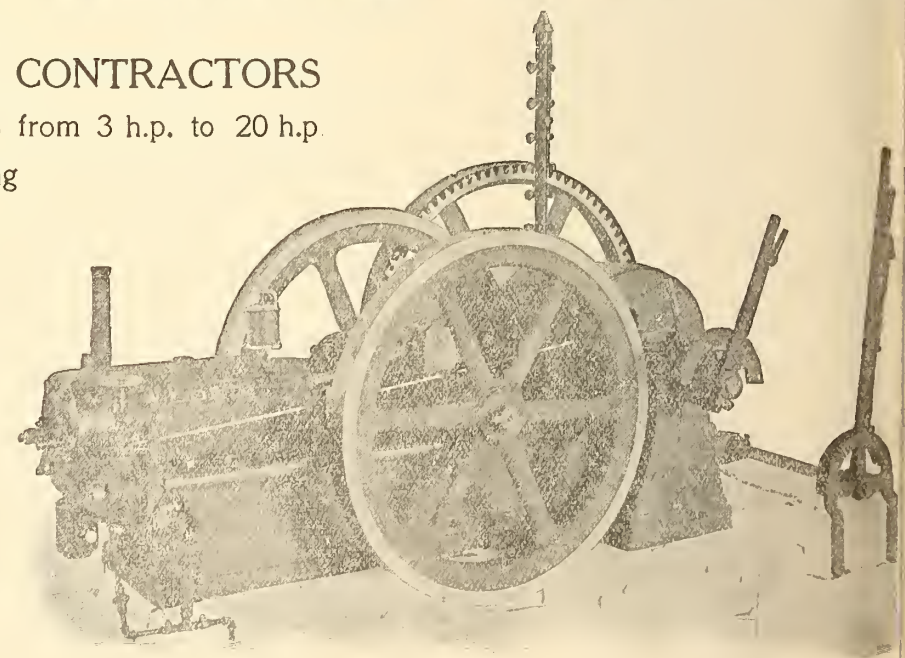

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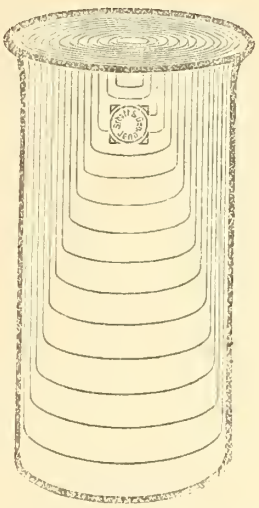

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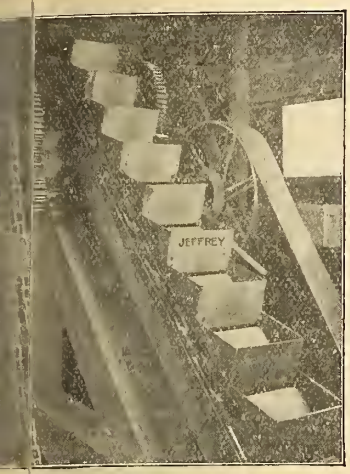

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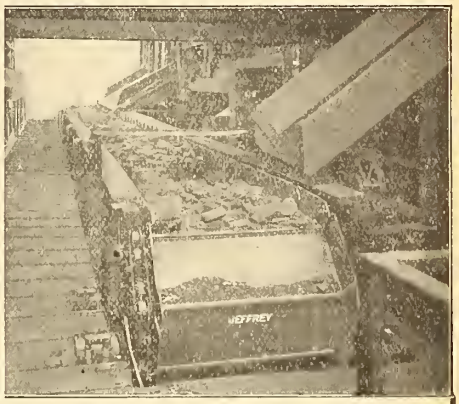

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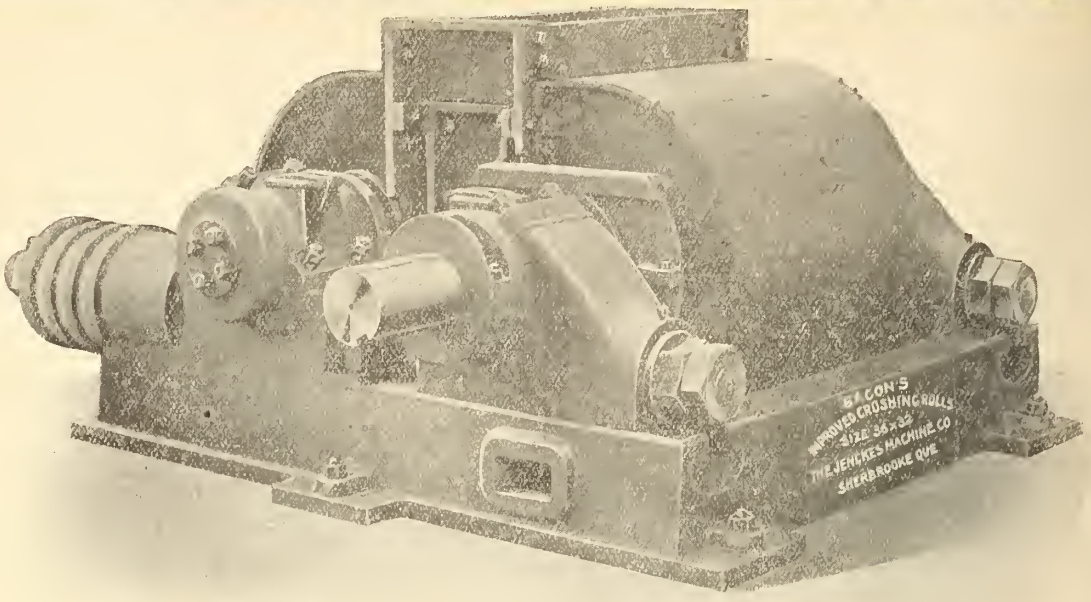

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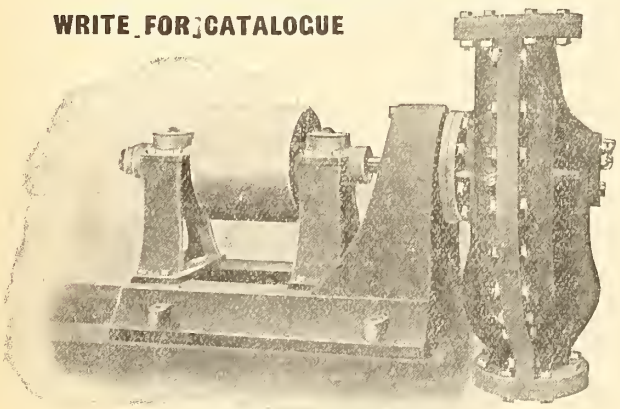

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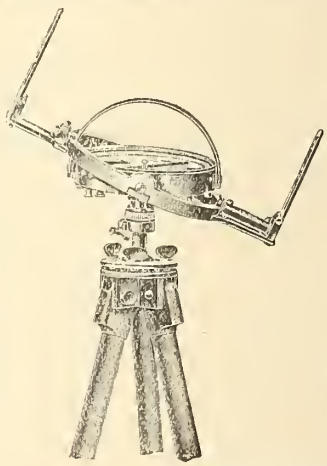

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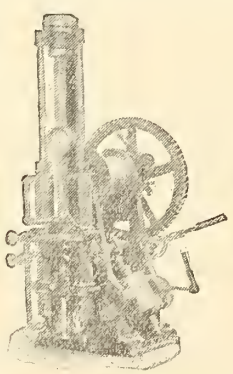

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THE CANADIAN MINING JOURNAL

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THE SPRINGHILL STRIKE.

Since the Dominion Coal Company assumed control of the Springhill (N.S.) collieries, there has been little outward change in the situation. The leaders of the strike have rejected the proposals made through the good offices of the Attorney-General, and are still insisting upon recognition of the U.M.W.A. committee.

The proposals of the company were a genuine effort to meet the claims of the strikers, so often and so insistently urged, for a tonnage rate instead of the former method of paying by the loaded box; for an equitable "docking" arrangement, and for higher wages to the lowest paid classes of labourers and boys. It is admitted by all that some method of exercising a check on the stone loaded out with the coal is absolutely necessary, and this is the object of the "docking" clause. The tonnage rates offered are the same as are now being paid to the men at work, who are making good wages, even under the hampered conditions attending operations during the strike. The rates existing when the strike was called were such as to make it impossible to operate the mine without serious monetary loss, and to attempt to continue such rates is merely to court bankruptcy.

Much the same tactics are being pursued by the U.M.W.A. organizers at Springhill as were followed in Cape Breton. A rumour is being assiduously circulated among the Springhill strikers that the Cape Breton miners will strike en masse about the opening of navigation in sympathy with the Springhill men.

There are certain ardent but irresponsible spirits among the members of the U.M.W.A. in Cape Breton who preach strike on every possible occasion, and advocate it as the remedy for all industrial ills, apparently not knowing that the idea of strikes is as obsolete as the prejudice against labour-saving machinery. An example of the methods of some of these men is evidenced by the troubles at the North Atlantic Collieries at Port Morien. Here, although the company had explained to the men that it was in difficulties owing to the winter conditions, the U.M.W.A. continued to harass the management until eventually it was announced that the Eastern Trust Company had been appointed as receivers. In these circumstances the local secretary of the U.M.W.A. wired the Minister of Labour railing against the Industrial Disputes Act in general, and stating that if a Conciliation Board were not immediately appointed, the Port Morien men would strike forthwith. At a time when it was uncertain whether or not it would be even possible to operate the mine on a reduced basis, this threat was not a very terrible one. Not content with such absolute futility, the U.M.W.A. sympathizers are stating that the mine

was mismanaged, and that the foreclosure by the Trust Company was made to prejudice public opinion!

At Port Hood, the U.M.W.A. is harassing a struggling company, and there is not a single colliery in Nova Scotia where the U.M.W.A. has gained any ascendancy that has not either been forced to the wall, or suffered serious financial embarrassment, which, in every case, has recoiled on the miners themselves.

The strike talk just referred to is entirely confined to these professional strife-breeders, and is being circulated with the idea of encouraging the strikers at Springhill to hold out. It is the general opinion that another strike in Cape Breton is the most unlikely thing to happen. As was the case in Cape Breton before the U.M.W.A. strike collapsed there, many of the Springhill strikers would gladly return to their work, but are deterred from doing so by fear of violence on the part of the pickets. The Dominion Coal Company is providing adequate police protection for the men at work, but as the local authorities either are passive or do not desire to prevent intimidation of those who wish to work, there will probably be a repetition of the farcical situation that existed in Glace Bay when the so-called U.M.W.A. special constables were appointed. In Glace Bay the people fortunately saw the humorous side of one set of policemen arresting the others, and a very grave train of possibilities was averted by the good sense of the populace. It is reported that Springhill may be proclaimed as a police district under a special commissioner in order to ensure the preservation of order.

THE COAL MINING INDUSTRIES OF NOVA SCOTIA AND OF WEST VIRGINIA.

Nova Scotian coal operators have a great deal to contend with. In particular they have to compete with the growing West Virginian coal industry, which seeks to absorb the Atlantic coast trade. Or, rather, in the event of any further reduction of coal duties, West Virginia coal will become a very disturbing factor. A glance at the present status of both countries will be timely.

Nova Scotia, throughout the past 125 years, has produced about 100,000,000 tons of coal. Nearly 50 per cent. of this total has been output since the year 1900. The annual output for the current year will approximate to 7,000,000 tons. Roughly, 94 per cent. of this quantity will be disposed of in the markets afforded by the maritime provinces, Quebec, the bunker trade, and Newfoundland. These channels are named in order of importance. The remaining few hundred thousand tons will be shipped to the United States, almost entirely by the Dominion Coal Company.

Turning now to West Virginia, a glance at a recent bulletin, issued by the West Virginia Mining Association, shows us that the total production to date has been almost 600,000,000 tons. Since 1863 the annua coal production of West Virginia has expanded fro less than half a million tons to almost 60,000,000 ton in 1910. This phenomenal growth has been mos marked in the last twenty years. During the two pas decades the annual production has been multiplied b six. As the coal mines of West Virginia are situate between three hundred and four hundred miles fro tide-water, transportation is the chief problem to b contended with. In fact, one writer, Mr. Frank Haa states that fully one-third of the capital invested i West Virginian coal mines is an idle asset on accou of insufficient transportation facilities. Unreliable d livery, Mr. Haas claims, is the prime cause of the lo of large and important contracts. Delivery to th consumer is considerably more costly than the labou of production. Labour is cheap and plentiful. Th number of coal-cutting machines in use is 1,967. Th tonnage of machine-mined coal was 23,362,675 tons i 1910. The proportion of machine-mined coal is stea ily increasing.

Our Nova Scotian correspondent informs us th there are approximately 500 coal-cutting machines i use in the province. The amount of coal mined b machines is about one and two-thirds million ton Nine-tenths of the machines are in use in Cape Bret collieries, the remainder on the mainland. Native l bour is not opposed to the use of machines; but it is difficult matter to secure European miners who a acquainted with coal-cutters.

The disparity in bulk of outputs is most marke Labour in Nova Scotia is costly and not too plentif Climatic conditions limit water shipments to eight nine months of the year. The channels of trade a strictly delimited. Railway facilities are not what th might be. These considerations, whilst they do n cover the whole ground, perhaps sum up the leadi features of the case.

It can be seen that, with Pennsylvania and Oh fuels pushing hard on one side, and West Virginia another, the Nova Scotian operator has ground to fe reciprocity. On the other hand, he has definite a vantages, such as immediate access to tide-water, s cure control of government railway contracts, and t possibility of safeguarding domestic markets by mo considerate treatment of local consumers. But, as West Virginia, so in Nova Scotia, organized and e cient transportation is an imperative pre-requisite. we have said before, right economic conditions wou place Nova Scotia in a position where outside co petition would not imply industrial paralysis. T question is not one of how large a measure of prot tion is needed, but of how soon the artificial barri can be reduced or removed. It would be as grossly u just to disregard the interests of the operator in s tling this question, as it would be to overlook the w fare of the consumer.

THE PORCUPINE BOOM.

Those who have at heart the real good of mining in general and of Porcupine in particular, strongly deprecate the stupid flotations that are now being advertised in the newspapers. When leading business men take an active part in selling to the public a risk that is based upon the opinion of an unauthenticated "engineer," it is high time to call a halt.

The specific instance that has been brought to our attention is the advertisement of Jupiter Mines, Limited. This enterprise is a $2,000,000 affair. 1,500,000 shares are in the treasury, 600,000 shares of treasury stock are offered at 50 cents. That is, the public is being asked for $300,000, which sum, less brokerage and expenses, is to be applied in part payment for two claims on which four veins have been uncovered. The total price to be paid for the claims is $250,000 in cash, along with 500,000 shares. Payments are distributed over a period of nine months.

The report of Mr. James H. Miller outlines the physical basis of the project. Mr. Miller is professionally unknown in Canada. His reports, whilst cheerful, might just as appropriately contain an epitome of the Book of Job. It conveys nothing to the reader beyond the figures of certain assay reports. The "research work" to which Mr. Miller refers has not been made public. We gravely doubt if it ever will. But all the "research work" and all the assays possible on a few outcrops cannot form sufficient ground for warm technical commendation. High assay results do and always will induce men to spend money. But the careful engineer confines himself to facts and not to glowing predictions. However, in justice to Mr. Miller, we must say that he conveys a radiantly optimistic impression in language so selected that he can, if necessary, take back-water in the future.

The claims in question are well situated. How much that implies no one knows. This very fact makes totally unnecessary such decorative features as Major J. A. Murray (whose firm, the Murray-Kay Co., is widely known), Mr. James H. Miller (who is not known), and the incandescent advertisement.

Porcupine does not need the blatant advertisement. Even the scintillating Mr. F. Augustus Heinze can be dispensed with.

The real work is being done by real engineers. Porcupine has struck her gait. Let her not be ridden by the frenzied financier.

REDUCTION OF LOW-GRADE ZINC ORES.

A year and a half ago, at the solicitation of British Columbian mining men, the Dominion Government authorized the expenditure of $50,000 in investigating the commercial practicability of treating low grade zinc and lead-zinc ores. Seven months ago, the Hon. W. Templeman, Minister of Mines for Canada, speaking at Nelson, B.C., outlined the steps that had been taken and touched on the plans that were formed for the future.

These generalities from the Minister are, so far as we know, the only intimation of progress that has been made public since the movement was begun. A year and a half has passed. No doubt progress has been made. But no news has come, not even of the experiments being conducted at McGill University. Kootenay mining men are anxiously awaiting tidings. They know how much hangs on the decision. Suspense is painful and costly.

The intention of those who took the matter up in 1909 was to try to benefit the infant zinc-mining industry of the district during the life of the present generation. We hope that, in the swift passage of the years, this intention will be kept in view.

Meanwhile it is possible that more immediate relief may come from Leadville, where a method of treating ores carrying from 10 to 20 per cent. zinc is being sought. Success is not unlikely to crown the Colorado investigators.

CODIFYING THE MINING LAW.

That the work of codifying the mining laws of the Dominion is being pushed rapidly is good news. The Dominion Government, after hearing the strong representations of the Canadian Mining Institute committee, immediately caused an appropriation to be made and selected Mr. J. M. Clark, K.C., of Toronto, to supervise the drafting of the new statutes. This work will entail a colossal amount of house-cleaning and reconstruction. Mr. Clark's shoulders are broad. He has long specialized in mining law, is the author of a standard text-book on the subject, has had long experience in mining litigation, and is an active member of the Institute. At present he is in correspondence with leading authorities in the principal mining countries of the world. Newspaper despatches indicate that his appointment is acceptable in the west as well as in the east.

Important announcements will soon be made relating to the consolidated statutes. Comments and suggestions are earnestly desired. Our columns will be placed at the disposal of any responsible correspondents. There is no need of emphasizing the desirability of co-operation.

EDITORIAL NOTES.

The many friends of Mr. F. H. Mason, especially his numerous acquaintances in Nova Scotia, will be glad to learn that, after a long rest at San Diego, California, his health is rapidly improving. The article, "Volatile Constituents of Coal," that Mr. Mason contributes to our columns, is thoroughly well done.

Our Quebec correspondent gives in this issue very satisfactory details as to the changes that have recently taken place in the administration of the Amalga-

mated Asbestos Corporation. An earnest and successful attempt to reduce operating expenses to a minimum has been made, and very close attention is being paid to American and European markets. The current year should bring gratifying results.

Mr. John Handley's article in this issue, "Shaft Surveying and New Plummets," is one of the most thoughtful and practical discussions that we have had the pleasure of publishing. The subject is one that is more often neglected than should be. The careful precautions that Mr. Handley suggests are by no means excessive.

CORRESPONDENCE.

STURGEON LAKE GOLDFIELDS.

Sturgeon Lake, Ont., March 11, 1911.

Editor, Canadian Mining Journal:

Sir,—Now that there is so much talk about the Porcupine goldfields, I would be glad if you would allow me to put in a word for this camp.

Though started eight or nine years ago, this camp has never had a fair test. Without prejudice to Porcupine, or to any other camp, I can safely say that this district can show as good surface indications for gold as any in Ontario. The general run of the formation here is northeast and southwest, and is composed principally of diorite, diabase, and schist rocks. Some rich veins have also been found in the granite close to the contact. One sunk to a depth of 12 feet this winter, shows ore in some places going over $500 a ton in gold, besides considerable silver. Quartz veins on the western contact run all the way from 8 to 18 feet wide, and some of them can be traced for over a mile. Most of them show good indications of gold, and where any sinking has been done the values show pretty high. One property, where a shaft has been sunk 36 feet, has a 14-foot vein at the bottom showing an average value of from $18 to $19. The St. Anthony mine, on the same contact, shows high values at over a hundred feet deep. Other veins all over the lake show exceptionally good values, lots of them going all the way from $20 to $90 per ton in gold. The north end of the lake is only three miles from the new Transcontinental Railway, and affords the best of facilities for cheap transportation. What we need here is some practical mining men to take hold of some of the properties and give a thorough test, when I have no doubt it will prove one of the most prosperous gold camps in the country. Most indications show so far as low grade ore is concerned, that the values increase going down.

Hoping you will pardon me for taking up so much of your valuable space. Yours sincerely,

H. Murray Tait.

QUALIFICATIONS OF MINING ENGINEERS

Editor, Canadian Mining Journal:—

Sir,—A flood of prospectuses, similar to that we had during the Cobalt boom, is again appearing in the daily newspapers. The reports contained in these prospectuses are, it is safe to say, signed in the majority of cases by men who call themselves mining engineers but who have not the slightest right to do so. During the Cobalt boom it was ridiculous to see the confidence that the public and the press appeared to had in self-styled mining engineers. One of these men, who did much posing and made many reports was a foreigner, who only a few years before had tramped the country with a pack on his back. Another other was a mechanic with no technical training concerning ore deposits. The list of quacks and fakirs who reported on Cobalt deposits could be extended ad infinitum. A similar class is making reports on Porcupine, and some of our leading financial men are officers of companies which publish the reports of these men.

It is not possible nor desirable that mining engineering should be made into a close corporation, such as law, dentistry or veterinary science. But is it not possible to get the title "mining engineer" or "mining geologist" so defined by Act of Parliament or of Legislatures, that it cannot be used by fakirs in general? The use of this title by such men is with the object of deceiving the public. Could the title not be defined in some such way as the following: (1) Any person using the title of mining engineer, geologist or mining geologist must be (a) a graduate or a university or technical school; or (b) he must be one who has had at least ten years' experience in mining or geology, at least five years of which shall have been in a responsible position. Yours, etc.,

Mine

BOOK REVIEWS.

CANADIAN NATIONAL ECONOMY—The Cause of High Prices and Their Effect Upon the Country—By James J. Harpell—182 pages—Paper Bound—Price 50 Cents—Published by the MacMillan Co. of Canada, Ltd. 1911.

On both sides of the Atlantic the trade relations of Canada and the United States are being hotly discussed. Canadians are being edified by much Parliamentary rhodomontade and by infinite newspaper slush. Strong crusading parties—mostly of the "anti-" stripe—are touring the land. Their intrepid leader, Mr. Clifford Sifton, whose sensational defection from the Liberal party has given him renewed prominence, is throwing all the weight of his prestige into the campaign. All leading manufacturers are with him. With him also is that unrestful person, Prof. Stephen Leacock, master of phrases and epigrams, and worthy wearer of the motley. For Prof. Leacock, when he remains within the bounds of good taste, most of us have large admiration. But from him, as from practically all his fellows, it is vain to expect more than electric sparks. On the Liberal side matters are better—but very little better. The Liberal press is no more convincing than is the Conservative. Both are carried away by

exigeneies of controversy. From neither has the lie received a conseentive and dispassionate pretation of the questions involved.

t is therefore with a sense of relief that we turn to volume under review in which the author has carely digested his facts and has avoided emitting danous elap-trap. Not that we wish to coneur in all . Harpell's eonelusions. This is not to be expected. t we thoroughly approve his eonstruetive attempt set forth Canada's economie eonditions as they ARE, d NOT as our sanguine blindness leads us to HOPE y are.

Whilst we shall pay most attention to the chapter t treats of the mining industry, it will be well to nce over the whole volume.

The nueleus of the book was an artiele, entitled anada and Tariff Reform," that appeared over Mr. rpell's signature in the "Contemporary Review" January, 1910. The ideas there embodied are now forth more eomprehensively. Protracted residenee Great Britain has given the author eertain advanges, and correspondenee with many leading econosts has provided a strong stimulus.

Chapter I. deals with the manufaeturing industries. e fiscal polieies of our politieal parties are here ced, and the influenees that have led up to the overelming growth of our combines are analyzed and lated. The gradual, but inevitable, effeet of high otection, and of its offspring, the trust, upon labour, st of living, and produetion is stated from the viewint of a declared free-trader. Official statisties, rangg from 1871 to 1906, are addueed to show that our nufacturing establishments have diminished in numr tremendously. The effect of this eentralization has en that now "hardly a staple eommodity, whether ported or produeed at home, . . is not eontrolled a few manufaeturers and middlemen." While Mr. rpell perhaps over-aeeentuates the resultant evils, t his general argument is strongly grounded in faet. e tone of this chapter indieates the tone of the reinder of the volume.

In Chapter II. the author seeks to show that our prerential tariff is almost nugatory. The elaim is adnced that with genuine free trade as between Great itain and Canada, many of the most important eomodities would drop 25 per eent. in price.

Chapter III. outlines the nature, methods, and profits our eombines, with especial referenee to their relaon to our banking system. Chapter IV. covers our tural resourees and foreign trade, eompares our adrse annual balanee of trade with the favourable balces of such eountries as the Argentine Republie, and ludes to the absenee of artifieial stimulation of instry in those countries in whieh tariff for revenue ly obtains.

Chapter V., "The Farming Industry," will be eondered the produetion of an alarmist. However this ay be, the facts addueed are too signifieant to be linked. That in ten years our exports of animals, tter, and eggs, have fallen to almost nothing, will me as a surprise to all but the best informed econoists. That our boasted eheese industry is on the wane ill also open many eyes. The presentation of these cts is elear and strong. The eonelusions we shall ave for the reader to diseover himself.

To the mining industry is devoted Chapter VI. The pening proposition is that no industry has suffered ore from high priees and profited less from the conderations that produeed them. The miner has sufred alike from the high eost of living and from the undeveloped home market—a market undeveloped beeause of high protection. This general statement Mr. Harpell illustrates by sketehing the eondition of eertain branches of the industry. Although, in a broad sense, the statement is true, the examples given are forced. For instanee, we do not believe that the falling off in Yukon gold produetion is attributable to any prime eause other than the depletion of the rieh alluvials. Meehanical improvements will bring up the output as time goes on. Politieal maladministration and other faetors have had but little effect in redueing the yield of precious metals. Human stupidity and human eupidity, have probably played larger parts. So also with the iron industry. The laek of well situated, properly developed, iron ore deposits in Canada has been a greater handicap to the industry than anything else. But it is quite eorreet to assert that iron, eoal, eement, gypsum, eopper, and allied branehes of mining, where low eost of produetion is vital, are extremely sensitive to general economic eonditions. The same eannot be postulated of gold and silver. As a matter of faet, Canadian placers and mines show in outstanding instances the lowest costs in the world.

The value of Chapter VI. seems to us to lie, not in Mr. Harpell's analysis, whieh is strained, but in his point of view, whieh is original and most eonduetive of thought.

Chapter VII. is a eoncise, rather meagre, view of the fishing industry. Absence of expansiou is noted.

Chapter VIII. reviews the evils resulting from politieal and fiseal abuses.

Chapter IX. is a forceful plea for national eeonomy. Speeial stress is laid upon the neeessity of reeasting our banking system.

Chapter X., "Reeiprocity with the United States," is a tempting chapter to dwell upon. We must refrain. Suffiee it to say, that it includes a eo-ordinated series of faets, well-authentieated facts, leading up to definite eonclusions. It earries no tinge of party polities.

In eonehding this too lengthy review, let us point out again that, however Mr. Harpell's eonelusions be reeeived, his book is a timely and valuable presentation of statistieal and eeonomie data. This kind of material is edueative. It stands in sharp contrast to the fireworks of the demagogue. It appeals neither to prejudiee nor to passion, but to right and ealm reason. We particularly commend the book in one dose to polemic professors and pyrotechnic politieians.

CORUNDUM.

The United States produees practically no eorundum at present. Canada's produetion, altogether from the plant of the Manufaeturers' Corundum Company, Craigmont, Ont., was 2,692 tons in 1910, valued at $172,000. This is exported prineipally to the United States and Europe. The demand is eonsiderably greater than the present eapaeity of the plant.

Infusorial earth is being used in a number of new ways. In Europe it enters largely into the preparation of artifieial fertilizers, its powers of absorption being particularly useful. It is also used in the manufaeture of water glass, various special eements, glazing tiles, glazing artifieial stone, and in preparing pigments, aniline colours, paper, sealing wax, fireworks, guttapereha, Swedish matehes, solid bromine, papier-maehe, ete. The demand is growing steadily.

SHAFT SURVEYING AND NEW PLUMMETS.

By John Handley.*

The most difficult part of any mine survey is the transferenee of the bearing, or astronomical meridian, to the underground workings. Upon this operation depends the worth of the entire survey. Thus, anything tending towards increased aecuraey will probably be well reeeived by the surveyor.

Though almost universally applicable, my remarks have speeial signifieanee in metal mine surveys. In the ease of the precious metals, the values are apt to be eoneentrated in small veins so that an error of a few feet may beeome important, by reason of the large values involved, if on no other grounds. Moreover, the surveyor is often limited to one opening (which we may assume to be a vertieal shaft), and unless he be provided with an auxiliary teleseope he will probably adopt the two-wire method for establishing his meridian underground.

It is perhaps as well to admit at the outset that mathematieal aeeuraey is physically impossible of attainment even under the most favourable conditions. Where a single opening has to be used the base line is commonly short. When the meridian has been carried underground through only one shaft, or opening, a eheek survey, made through a second opening, and using the first to elose the traverse, will invariably show the original survey to be in error; though this error may be surprisingly small.

In plumbing a shaft by means of two wires carrying suspended weights the assumed eonditions are as follows:—

The weights shall be heavy enough to hold the wires vertieal; they should stretch the wires, and even strain them; the wires shall be equidistant their entire length, parallel to each other, and hang in the same plane.

A philosophical eonsideration of the conditions will show that these two wires should converge, slightly, toward the earth's centre. The practical eonsideration shows, however, sinee the mass of rock has been removed, that the wires will, in faet, diverge slightly from each other, owing purely to gravitational causes. An error is thus introduced at the ontset, but it is so small that it may be ignored in practiee. Nevertheless these eonsiderations are of interest to the surveyor, who aims at the highest possible degree of aeeuraey.

The assumed eonditions are interfered with by a diversity of eauses, and probably defeetive weights are the most produetive source of error.

Many, and wonderful, are the varieties of weights pressed into the shaft surveyor's service; of these we may consider three types:

(a) Iron weights of any kind.

(b) Winged weights.

(e) The improvised weight, as exemplified by the flat-iron, or the window-weight.

Iron weights of any kind are objectionable on the ground that there is always a probability that magnetic influenees, terrestrial or otherwise, may distnrb the assumed eonditions; causing the wires to hang out of the vertical, or in different, sometimes even in varying, planes. When magnetic influences are present the plumb-bobs may attraet each other; or they may repel eaeh other, which is, I believe, the commoner oeeurrenee. It may be argued that an error of this nat will be discovered by the tape measnrements; w should be in agreement with similar measurem made at the surface, near the hangers. These m surements are notoriously difficult to make with requisite degree of aeeuraey sinee an error so s as to eseape detection by the tape method migh vital when read as azimuth angle.

Plumb-bobs having wings of sheet zine fitted slots at their sides are favoured by some survey The funetion of the wings is to bring the bobs qui to a position of rest when hanging in liquids. A tion of apparent rest will eertainly be taken up quiekly when such weights swing in oil or other vi liquid, on aeeount of the large area of resistance fered by the wings. I have spoken of the positio APPARENT REST, sinee sueh position is visual rather actual. Let the surveyor examine the wires at a p say half-way between the hanger and the plumb- In the majority of eases he will find that the wi actually vibrating eonsiderably — in preeisely same way that a taut musieal string will eontinu vibrate for some minutes after it has been struck. musieal string being fast at both ends, such vi tions will be regular and rhythmie. In the ease o shaft wire one end is fast while movement at the o end is retarded, not prevented, by the weight attac Vibration in the wire, therefore, will not be rhyth on the eontrary, the nature and amount of the v tions will vary at different points over the whole le of the wire. This faet may be of importanee sin is eustomary to take off azimnths from the wir various mine levels, so that, eoneeivably, the azim at any two given levels may not be in eoineid Such errors may be negligibly small, in any e there is an element of nneertainty as to their pos magnitude; whieh may be great enough to affect value of the whole survey. The possibility of a erepancy in the azimuths between any two levels, great importanee when it beeomes needful to eo drifts by raising, sinking, or headings.

The resistanee which a viseid liquid offers to winged weights may actually be the eause of e certainly the increased area, whieh the wings gi the plummet, will be proportionately affeeted by currents, or drops of falling water. To sum up case against winged weights; it may be said tha real difficulties arise from the faet that it is al impossible to ascertain how sueh weights will be under any given conditions that may arise in a practiee. The one valuable feature about a wi weight is that it does not revolve freely, and thus ger of the wires breaking by torsion is largely inated.

If aeenrate surveys could be made in spite of th of flat-irons, window-weights, and irregular sh plumb-bobs of various kinds, the fact would not n sarily eonstitute a valid argument for their conti employment. Weights of this elass are the wor all because they do not swing in an ellipse,— 'wobble,''—their motions are irregular and er The vital importanee of this point will be bette preciated if it be admitted that a weight moving ly, through a regnlar orbit, is the most desirable dition for correet work.

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It will be noticed that plummets, otherwise suitable, but inaccurately turned, or badly balanced, are open to all the objections that may be advanced against the use of irregular-shaped weights.

In shaft surveying time is invariably an important factor, and it is imperative that the work be done with all possible despatch, subject only to the attainment of the requisite degree of accuracy. From the nature of the case the frequent re-checking, possible in ordinary surveys, is not permissible where the main entry to the mine is closed during the progress of the surveyor's work.

In the case of an opening several hundred feet in depth, hours must elapse from the hanging of the wires to the time when it may be possible to begin to take off the azimuth, assuming that the surveyor wishes to "jiggle in," or requires a quiescent wire for triangulating. One single swing of so long a pendulum may occupy minutes. There is a method in use by which the weights are fastened down; even when the correct position of rest can be chosen for the bobs the method is objectionable since it will not do away with the twanging, or vibration, of the wires; moreover, much time is needed even with this method.

For speed and accuracy both, there is nothing so good as a freely moving weight. For the employment of this method the prime requisite is a properly constructed plumb-bob, evenly balanced, and free from magnetic influences. In practice a scale is placed behind the wire, the extremity of the swing in each direction being carefully noted on the scale—it is then only a question of bisecting the longer axis of the ellipse of swing in order to find the correct position of rest for the plumb-bob. It is advisable, space and other limitations permitting, to use two transits and two scales, and by this means bisect both the longer and the shorter axes of the ellipse. Some care is necessary to place the scales at right angles to the line of sight of each transit.

Where a glass diaphragm is used, in the transit, the horizontal cross-hair may have a scale added to it, divided into an equal number of graduations on each side of the vertical cross-hair. In this way the use of scales behind the wires may be avoided, and since the scale forms part of the eye-piece it follows that it must be at right angles to the line of sight; therefore, the possibility of an error in the bisection of the ellipse of swing is reduced to a minimum.

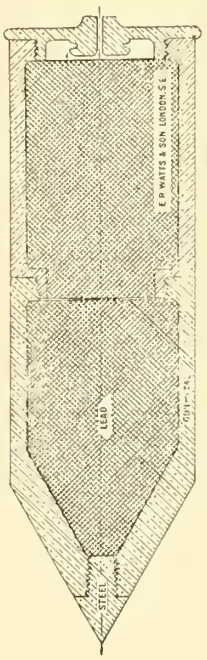
Such micrometer scales are commonly engraved for use with a microscope, and transit makers might, with advantage, be induced to borrow this refinement.

Where spider-webs, or wires, are in use in the diaphragm the scale may be engraved on an extra glass fashioned so that it may be dropped into the eyepiece. Objection may be raised to this method on the ground that such extra lens would reduce the light passed by the eyepiece. Without doubt the point is well taken since illumination underground is never too good; however, without having actually tried the micrometer eyepiece, the idea seems to me well worth consideration.

In the moving wire method it is assumed that the weight shall move through a regular ellipse without deviating or "wobbling." There must be freedom from magnetic attraction; thus all iron weights are barred. When the bobs are suspended in the shaft the wires must be continuations of the true vertical axes of the plummets. In other words, the instruments should be turned in a dead-centre lathe in order to ensure that their points, and points of suspension, are in the same vertical; the weight throughout the plumb-bobs must be regular, and evenly distributed, otherwise these assumed conditions cannot be fulfilled.

Some months ago I found it impossible to procure plumb-bobs of sufficient weight fulfilling the above requirements, and I had such instruments specially constructed. There is nothing particularly novel about these plummets except that they are built in sections (see sectional sketch); they have proved a great convenience in my own practice, and therefore a brief description may be of use to others. They may now be obtained through scientific instrument makers.

The outer tube is of brass, and the filling is lead. A point of hardened steel is threaded into the brass tube so that in case of damage it may be replaced. The cap of the bob is bored to admit the suspending wire, the loose end of which is secured by being wound round a drum fitted inside the cap. In order to meet varying requirements the plumb-bobs are made in sections of ten pounds each. For plumbing a 50-foot winze the 10-pound bob will suffice; for a 200-foot



shaft 20 pounds are required. All the threads are made interchangeable so that plummets of any required weight may be built up by the addition of more sections. In order to protect the points and to provide a convenient means of transportation, leather cases were devised; these are of telescopic form so that they will accommodate one section alone, or a complete 20-pound bob.

The lead filling is run into the brass tubes in a molten condition, and care is necessary that the filling may set in a solid body free from bubbles, or interstices, otherwise the instrument will not be in perfect balance. After the filling is cold it is trimmed off level, and the final adjustment is again made in the dead-centre lathe.

There is a wide variation in the size and kind of wires used in shaft surveying. A steel wire is very much stronger than a copper wire of equal diameter. It is desirable to employ as small a wire as possible since fine wires are easier to line-in on, and are, therefore, more accurate; there is, further, less area for currents of air or drops of falling water to play upon. Piano wire is excellent for many purposes, but if "kinked" it breaks very readily, and, above all, it is difficult to procure.

Soft-drawn copper wire of 18 to 20 gauge may usually be obtained at any time, and even from the smaller hardware stores. I prefer this wire since it may, with care, be repeatedly employed, and a heavy weight will take out any ordinary bends.

The thinnest wire capable of sustaining the required weight, at the particular depth, should be chosen. Allowance must be made for considerable stretch when hanging the weights. If these are to be immersed in heavy oil the stretch will be very materially reduced owing to the buoyancy of the viscid liquid.

Particular attention must be given to the hangers to see that these eyelets are not rough, otherwise the wire will cut. An excellent plan is to ream out the eyelet, so as to allow of its being wound with a narrow strip of lead foil, which prevents the hard metal cutting through the copper wire.

Wires should be lowered on a frame, and the plumb-bobs attached at the bottom of the shaft, allowing the full weight to be gradually taken by the wires. The wires will be preserved, and kinking largely eliminated, if they are wound upon two wooden drums of five o six inches in diameter.

It is good practice to use heavier weights than th apparent conditions seem to demand. The effect o air currents in a shaft is most difficult, if not impos sible, to determine. For instance, the corkscrew mo tion assumed by air rushing up a shaft, will certainl tend to cause the wires to deviate from the true plan An excessive weight would, of course, tend to ove come this action.

In conclusion it remains to be stated that, wherev possible, the two-wire method is to be avoided. Shoul a current of air, or falling water, act only upon on wire, it is readily conceivable that while the distance apart, as recorded by tape measurement, may be in c incidence, the bearing of the wires at the foot of th shaft may be different from their bearing at the su face. In a large number of mine surveys, the two-wi method is the only one open to the surveyor, and whe such is the case the vital necessity for great caution obvious.

THE VOLATILE CONSTITUENTS OF COAL

(Written for the Canadian Mining Journal by F. H. Mason, San Diego, California.)

In his perusal of the journals of the various chemical societies, the metallurgical engineer reads many of the papers—such as "The Optically Active Salts of 4-Oximinocyclohexanecarboxylic Acid, whatever they may be—by title only; but just occasionally an eminently practical paper is found, which he feels many times repays his annual subscription. "The Volatile Constituents of Coal," by M. J. Burgess and R. G. Wheeler, in the October issue of the "Journal of The Chemical Society," is such a paper.

It has long been known by both analytical chemists and coal-mining engineers that the so-called "proximate coal analysis" will give concordant results only when conducted by fixed rules, generally adopted by the profession, and that so light a thing as the substitution of a porcelain for a platinum crucible is sufficient to affect the uniformity of the results. In a word, then, careful research, considerably augmented our know ledge on the subject, and now Burgess and Wheel publish the first installment of a research that they a still conducting. The object of this last investigatio so far as it has gone, has been to find out the amou of gas to be derived from given coals by destructi distillation at various temperatures, and also to di cover the variation in the composition of the gas o tained at different temperatures.

The apparatus they employed was of the simple natnre. It consisted of a platinum tube (fig. 1), clos at one end, the open end was silver soldered into a gu metal flange, having a sunken ring midway between i centre and circumference. The leading-tube, also gun-metal, had a similar flange, except that the ri was raised instead of being sunk. After the coal, co tained in a platinum boat, was placed in the retort, t

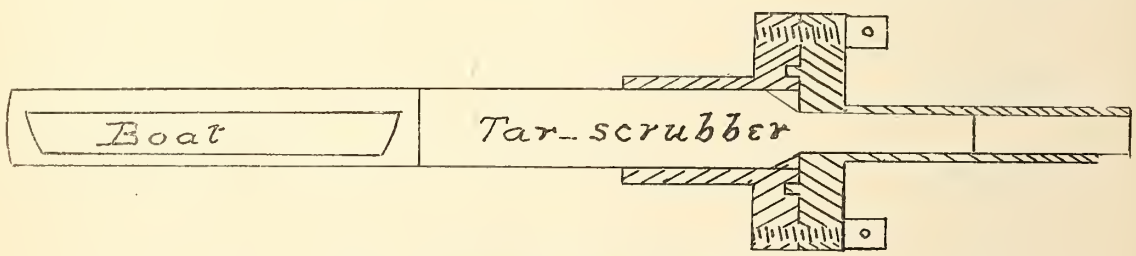


Fig 1. Platinum Retort and Connections.

a "proximate coal analysis" is of value in comparing two coals only when carried out in an exactly uniform manner, and it in no way gives a measure of the amount of gas a coal is capable of producing. The gas engineer, too, is well aware that it is in the earlier stages of the distillation of coal that a gas richest in "illuminauts" comes away. But until recently, beyond such very general facts, our knowledge of the products derived from the destructive distillation of coal under varying conditions of temperature has been lamentably wanting. In 1907-8, H. C. Porter and F. K. Ovitz, of the United States Geological Survey, by a leading-tube was bolted to it, a washer of graphite a asbestos making a vacuum-tight joint. Before maki the connection, a tar-scrubber, consisting of ignited a bestos, contained in a platinum tube open at both en was placed in the mouth of the retort. A stout rubb pressure-tube attached to the leading-tube connect the retort with a mercury manometer, a two-litre g holder, or a vacuum pump; glass cocks, suitably plac intervening, in order that the retort might be connect with any of the foregoing at will. The whole apparat was securely fastened to a wooden support mounted wheels, so that it could be rapidly run into the elect

rnace, that had previously been brought to the temrature of the experiment. The furnace used was a atinum-wound electric resistance furnace, which, with current of a little more than 1 ampere at 200 volts, s capable of producing a temperature of 1,400 dees. The temperatures were taken with a Le Chatelier pyrometer, the thermo couple running the whole ngth of the furnace, and the junction being in the ddle of it. The evolved gases were collected over mixture of equal parts by volume of glycerol and ater, previously saturated with coal gas. This mixre was found to absorb little or no gas and to be ore convenient than mercury. The analyses of the ses were made in a modification of a Bone and Wheeler apparatus. In making the analyses the following reents were used to absorb the various gases, which ere removed in the order named:

Gas.	Reagent.
mmonia.	10 per cent. sulphuric acid sol.
enzine.	Concentrated sulphuric acid.
ydrogen sulphide.	Acidified copper sulphate sol.
rbon dioxide.	Potassium hydroxide sol.
xygen.	Strongly alkaline pyrogallic acid. sol.
cetylene.	Ammoniacal silver chloride sol.
thylene.	Bromine and potassium bromide sol.
rbon monoxide.	Ammoniacal cuprous chloride sol.

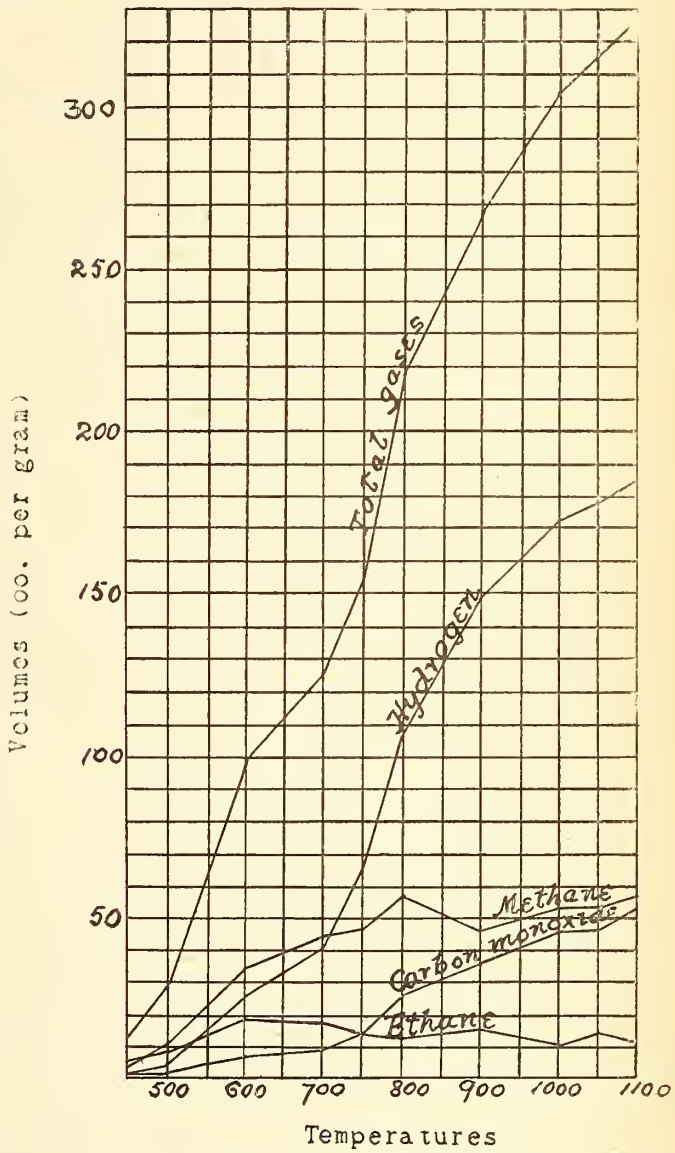
he gases remaining after these absorptions were assed into a set of exhausted glass bulbs, heated over water bath at 90 degrees, containing oxidized palladium precipitate. After ten minutes the bulbs were lowed to cool, and the residual gases were withdrawn means of a mercury pump and measured. The difrence in volume was taken to be hydrogen, which as expelled from the palladium and exploded in the ual way.

In conducting the experiments two grams of carelly sampled coal, pulverized to pass a screen with 0 meshes to the linear inch, were taken for each exriment. In all cases the temperature of the furnace as taken, but special previous experiments, in which pyrometer was placed in both the furnace and the al, demonstrated that the coal attained the temperare of the furnace within two minutes after being aced inside it. The coal, contained in a platinum at, was placed in the back and the tar-scrubber in e mouth of the retort, and the leading-tube attached. he retort was then connected with the vacuum pump d evacuated, then connected with the manometer d run into the furnace, which had previously been rought to the desired temperature. As soon as the onameter indicated that the pressure within the reort had attained that of the atmosphere, the retort as connected with the gas-holder, and the quantity gas that collected noted at stated intervals of time.

The experimenters examined four samples of coal—o bituminous, one semi-bituminous, and one anthrate—with this apparatus, making distillations at a mber of temperatures between 450 and 1,100 degrees. For each coal they give four tables, namely: Rate of evolution of gas at different temperatures; Volatile constituents evolved at different temperares; 3, Percentage composition of gases evolved at fferent temperatures; 4, Total volume of gas evolved r gram of ash-free, dry coal at different temperares, and volume of principal constituents. It will sufficient for the purpose of this article, if we take e of the bituminous and the anthracite coal, give an abridgment of the first table, and a modification of the curve illustrating the last table.

The bituminous coal was taken from the Altofts Silkstone seam, and had the following ultimate analysis:—

Carbon	80.50	Per cent. of ash-free, dry coal.
Hydrogen . . .	5.45	
Oxygen	9.70	
Nitrogen . . .	1.42	
Sulphur	2.93	



Curve showing total volume of Gases evolved per gram of Ash-free dry Coal at different temperatures, and volume of principal constituents.

TABLE 1.

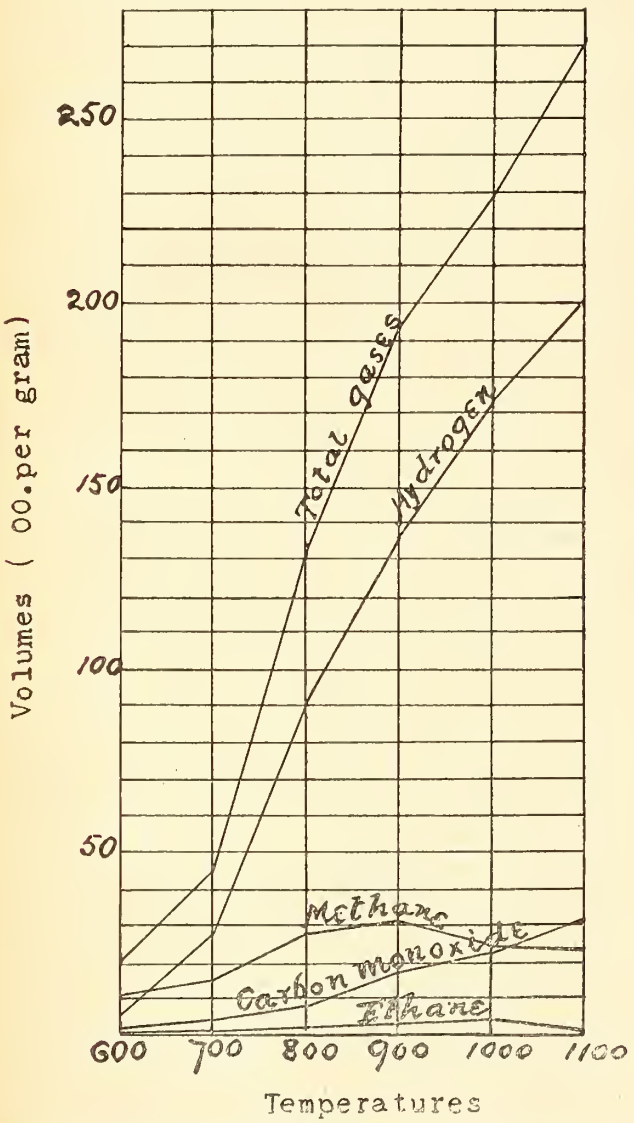
Rate of evolution of gas at different temperatures. Total gas from two grams of coal, measured at atmospheric temperature and pressure:

	Distillation temperature.							
..	600	700	750	800	900	1000	1050	1100
	cc.	cc.	cc.	cc.	cc.	cc.	cc.	cc.
1st minute	40	50	90	145	225	300	375	...
First 5 minutes	95	125	185	300	445	505	515	565
Next 5 minutes	22	30	30	60	50	60	25	30
Next 5 minutes	13	15	25	25	15	15	15	5
Next 15 minutes	25	35	35	27	20	25	15	25
Next 15 minutes	15	10	15	13	15	15	15	15
Next 30 minutes	10	10	5	10	10	25	15	5

With distillations at 450 and 500 degrees, 25 cc. and 60 cc., respectively, were evolved, the total duration of heating being two hours.

The sample of anthracite coal was taken from Pontyberen, South Wales, and had the following ultimate analysis:

Carbon	92.66
Hydrogen	3.14
Oxygen	2.20
Nitrogen	0.99
Sulphur	1.01



Curve Showing total volume of Gases evolved per gram of ash-free Dry Coal at different temperatures and volume of principal constituents.

Table 2.

Rate of Evolution of gas at different temperatures. Total gas from two grams of coal, measured at atmospheric temperature and pressure:

	Distillation temperature.				
	700	800	900	1000	1100
	cc.	cc.	cc.	cc.	cc.
1st minute	..	50	120	250	375
First 5 minutes	15	140	300	405	485
Next 5 minutes	40	50	43	40	15
Next 5 minutes	..	20	10	15	10
Next 15 minutes	20	30	20	5	25
Next 30 minutes	5	10	5	5	15

With a distillation temperature of 600 degrees, 50 c were evolved in two hours.

The great increase in the rate of evolution of hydr gen in all the samples examined between 750 and 9 degrees is of particular interest. In discussing a cau for this, the experimenters are inclined to attribute to a rapid break-down in the higher hydrocarbons the paraffin series chiefly into carbon and hydroge while at lower temperatures they would be more like to decompose into methane, ethane, and hydroge That it cannot be due to decomposition of metha itself, they claim, because, first, the quantity of th gas undergoes very little variation, and, second, has been demonstrated that it is comparatively sta when heated in a porcelain tube at temperatures bel 1,000 degrees. With regard to the latter contenti that the heated platinum of the retort may have act as a catalytic agent to bring about the decompositi of the methane does not appear to have entered in the discussion. To the writer this appears to be point worth investigating. This question, however, the rapid increase of the evolution of hydrogen tween the temperatures named, the experimenters a still investigating. With regard to the large amou of ethane found in the distillate made above 700 grees, this gas, as the authors point out, must ha been generated when the retort was first pushed in the furnace, and swept out with the rush of ot gases, for it has been demonstrated that ethane rapi undergoes decomposition at temperatures below 0 and is incapable of existence above 1,000 degrees.

The principal conclusions the authors draw fr their investigation are: "First, with all coals, whet bituminous, semi-bituminous, or anthracite, there i well-defined decomposition point, at temperatures ing between 700 and 800 degrees, which correspo with a marked increase in the quantity of hydro evolved. With bituminous coals, the increase in quantity of hydrogen evolved falls off at temperatu above 900 degrees, but with anthracite coals it maintained up to 1,100 degrees. Second, evolution hydrocarbons of the paraffin series ceases practica entirely at temperatures above 700 degrees. Th ethane, propane, and butane, and, probably, hig members of the paraffin series, form a large percent of the gases evolved at temperatures below 450 grees."

One dislikes to appear to pick holes in so emine useful a piece of research work, still it is impos to overlook the fact that a large proportion of gases—in some cases more than half, as can be s from the tables—came away during the first mi of the experiment, before the coal had attained temperature of the furnace, where the temperatur the experiment was taken. This difficulty might h been overcome by passing the products of distilla through a long porcelain tube, contained in an elec furnace, previously heated to the temperature of experiment. It would appear, too, that a fracti distillation, in which the fractions coming away tween given temperatures were removed and exam separately, might give more practical information t the massing together of the whole distillate, made ing the rise to and maintenance at a given temp ture, before analysis.

The ore reserves of the Great Boulder Proprie Gold Mines, East Coolgardie, Western Australia, estimated at 750,177 tons of ore, carrying 570,821

OUR EUROPEAN LETTER

Good News from South Africa fails to stimulate mining investment in England — Steady engineering improvements on the Rand — The native labour question and an insurance note — Story of the finding of Bullfinch, West Australia — Its already big output— Australia celebrates sixtieth anniversary of discovery of the precious metal — Still greater gold future for the Island Continent — Increasing cost of coal getting in Europe — Diminished output of colliers— Rise of oil fuel with promises of a new oil boom.

(Exclusive correspondence of CANADIAN MINING JOURNAL.)

London, Feb. 18th, 1911.

Mining share investment and speculation in the United Kingdom shows no particular movements of interest and quietness rules in market conditions. Even the fact that the report just issued by the British South African Company (generally known as the Chartered Company) shows a profit for the first time in the company's remarkable history, has failed to move things. This report is a remarkable document for the above-mentioned reason, and it is to be noted that the profits of $115,000 there mentioned have taken twenty-one years to mature. Of course, these profits are far too small to allow of any dividend upon the ordinary shares of the Chartered Company, as they exceed six million in number, of the face value of five dollars each. It is these shares which reached, in the glorious days of Rhodes, Beit and Company and the others, to $40 a share. In recent years their ways have laid in humbler places, their present figure even being no better than $8.50.

Rand descriptions continue quiet, although the news from the Transvaal is generally wholly good. All kinds of interesting developments are taking place. A few of these may be noted here. Petrol locomotives for underground work are being tried at several mines and it is conceived that these may, in view of the shortage of native labour, supply a convenient motive power for small loads. A special petrol engine has been designed for the underground workings at the Crown mines. These trials will be watched closely by mining engineers throughout the world, as in many mining countries petrol can be obtained at a lower rate than on the Rand, and the desire to save labour costs is always with us.

Another point of interest is in connection with shaft sinking through the Rand water-bearing strata. It will be no news to readers of the CANADIAN MINING JOURNAL that the overlying dolomites of the Rand carry very heavy bodies of water. While passing through the water-bearing strata on the Western Rand estates arrangements were made to tub the shaft with a patent overhung tubbing, by which means the shaft as it proceeds can be hermetically lined and kept perfectly dry. This avoids the heavy cost for pumping and permits heavily charged water zones to be passed through. A temporary difficulty was met by an inflow of water, but this has been overcome and shaft sinking is being proceeded with. When the water-bearing formation has been passed through, more solid ground will permit of ordinary sinking being resumed without the necessity of tubbing. On the Far-Eastern section of the Rand, in the Geduld and Springs, a similar inflow of water was encountered.

Two interesting sets of pumps have just been completed for the New Kleinfontein. These are of the three-throw type, each of which will deliver 15,000 gallons of water per hour against a head of 2,000 feet. They are belt-driven from an electric motor and have a set of double reduction, double helical tooth gearing, while the crankshaft, which runs at 41 revolutions a minute, is supported on four bearings. Both suction and delivery branches are so arranged that the pipes may be led off on either side of the machine as may be most convenient.

With regard to the Rand labour question, although there is an increase in the number of labourers offering, the requirements of the mines increase in a still greater ratio. Including the Premier Diamond mine and the collieries, the complement at the end of last year was 276,844 native labourers. This was an advance of over 50,000 labourers on the year, and yet the ratio of employees to complement had fallen to 71 per cent. Developing mines are employing twice as many natives as a year ago and absorbing half the increase in labour. Mortality is very heavy amongst the natives in the mines, especially from pneumonia.

Whilst on the question of Rand mine employees it might be noted here that the assurance companies which issue policies protecting the mining companies from compensation loss through accidents to workmen are finding their business very extensive on account of the tendency of the Transvaal courts always to give the claimant the benefit of any doubt. At present the insurance is being underwritten for a premium of 2 per cent.; it will probably be increased to 3 per cent., and the risk in connection with building has so increased that the building premium will be raised from three-eighths of one per cent. to one and a half per cent. A very large proportion of the compensation risks of the Rand mines is covered by a mutual insurance company in which the employing companies are interested, and which does not seek to make profits. It seems that if it did so seek it would be grievously disappointed.

The attempts that have been threatened from time to time to introduce legislation restricting or abolishing Sunday labour on the Transvaal mines have been thrust in the background for the time being by the fact that the new draft mining regulations contain no vital alteration with regard to Sunday work. It seems clear that the finances of the Union Government of South Africa are in so indifferent a condition that the authorities could not see their way to bring about what would be a serious reduction in the revenue derived from the mining industry.

Although West Australia shares do not show much life on this side, despite the fact that an important market here is devoted to them, and although we have seen nothing of the threatened Bullfinch boom here, all the news from Australia is full of the fame of Westralia's newest goldfield. D. L. Doolette, the Bullfinch finder, a member of the famous Westralia mining family, is on a visit to this country, and has been telling the story of the discovery. Doolette and a colleague, Shallcross, following a prospector whom they had sent on ahead, secured a substantial claim in the Southern Cross district of West Australia. Fine pannings resulted, but the indications were such that the two men did not think the show big enough for them both, and they decided that one should sell out to the other for $5,000. Doolette was the lucky buyer, and almost immediately afterwards indications improved and the value of the mine could hardly be estimated. Doolett in his interviews modestly passes over the fact that he

promptly gave his colleague a sixteenth interest in the mine instead of the $5,000 which had been arranged. Some of the ore run into carried gold up to 25 ounces to the ton, and when it got into Kalgoorlie for treatment the boom set in and men from all over Australia hurried to Southern Cross. The twenty miles of road from Southern Cross to Bullfinch was crowded. Pegging took place for sixty miles of country from Golden Valley, thirty miles north of Southern Cross, to Parker's Range as far south. In a very few weeks there was not an acre of timber, salt brush, or granite country that had not been taken up. Of course, the outlying properties had no intrinsic value and were probably only secured in order to be sold to the later option seekers who afterwards thronged the district. Between June 22nd and December 17th, the Bullfinch property produced gold to the value of over $215,000.

Australia's gold industry celebrated its diamond jubilee in the second week of February this year. In that period over $2,600,000,000 worth of gold has been won, and these recent developments in Western Australia point to even more remarkable finds in the future. Despite the fact that wool growing has brought more wealth to Australia than all the minerals put together, the gold industry has always exercised the greatest fascination over the public mind. The name of the actual first finder of gold in Australia will never be known. The Dauphin Chart, dated 1530-1536, which is preserved in the British Museum, contains a land to the south of Java, which is thought to represent Australia, and its northwest coast is called "Costa d'Ouro," or "the Gold Coast." Coming down to known fact, however, it is recorded that a New South Wales surveyor named McBrien, found gold near Bathurst in 1823, but no steps were taken to work it. In 1839 Count Strzeleeki, the Polish explorer, reported a discovery of gold to the Governor, but at his request kept the matter secret. It was feared in official circles that economic conditions in the young colony might be disturbed by a gold rush.

That this fear was well founded was shown by subsequent events. The facts prove that Australia is one of the greatest gold-bearing countries of the world. An additional fact, often lost sight of, is that she is also a country a large portion of which has never been geologically explored. The cursory examinations of the Northern Territory made so far by geologists and prospectors indicate that the mineral future of that enormous province of half a million square miles is on the knees of the gods. Practically every precious and semi-precious metal is known to exist in the Territory, and it would be no surprise to those who know the country if it should eventually become one of the world's richest mineral areas. A proposal has received the consideration of the Commonwealth Government—which recently took over the administration of the Northern Territory—for a commission of scientific experts from the universities of Australia to make a tour of exploration through the Territory, which would greatly increase the general knowledge as to its mining possibilities.

Coming back to British and European matters, some interesting facts have been arrived at with regard to the cost of winning coal in the chief European producing centres. The average cost per ton rules highest in Belgium and France, where it is 16.14 francs and 15.95 francs respectively. England comes as one of the cheapest countries, at about two-thirds of these costs. During the past twenty years the price of mining coal has substantially increased all over Europe. In Wales, Belgium and Westphalia, between 1886 and 1907 it more than doubled. The increase has been least France. One of the reasons given for this augmentation in cost is the diminishing daily output of the coal getter. The range of time covered is not so great, but it appears that whereas in 1899 the English coal min who, by-the-by, headed then and still heads the list f output per man, turned out 311 tons of coal. T figure had shrunk to 279 tons in 1908. Belgium is the bottom of the list with a fall in output per m from 173 tons to 160 tons.

It is urged that in the United Kingdom recent leg lation in restricting operations to an eight-hour d in our mines has also had an adverse effect both the quantity of coal produced and in the cost of p duction. It has led to a speeding up in many collier and to the discharging of many of the older min who were unable to put in the amount of work in t reduced hours, and to an increase in mining risk the miners.

Apart from the result in curtailment of coal c sumption by the rise of oil fuel, there is a midw method in operation whereby oil is mixed with c on railways and other works. A large colliery own in this country has just declared that he has tried admixture of oil in coal on his own line and in his o works and finds a large economy as a result.

The direct competition of oil with coal in Eur is emphasized in a report issued by the Petrows Commission in favour of replacing coal by fuel oil the Russian State railway system. This has cau something like consternation in the Donetz coal d trict, for almost 30 per cent. of their entire output now taken by the State railway authorities. It not thought possible that the change from coal to can be anything but a gradual one, for any other pol would press with great severity on the workers. Pri of coal have fallen as a result of this report, and p ducers assert that they are now below profitable lev It is quite certain that Russian coal producers are fi ing the oil competition difficult to meet, and ma manufacturers, attracted by the exceedingly low ra at which heavy oils are being offered, have adop this system of firing, and have contracted for supp to cover their 1911-12 requirements. Instances of c tracts covering 1913 are mentioned.

It is very clear that a new oil boom might br out at any time upon the least provocation. The n ber of new oil ventures waiting to make their ap for capital to the public is considerable and every centre of the world is drawn upon. The Maikop f will, of course, be responsible for many, while renew attention is being paid by the promoters to Gali Cuba, even, is coming into favour. Even that far-a corner of the British Empire—New Zealand—produ testimony to the value of oil fuel. Upon the State r ways there the fuel used is crude petroleum contain about 40 per cent. of kerosene and benzoine. The p to the railways was eight cents per gallon. In on the tests the fuel kept its end up by maintaining spe steam on a locomotive pulling at least 200 tons fo miles, generally uphill, at a satisfactory rate and w out the least hitch.

On account of unwarranted reduction of work costs in 1909, many Rand mines have been forced bring up their expenditure largely during 1910. A age costs for 1909 were 17s.3d. per ton; whilst t for 1910 were 17s.8d. Individual mines, of cou greatly exceeded these figures. The average pr per ton for 1909 were 11s.7d., and for 1910 only 1

Valedictory Banquet to W. H. Aldridge.

The valedictory banquet given at Trail, British Columbia, on February 20th, to Mr. Walter H. Aldridge, who on January 1st retired from the position of managing director of the Consolidated Mining & Smelting Company of Canada, Limited, was an unique event, for no other occasion has there been such general and widespread expression of appreciation of the value of the services of any one man in promoting the best interests and extending the operations of the mining and metallurgical industries of the southern interior of British Columbia.

In the JOURNAL of February 1st were given brief particulars of Mr. Aldridge's retirement, and the chief reason for it, namely— to quote Mr. Aldridge's own words: "in order to enable me to become associated with William B. Thompson, of New York, who is a director of several of the largest copper-producing companies of the United States, and who, with Gunn, Thompson & Company, has control of a number of the leading copper mines of Arizona and Nevada." At the same time there was given, too, a short account of Mr. Aldridge's career as a mining engineer and metallurgist from the time he left the Brooklyn Polytechnic in 1883.

The banquet at Trail was largely attended by a most representative assembly, comprising men chiefly from various parts of the Kootenay and Boundary districts, with which Mr. Aldridge's activities had been numerous and important during the comparatively long period of twelve or thirteen years throughout which he was intimately associated with the development and expansion of mining and smelting operations of a part of the province, the ore production of which has reached an annual tonnage in excess of 2,000,000 tons, and the total output of which last year was about 1,500,000 short tons. Beside this influential gathering present to do honour to Mr. Aldridge, there were many others who, by letter or telegram, intimated their regret at the departure from the province to other scenes of activity, and joined in the unanimous expression of goodwill and best wishes for the continued success of the guest of the evening. Among the large number from whom felicitous communications were received were the Hon. Richard McBride, Premier of British Columbia (who is also Minister of Mines for the province); Hon. Wm. Templeman, Dominion Minister of Mines; Mr. R. W. Brock, Director of the Geological Survey; the members of the Provincial Legislature (then in session) representing the mining districts of the southern interior; the president of the Consolidated Mining and Smelting Company of Canada, Toronto; many mining engineers and metallurgists; two judges of the Supreme Court of British Columbia; prominent Canadian Pacific Railway officials, and others too numerous to mention. Communications appropriate to the occasion were also received from the Canadian Mining Institute, Montreal; the Western Branch of the C.M.I., British Columbia, and the Toronto Branch of the Institute.

The following address was presented at the banquet:

"Mr. Aldridge: This gathering and these few expressions evidence in a simple way the great good-will which the people of the Kootenays, the men of the Consolidated Mining and Smelting Company of Canada, your associates, and your friends, entertain for you, in retiring from the active direction of the mining and smelting interests which have been in your charge for the past twelve years, the sentiment is general that not only the mining districts but the whole province of British Columbia is losing a capable, conscientious, and faithful advocate of the country's welfare.

"The desire to show recognition of the signal services you have performed in the development of the vast and varied resources of the province, does not constitute the only motive for admiration and respect. Consistency of character, and a uniform regard for the welfare of employees, coupled ever with evidences of fairness, courtesy, and high-minded principles, have commanded a confidence and esteem which promoted the pleasantest relations and insures for you always the kindliest recollections. In the success of all engagements and the achievement of every ambition you have the earnest and cordial following of a host of well-wishers who appreciate you as an executive, admire you as a citizen, and honour you as a man."

Before reading the foregoing address, the chairman said, in giving the toast of "Our Guest": "Gentlemen: In proposing the toast to the guest of the evening, I do so with mixed feelings, pleasure and regret; pleasure, because there is no man deserves the honour more than the guest of this evening; regret, that we in British Columbia are losing a man of Mr. Aldridge's standing in the mining and smelting world. This province can ill afford to lose such a gentleman as the guest of this evening. We admire him not only as a successful mining and smelting man, but as well as a good, broad-minded citizen and a thorough gentleman, a man whose word is as good as his bond. But we are not selfish in our regret, so we are met here this evening to bid him God-speed in his new field of labour, and wish him every success in all his undertakings. When Mr. Aldridge came to the Kootenay, some thirteen years ago, mining and smelting were at a low ebb, owing to the high rates for freight and treatment of ore. The Le Roi mine was forced to build its smelter at Northport, Wash., and we, in Trail at any rate, felt that our sun was darkened. But Mr. Aldridge came along then and took hold of the smelter at Trail, and through his energy and business ability, freight and treatment charges were reduced by about one-half. A few years later he formed what is known as the Consolidated Mining and Smelting Company of Canada, Limited. It was through his ability and the high respect in which he was held in the financial world, that he was enabled to form this company. To-day the company not only has mines at Rossland, but in nearly every camp in the Kootenay and Boundary country. We have here in Trail one of the largest smelters in Canada, and the only refinery of its kind in the Dominion. This, gentlemen, is part of the work of the guest of this evening, but this is not all. During all these years he has had no serious trouble with any of his employees. Why? Because he was always ready to meet them in a fair and generous spirit, and treat them as men. But while he is going away from us, we are glad he has not altogether severed his connection with the Consolidated Mining and Smelting Company, and I am quite satisfied that those upon whom his mantle has fallen will in the future carry out his policy."

After the toast had been enthusiastically honoured, Mr. Selwyn G. Blaylock, assistant manager of the Consolidated Company, on behalf of the company's many employees, presented Mr. Aldridge with a magnificent service of silver plate. They had desired, Mr. Blaylock said, to give Mr. Aldridge something that would express their esteem for him and, also, that could not be duplicated elsewhere. This had been accomplished through this service, which was manufactured from sil-

ver mined in the Kootenay and refined at Trail.

Mr. Aldridge, in his response, first suitably acknowledged the honour done him and the great kindness his many friends had shown him. Following this he said there was one thing he felt he could fairly take credit for, namely, in having got together in the company's employ the finest and ablest lot of young men he knew of working anywhere. Referring next to the men employed at the company's mines and smelting works, he observed that the Lemieux Act was designed to give employer and employed a rest, but he could say with pride that not a property of the Consolidated Company had stopped work for even a day by reason of labour troubles. He had always found the labour leaders in this territory able and reasonable men. Regarding the outlook for mining, he remarked that in many parts of the country promising indications of the occurrence of copper ore had been discovered, and he looked for a great future for the copper mining industry of the province. He spoke of the days when the War Eagle mine, at Rossland, had been supposed to be worked out, but since it had passed into the possession of the Consolidated Company it had become the greatest producer the company had ever owned. At one time, though, there was only three months' ore in sight, but mines sometimes were able to come back as this one had done. After speaking of the new duties he had undertaken, and the great productiveness of some of the mines with which he will hereafter be connected, Mr. Aldridge said that before leaving British Columbia he would like to make a few suggestions. Certain of the western States were founded through the mining industry. Then had come the agriculturist to supply the wants of the miner, and then the manufacturer. These States are now in a position where, if the mining industry ceases to exist, they will still be prosperous. For similar reasons mining in British Columbia should be given every encouragement, for it opened up the province. The St. Eugene mine, at Moyie, for years had not paid a cent to its shareholders, and the Centre Star War Eagle mine at Rossland, which is the Consolidated Company's best property, is paying to the Government a comparatively large proportion of its profits, and yet is not paying dividends to its shareholders. He advocated a reduction of the mineral tax from two per cent. to one-half per cent. A second suggestion was that measures should be taken to prevent large numbers of mineral claims being held by men who do not work them, but who are only required to pay $13 a year taxes on each. Every man holding a claim should be compelled to develop it. A third suggestion was that the law of eminent domain should be adopted in principle, so as to debar, for instance, some of the occurrences in certain states, where a man owning a few acres of land and employing, perhaps, one Chinaman, was able to cause the closing down of a mine employing thousands of men.

The Nelson "Daily News" has published a lengthy report of the evening's proceedings, and from that has been taken the information given above. Space limitations prevent further quotation except to make brief reference to an address from the company's Italian employees, read by one of their number, and a speech by one of the Rossland miners. The former expressed —as the reader said, quite inadequately, being in English—the sentiments of those who presented it, which were expressive of esteem for Mr. Aldridge and great regret at his departure. The latter was as follows:

Mr. Rupert Bulmer said no higher tribute could be paid to Mr. Aldridge than the loyalty of the men who had worked for him. He would be assured of success in his new sphere, for he would command equal loyalt from his men there. He had assembled a splendid sta of young men, and the administration of the affairs the Consolidated Company's properties had fallen upo the shoulders of a young man (Mr. R. H. Stewart), whom Rossland had complete faith. As long as th employers met their men in the open spirit which M Aldridge had uniformly employed with his men, the would find union men ready to meet them half way. O behalf of the Miners' Union of Rossland he wished M Aldridge God-speed.

Discussion

Of Paper by John Stansfield on "Microscopic Exan ination of Some Typical Speciments of Porcupine Rock and Vein Matter." C. M. J., Feb. 15, 1911, p. 109.

The descriptions of the rocks and ores from the V pond mine, show these specimens to have characte in common with those from other parts of Tisda Township. It is noteworthy that while the wall roc of different deposits are of many different rock type they have all been so altered by secondary process to carbonates, that it is almost certain that they hav been acted upon by solutions which emanated from th fissures later filled with gold-quartz. As Mr. Stan field points out, the quartz veins are in most cas younger than the carbonates. The carbonates ar however, not all in the form of veins; but form replac ment deposits in altered rocks, and the quartz vei are clearly younger than the carbonates which enclo them. The relation of the quartz to the carbonates well illustrated on a large scale by the Foster lode, which photographs have been shown in this journa A similar relation for minute quartz veins is found microscopic examination.

It is well to point out, however, that as Mr. Stan field notes in some of his specimens, there are so carbonates in the quartz which are younger than th carbonates in the wall rock and younger than most the quartz. The younger carbonate, moreover, is n the same as the older. In some specimens from th Dome mine it is apparently calcite, while the carbo ate in the wall rock is ferrodolomite.

The character of the quartz at the Vipond is ev dently like that of other deposits, largely made up coarse grains full of inclusions and showing strain effects and in less degree of fine grains which have be produced partially by crushing, aided by solution an recrystallization. These finer grains are then young than the coarse, as are also the small particles whi were not so evidently formed from neighbouring quar grains, and which may have been deposited from sol tions coming from some distance.

The character of the veins and the abundance carbonates strongly suggests that the solutions whi altered the country rocks and deposited the gol quartz were hot and contained constituents common molten rock magmas. It is reasonable to suppos therefore, that the solutions rose from an igneous ma ma which was intruded into Keewatin and Huroni rocks. The rock mass has not yet been located. It m underlie the deposits at considerable depth and n where reach the surface, or it may outcrop at so distance from the deposits.

Reginald E. Hore,

Houghton, Feb. 25, 19

CANADIAN TELLURIUM-CONTAINING ORES.

D. D. Cairnes, Ph.D., Ottawa, Ont.*

(Annual Meeting Canadian Mining Institute, Quebec, 1911.)

INTRODUCTION.

During the past few summers the writer, while employed in northern British Columbia and southern Yukon, has had occasion to examine a number of quartz veins that contain rich ores in which various tellurides occur; and since tellurium-containing minerals seem to be particularly attractive to the prospector and are of somewhat rare occurrence, it is thought that, possibly, a brief description of these veins together with a compilation of some of the main, available facts concerning other known Canadian ore-deposits in which telluride minerals occur, may be of interest to members of the Canadian Mining Institute. Tellurium occurs as native and in composition with sulphur, selenium, bismuth, gold, lead, mercury, nickel, and silver, yet the tellurides are the only mineral-compounds of gold that are known.

Minerals.

The following tellurium minerals have been found and identified in Canada:—

Sylvanie, (Au Ag) Te.
Hessite, Ag_2 Te.
Petzite, $(Ag, Au)_2$ Te.
Calaverite, $Au Te_2$.
Nagyagite, a sulpho-telluride of lead and gold, containing about 7 p.c. of antimony.
Altaite, Pb Te.
Tetradymite, approximately Bi_2 (Te, S)$_3$.
Tellurite, (Tellurie ochre), $Te 0_2$.

In addition, a mineral thought by Dr. Hoffman[1] to be native tellurium, was found at Long Lake, Greenwood mining division, British Columbia.

Oxidation.

All these tellurides oxidize readily and give rise mainly to tellurie oxide, tellurites or tellurates with bismuth, iron, and probably mercury, and native gold, silver, also rarely, bismuth; the tellurie oxide, also known as tellurite and tellurie ochre, in its pure state is a soft (1.2) white to yellowish mineral, but generally occurs mixed with other oxides, frequently those of iron, when a yellowish to reddish powder or coating results.

Mineral Associations.

With the exception of tetradymite, these minerals occur in Canada only in veins which may have been produced either by fissure filling or by metasomatic replacement or may owe their existence in a large degree to both agencies. The veins are found in a great variety of formations, including various schistose rocks, granite, granodiorite, diorite, andesite, volcanic breccias, quartzite, slate, shale, and arkose; but with but one known possible exception they are all either in, or in the vicinity of, igneous rocks. In all cases, so far discovered, the veins consist predominantly of quartz, calcite, and, rarely, ankerite and sericite occur as gangue minerals. Several varieties of tellurides are in many cases intimately associated in the same deposit and wherever one or more of these occur, native gold, silver and in places bismuth and copper are characteristic accompanying minerals, in addition to which, pyrite chalcopyrite, and galena are present in many of the veins, and pyrrhotite, chalcocite, siderite, and zinc blende are found in some of them.

Sylvanite, hessite, petzite, calaverite, nagyagite, and altaite are, in all the deposits so far discovered, minerals of primary deposition, so that their presence indicates a zone of unoxidized or at least incompletely oxidized material. The native gold, so commonly found associated with the tellurides, has in many cases been derived from these minerals by oxidation, when it is generally spongy and frequently has a brownish colour; where this origin for the gold can be proved, the zone in which it and the telluride occur together lies above that of the primary sulphides and consequently (as the zone below ground-water level is reached, i.e., below the oxidized zone and the zone of secondary enrichment), the gold may be expected to cease to be free and to occur instead, combined with tellurium.

Tetradymite is known to have been discovered at but two points in Canada, viz.: at the Nickel Plate mine, Osoyoos mining division, and on the Roderick Dhu claim, Greenwood mining division, both in British Columbia. At the Roderick Dhu claim tetradymite occurs in a quartz vein like the other tellurides; but at the Nickel Plate mine it is found in contact-metamorphic rocks, and is probably also a primary constituent of the ore, although Mr. Camsell,[2] who has described the occurrence, considers that possibly this mineral may be the result of secondary surface alteration.

Uses and Value.

Tellurium as yet, has practically no technical use and consequently there is very little if any demand for the metal itself except for experimental purposes. A number of uses to which this metal may be put have recently been proposed, however, and concerning it, Edison[3] says: "I have worked it to a considerable extent and I pronounce it a marvellous substance; I could use it in large quantities if it were cheaply produced."

Potassium tellurate is employed to a limited extent, however, in therapeutics, being used for night sweat of phthisis.

Treatment and Assay.

To enter into a detailed discussion concerning the assaying and treatment of tellurium-containing ores, would be beyond the scope of this short paper; but a few lines on this topic may not be entirely amiss, since a study of the literature dealing with these ores cannot fail to impress one with the fact that tellurium has a much more general distribution and is more commonly associated with gold than has been commonly supposed.

Treatment—Ores in which tellurium occurs associated to any considerable extent with the precious metals have been a source of perplexity to many millmen and metallurgists, particularly in American practice; in many of these cases, possibly in the majority of them, the tellurium has not been detected or if it has been discovered, its presence has been ignored with disastrous consequences. In milling processes, it is found that ores in which compounds of tellurium are

* By permission of the Director, Geological Survey, Department of Mines, Canada.

prominent, are not susceptible to amalgamation or to the ordinary methods of hydraulic concentration. Concerning smelting operations Kustel[4] states that "not all tellurium combinations with gold, lose gold to a notable extent while roasting; but some do, and that up to a considerable amount, 20 per cent., perhaps even more." He also adds: "The loss is no mechanical one, occasioned by draft of the furnace, but principally by volatilization." The result of the various investigations from those of Plattner to the present, seems to be that in all ordinary oxidizing roasting of gold ores containing no tellurium that there is no loss of gold other than a mechanical one; but where ores are involved in which there is any appreciable amount of tellurium, there appears to be always a loss of gold by volatilization, in any operation involving the roasting of the ores or any of their products from which neither the gold nor the tellurium has been separated. Mr. F. C. Smith has made a careful investigation of such ores and in an excellent article[5] concerning them writes:

"Careful experiment with such ores, especially where conducted at a reduction works handling large quantities of them, should not only finally avoid embarrassment from the presence of the tellurium, but even turn it to a profit." This indicates that the only objectionable influence tellurium in ores possesses is likely to be overcome; when this is established the discovery of this metal in an ore-deposit will be cause for unalloyed gratitude on the part of the owner, as tellurium is almost invariably an indication of the occurrence of gold.

Assay—On the subject of the assaying of ores containing tellurium, Mr. Chas. A. Fulton, has published a very carefully prepared article[6] and according to him scorification of any kind is a very bad, and the crucible assay is the best, method. The fire should be moderately hot, a large excess of litharge should be used, and a button of 20 to 28 grains should be obtained, which can be cupelled directly.

Identification.

The presence of tellurium is frequently overlooked partly because, in many cases, it occurs in very small amounts, and also because its determination is a somewhat difficult and laborious process in comparison with that of gold and silver. A small fraction of an ounce of gold to the ton of ore may be easily and accurately determined by dry assay; but a similar amount of tellurium, or other metal to be found by wet methods, calls for a refined analysis. A refractory character in ores, or even the recognition in the gold carried by them of the brown spongy appearance characteristic of gold derived from the alteration of tellurides, is sufficient to arouse suspicion as to the presence of tellurium. A further significant fact concerning ores containing this metal is that even when very rich, they often fail to show colours in panning.

Localities.

Ores containing tellurides have been found in the following Canadian localities, which are named in order commencing at the northwest and proceeding towards the southeast. On the accompanying map of Canada the positions of these localities are indicated by encircled numbers which correspond with those in the list given below.

Yukon Territory.

1. Wheaton River district, Conrad mining division, on—
   - (a) The Gold Reef claim on Gold Hill.
   - (b) The Buffalo Hump group on Mt. Stevens.

British Columbia.

2. The Engineer Mines and vicinity, on the east s of Taku Arm, above Golden Gate, Atlin mining divisi
3. Valdez Island, Nanaimo mining division.
4. The Nickel Plate mine, Osoyoos mining divisi
5. Near Osoyoos Lake, Osoyoos mining division the following points:—
   - (a) Northern end of Osoyoos Lake (repor occurrence).
   - (b) On Kruger Mt., on western side of Osoy Lake.
6. Olds Mt., Arrow Lake mining division, (repor occurrence).
7. Burton camp, Arrow Lake mining division (ported occurrence).
8. Long Lake camp, Greenwood mining division, the following properties:—
   - (a) Jewel mine.
   - (b) Lakeview claims on the north side of L Lake.
   - (c) North Star claim, on the south side of L Lake.
   - (d) Enterprise claim, on the south side of L Lake.
   - (e) Roderick Dhu claim.
9. Olive Mable claim, Gainor Creek, Trout Lake m ing division.
10. Six miles north of Liddle Creek, Kaslo Riv West Kootenay district (reported occurrence).
11. Pay Roll mine, ten miles southwest of Cranbro Fort Steele mining division.

Ontario.

12. Gold Creek, Pine Portage Bay, Lake of Woods district.
13. The Huronian mine, near Jackfish Lake, M Township.
14. The Sudbury mining division, two miles so of the southeast corner of Musgrove Township (rep ed occurrence).

Quebec.[7]

15. The Opasatica district, Pontiac County.

Tellurium is reported to occur also in Newfoundla

Descriptions of Occurrences.[8]

In the following paragraphs, brief synopses are gi of the available information concerning the telluri containing ores of the above mentioned localities, gether with references to published descriptions these deposits. An attempt has been made to make list of occurrences and references as complete as sible, and it is hoped that members of the Canad Mining Institute will kindly supply any omissions t occur.

1a. Gold Reef Claim.[9]

The Gold Reef claim was staked in 1906, and was first location made on Gold Hill in the Wheaton R district, Yukon Territory, situated midway betw the Watson and Wheaton Rivers and twenty mile a westerly direction from Robinson on the White R and Yukon Railway.

The ore on the Gold Reef property occurs in a in greenstone schists in the vicinity of intrusive gr diorites, and is traceable for upwards of 1,000 throughout which distance the vein has an aver thickness of possibly four to five feet. The strik the vein, in a general way, coincides with that of formation in which it occurs, so that the greater of the quartz has been deposited along the folia planes of the rock and lies conformable to the en ing laminæ; in places, however, the deposit cuts ac

the planes of schistosity for considerable distances.

The vein-filling consists predominantly of quartz, which presents a dense, massive appearance, and with the exception of occasional particles of pyrite, contains, in most places, practically no metalliferous minerals. A few widely separated pockets of rich ore, however, have been found, ranging in weight from five or ten pounds each to one of about six hundred; this ore contains free-gold, sylvanite, hessite, petzite, and telluric ochre, the values usually representing hundreds of dollars to the ton; but so far the mineral has not been found in nearly sufficient quantity to pay for the development work undertaken on the vein.

1b. Buffalo Hump Group.[10]

The Buffalo Hump Group consists of three claims located in 1906, and situated on Mt. Stevens in the Big Bend of the Wheaton River, Conrad mining division, Yukon Territory. On the Golden Slipper claim several veins of quartz were discovered. This was at first thought to form part of a vein in situ, but which subsequent development showed to be transported; the material, however, occurs near the summit of the mountain, and appears to have been derived from the hill on which it is found.

The quartz, in addition to a small amount of disseminated galena, contains some native gold and sylvanite.

On the Surprise claim a quartz vein also occurs, which is as much as seven feet in thickness at one point, and contains promising amounts of gold and silver, but in it no tellurides have been detected.

2. Engineer Mines[11] and Vicinity.

The Engineer mines are situated on the east side of Taku Arm, ten miles above Golden Gate, Atlin mining division, British Columbia. This property was first located in 1899, and although rich gold-bearing quartz was found at various times in the early workings, the operations during the season of 1910 have resulted in the discovery of the rich ore in considerably greater amount than in previous years. The recent workings consist mainly of a few open-cuts, several hundred feet of trenching, and about fifty feet of tunnelling. A Joshua Hendry 2-stamp mill has been installed and was in operation during part of the season of 1910.

The ore occurs in veins in Upper Jurassic or Lower Cretaceous shales, slates, and related clastic rocks in the vicinity of granitic and andesitic intrusives. The veins consist mainly of quartz associated with some calcite and varying amounts of intercalated and brecciated wall-rock, and contain as ore-mineral free-gold, a brass-yellow telluride, apparently calaverite, native bismuth, and pyrite.

Two deposits of quartz and brecciated and intercalated slate and other wall-rock; these all carry gold to of 270 and 200 feet, respectively, and exposed lengths but little in excess of these figures; but on account of the thick covering of superficial materials, neither their entire widths nor their lengths could be ascertained. Traversing these two central masses, from various directions, two sets, of three and six veins respectively, have been discovered, which range in thickness from 2 to 40 feet. In addition, ten other veins from 1 to 50 feet thick were noted which have not been traced into any central mass.

The larger veins and deposits are generally to some extent brecciated and contain considerable intercalated slate and other wall-rock; these all carry gold to some extent at least, as small particles were frequently found in them. The amount per ton of the gold, however, has not been definitely determined; but is known to be low in most cases, and the few assays that have been made have generally given results ranging from traces to about ten dollars per ton.

In four or five of the smaller, more thoroughly prospected veins, pockets or shoots of very rich ore have been found. These veins are composed almost entirely of quartz with some calcite, are from 6 inches to 4 feet in thickness, and can be traced on the surface from 100 to 1,000 feet; but even these have been but slightly explored. The pockets appear to occur prevailingly at points where the veins are intersected by cross-fissures; they vary considerably in size, some containing but a few pounds while others contain several hundred pounds, and the greater part of the ore has a value of from $1 to $5 per pound. It was ascertained during the summer of 1910, that much of the quartz in the veins between the high grade pockets, will pay to mill. The only body of rich ore of sufficient size to be termed a shoot, so far explored, is in vein No. 1; this has an average thickness of from 1 to 2 feet, is at least 20 to 30 feet in length, measured along the strike of the vein, and has been followed downwards for thirty feet without any apparent depreciation in values. This shoot might perhaps be better described as a portion of the vein in which pockets are more than usually present, but practically all the material so far obtained from it has been pay-ore.

The first 800 pounds of selected ore from this property that was milled during the summer of 1910, yielded 20 pounds 3 ozs. (Troy) of gold, the next 1,000 pounds, gave 21 pounds 8 ozs. (Avoirdupois), and it is claimed that the tailings in each case contain approximately 30 per cent. to 40 per cent. of the original gold-contents; but the truth of this claim was not investigated. The ore taken from the various workings during the summer previous to September 1st, was valued at about $25,000, and from the part milled $8,000 worth of gold bullion was obtained.

Tellurides are reported to have been found on other claims near Engineer mines; but no specimens could be found by the writer when these properties were visited.

3. Valdez Island.

Mr. H. Carmichael, Provincial Assayer, Victoria, V.C., writes[12]: "From Valdez Island, B.C., we have news of a recent strike of copper ore carrying associated gold tellurides running half an ounce of gold per ton."

4. Nickel Plate Mine.

"Tetradymite is found sparingly in the upper part of the Nickel Plate mine[13]" which is situated in Hedley mining district, Osoyoos mining division, British Columbia. This mineral there "occurs in massive altered limestone which consists or garnet and epidote with much arsenopyrite, and is often found in association with free gold." Specimens of the ores from the Nickel Plate mine show crystals of tetradymite enclosing small particles of native gold."[13] This telluride "has apparently no connection with fissures," and, as mentioned above, is most probably a primary mineral here as it is in the various veins in other places, but Mr. Camsell[13] also considers the possibility of the occurrence being the result of secondary surface alteration.

5a. Osoyoos Lake.[14]

Narrow quartz veins containing tellurides of gold and silver were reported to Dr. R. A. Daly[14] to occur in the diorite found at the northwestern corner of Osoyoos Lake, Osoyoos mining division, British Columbia.

5b. Kruger Mt.

Messrs. H. A. and G. A. Guess[15] observed hessite occurring with petzite, native gold, etc., in a vein composed of quartz and coarsely crystalline siderite, and the Calumet claim, Kruger Mountain, on the western shore of Osoyoos Lake, in Osoyoos mining division, British Columbia.

6. Olds Mountain.

Tellurides have been reported to occur on Olds Mountain which formed the divide between the headwaters of Kettle River and Eight Mile Creek, which drains into Fire Valley. The deposits in this locality were examined in 1901, by the Provincial Mineralogist of British Columbia[16], who, however, was unable to find any of these minerals.

7. Burton Camp.

Mr. R. W. Brock[17] reports that some tellurides are stated to occur in Burton Camp, which is situated at the east side of the lower end of the narrows between Upper and Lower Kootenay Lakes, Arrow Lake mining division, B.C.

8a. Jewel Mine.[18]

The Jewel mine is situated in Long Lake camp, Greenwood mining division, Boundary Creek district, B.C. The ore on this property is described by Mr. R. W. Brock[18] as occurring in veins of from two to twelve feet wide, mainly at the contact between grey biotite-hornblende granodiorite and a green schist, but occasionally in one or other of these formations. In the production of these veins both replacement and fissure-filling processes have been active. The ore is galena, pyrite, and chalcopyrite, in a quartz gangue, the upper portions containing free gold and "rich tellurides" are found.

8b. Lakeview Claim.

Messrs. H. A. and G. A. Guess, identified altaite "associated with hessite, fine to coarse native gold, thin plates of native copper and, apparently, native tellurium, in segregated quartz veins carrying chalcopyrite, pyrrhotite, and chalcocite, at the Lakeview claim on the north side of Long Lake, a small sheet of water some thirteen miles north-northeast of the mouth of Boundary Creek,"[19] Greenwood mining division, Boundary Creek district, B.C.

8c. North Star Claim.

Messrs. H. A. and G. A. Guess observed hessite "associated with native gold, chalcopyrite, pyrite, and galena in a quartz vein, at the North Star claim"[20] on the south side of Long Lake, Greenwood mining district, B.C.

8d. Enterprise Claim.

Messrs. H. A. and G. A. Guess identified petzite "in association with free gold, galena, and pyrite, in a quartz vein at the Enterprise claim, on the south side of Long Lake"[21] Greenwood mining division, B.C.

8e. Roderick Dhu Claim.[22]

In 1895, Mr. Harry Guess, of Midway, identified several tellurides, including tetradymite and altaite, in a 12-inch vein cutting a large granite-boss flanked by siliceous and micaceous schists on the Roderick Dhu claim, Long Lake camp, Greenwood mining division, British Columbia. Mr. Fowler also noted tellurides on this property.

9. Olive Mabel Claim.

The Olive Mabel claim is situated on Gainor Creek, Trout Lake mining division, British Columbia, about 15 miles directly east of the head of the northeast arm of Upper Arrow Lake, and according to Prof. Kemp's[23] descriptions, a body of quartz about two feet thick, which narrows to small dimensions at each end, has been opened on this property. The vein "contains much siderite, some of which is decomposed, revealing considerable coarse free gold. Principally in the quartz, but to some extent in the siderite also, two tellurides are found. One is certainly nagyagite, as it affords a mere trace of silver, if any, but much lead and gold. The vein lies in an extensive belt of argillites," which it cuts across, and no igneous rocks appear.

10. Liddle Creek.

Mr. R. A. A. Johnston, of the Geological Survey, Department of Mines, Canada, identified as massive altaite, a mineral occurring in a gangue of white subtranslucent quartz, in a specimen said by Mr. Ruecan[24] to have been found by him at a point six miles north of Liddle Creek, Kaslo River, West Kootenay district, British Columbia.

11. Pay Roll Mine.

The Pay Roll mine is situated to the north of the Moyie River, about a third of a mile north of the point where the trail up the river crosses Nigger Creek. Here, according to Mr. McEvoy, a dike of dark-green intrusive rock, resembling a diorite, extends northward, dissecting the flat-lying massive beds of gray quartzite. A small vein cuts across this dike and "showed," in a specimen examined by Dr. Hoffman, [25] "rust-stained quartz carrying a little telluride of lead (altaite) and some particles of free gold."[26]

12. Gold Creek.

Hessite is reported to occur[27] in lead-gray, plate-like masses with quartz and a little pyrite and chalcopyrite on Gold Creek, Pine Portage Bay, Lake of the Woods region, Ontario.

13. Huronian Mine.[28]

The Huronian mine, also at one time known as the Shebandowan gold mine, is situated in location H.1, in the Township of Moss, Ont., and is about 70 miles in a direction a little north of west from Port Arthur. The rock formation here according to Bureau of Mines' reports, consists mainly of interbedded talcoid, chloritic, dioritic, and a little dolomitic schist, siliceous magnetite, and massive diorite. A small intrusive area of granite sends an arm southwestward to within a short distance of the mine and is well exposed on Jackfish Lake. The ore occurs in a vein which is six to eight feet in thickness, of which two to five feet are mainly quartz, the rest being incorporated schist. The quartz carries pyrite, chalcopyrite, galena, zinc blende, sylvanite, and a little free-gold. Mr. F. C. Smith [29] says: "The ore carried an inconsiderable amount of galena with iron and copper pyrites, argentite, hessite, sylvanite (or petzite), and probably altaite, the telluride of lead. Near the surface the ore showed considerable native gold, but this disappeared with greater depth. In some cases the tellurides occurred in irregular, bluish-grey masses enclosed in pure quartz; at other times they occurred as very dark brown scales filling small seams in the quartz. Samples of quartz from this mine, which showed no trace of metallic contents, but seemed to be saturated with the tellurides and resembled an ordinary piece of smoky quartz, have given upon assay as high as 902 ounces of silver and 34 ounces of gold per ton."

A ten-stamp mill was erected to treat the ore in 1883, and was run to some extent during 1884 and

1885, when work was suspended and has not since been resumed.

14. Sudbury Mining Division.

Mr. J. C. Nelson, of Haileybury, Ont., showed a sample of ore to Mr. R. A. A. Johnston, Mineralogist, Geological Survey, Department of Mines, Canada, which he claimed was obtained from a point in the Sudbury mining division, Ontario, two miles south of the southeast corner of Musgrove Township. Of this specimen Mr. Johnston writes: "A quartzose rock carrying small quantities of tellurium minerals containing lead, silver, and possibly gold."[30]

Porcupine Area.

Tellurides probably occur in the Porcupine area, Ontario, as some apparently unpromising veins have yielded good assay returns ascribable, it is thought, to the presence of tellurides; further, in refining gold bullion at McGill University from the Hollinger mine, lot 11, con. 2, Township of Tisdale, phenomena suggesting tellurium are believed to have been observed.

15. Opasatica District.

In the Opasatica district in the northern part of Pontiac County, Quebec, near the Ontario boundary line, on a claim owned by the Pontiac-Abitibi Mining Company, sylvanite occurs with native gold in quartz-ankerite veins cutting the Keewatin porphyrite and the Huronian breccia and associated dikes. The largest vein reported from here is about 2½ feet in thickness. The quartz is commonly banded with ankerite and carries sericite, pyrites, and chalcopyrite. The gold occurs both free and in combination with silver as sylvanite which is later than the quartz and ankerite.

From published accounts of the geology of the Porcupine country, Mr. Harvie[31] considers this district in geological characteristics must closely resemble the Apasatica and anticipates the discovery of tellurides there.

Newfoundland.

Mr. Howley[32] mentions the occurrence of tellurium in Newfoundland.

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(2) Camsell, C.,—"The geology aud ore-deposits of the Hedley Mining district, B.C.;" Memoir, No. 2, Geol. Surv., Dept. of Mines, Can., 1910, p. 138.

(3) Edison, T. A.,—Trans. Amer. Inst. Min. Eng., Vol. XVIII., p. 442.

(4) Roasting of Gold and Silver ores," p. 57.

(5) "The occurrence and behaviour of tellurium in gold-ores, more particularly with reference to the Potsdam ores, in the Black Hills, South Dakota;" Trans. Amer. Inst. Min. Eng., 1896, Vol. XXVI., pp. 485-516.

(6) "The assay of telluride ores;" Jour. of Amer. Chem. Soc., 1898, p. 586-597.

(7) Tellurides also probably occur in the Porcupine area.

(8) For an excellent general article on telluride gold ores the reader is referred to:—

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(9) Cairnes, D. D.,—Sum. Rep. Geo. Surv. of Can., 1906, p. 27.

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(12) Carmichael, H.—Journal Can. Min. Instit., 1909, p. 452.

(13) Camsell, C.,—"The geology and ore deposits of Hedley mining district, British Columbia"; Memoir No. 2, Geol. Surv., Dept. of Mines, Can., 1910, p. 138.

(4) Daly, R. A.,—"Geology of the western part of the international boundary (49th parallel)"; Aunual Rep. Geol. Surv. of Can., 1902-03, Vol. XV., p. 143A.

(15) Hoffman, G. C.,—Ann. Rep. Geol. Surv. of Can., 1895-96, Vol. VIII., p. 12R.

(16) Report of the Minister of Mines of British Columbia, 1901, p. 1130.

(17) Brock, R. W.,—Ann. Rep. Geol. Surv. of Can., 1898, Vol. XI., p. 69A.

(18) Brock, R. W.,—"Preliminary report on the Boundary Creek district, British Columbia;" Ann. Rep. Geol. Surv. of Can., 1902-03, Vol. XV., p. 127A.

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(20) Hoffman, G. C.,—Ann. Rep. Geol. Surv. of Can., 1895-96, Vol. VIII., p. 12R.

(21) Hoffman, G. C.,—Ann. Rep. Geol. Surv. of Can., 1895-96, Vol. VIII., p. 12R.

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Smelting in the Interior of British Columbia.

By E. Jacobs, Victoria, B.C.

(Continued from Feb. 1, 1911.)

General Information.

Other information must be very briefly summarized. The bulk of the copper ores received is sampled in the largest mill, which includes in its equipment Nos. 8 and 4 McCully crushers, Vezin samplers, smaller crushers, rolls, etc. The proportion of the ore delivered to the quartering floor is one two-thousandth part of the quantity sampled. It is quartered by hand or in Jones riffles; part goes to the assay office, part to the owner, and part is kept as a check until the ore is paid for. The blower plant comprises 7 rotary blowers, operated by individual motors; three are Connersville type and four the later Root blowers. The largest of these delivers 33,000 cubic feet of free air per min. at a pressure of 36 ounces and requires 350 horse-power to drive it. The total power for the blower plant is 1,200 horse-power. Electric power is transmitted from Bonnington Falls, distant 33 miles, at 20,000 volts; at the smeltery it is stepped down to 550 volts. The total power consumption is about 3,000 horse-power.

Extensive brick and metal flues connect with two brick stacks, from the copper and lead furnaces, respectively. The copper furnace stack is 185 feet high and 144 square feet internal area. The flue dust, amounting to two per cent., is briquetted and resmelted. The assay office has modern equipment, including electric motor for driving the crushers, electric heater, four coal-fired muffle furnaces, and a complete equipment for wet and electrolytic work.

The ore supply comes chiefly from East Kootenay, Slocan, Nelson, Rossland, and Boundary districts, and some from the neighbouring State of Washington. Coke, of which about 225 tons is used daily, comes from Hosmer, Crow's Nest Pass, 249 miles distant. Limestone, chiefly for flux, is obtained from the company's quarry at Fife, 68 miles away; requirements are about 200 tons a day and cost is $1 a ton in the charge bins. The works are advantageously situated, with railway connections to all important mining camps in the Kootenay and Boundary districts.

Granby Consolidated Mining, Smelting and Refining Company, Limited.

The Granby Company's smeltery, situated at Grand Forks, Boundary district, is stated to be the largest copper reduction works in the British Empire, and among the largest in the world, second only to the great Washoe works at Anaconda, Montana, U.S.A.

There are at Grand Forks eight rectangular water-jacketed blast furnaces, contained in a building having steel frame and corrugated iron sides and roof, dimensions 71 feet wide by 289 feet long, with a lean-to 9 feet 6 inches wide by 12 feet high. The feed floor is 18 feet above the furnace floor. The average distance centre to centre of the furnaces, is 36 feet. There are six furnaces 44 by 266 inches, 4½-inch tuyeres, 18-inch centres, 12-inch bosh, and two furnaces 48 by 260 inches, 3½-inch tuyeres, 8-inch centres, 12-inch bosh; depth of furnaces is 15 feet 8 inches. Their total treatment capacity is 4,000 to 4,500 tons of ore per diem; they are served by two 12-inch water mains, and two 60-inch blast mains placed directly at the back of the furnaces and running the entire length of the building. The furnaces have uptakes 6 feet in diameter, with damper, which can be raised if required, but this is seldom necessary. Six-foot downtakes lead to an overhead stee flue-dust chamber 13 feet wide, 15 feet high, and 31 feet 7 inches long, erected 12 feet above the feed floo and parallel to the long way of the building. At on end it is connected with a brick flue 10 by 15 by 44 feet leading to a brick stack 13 feet diameter and 15 feet high; the other end is also connected with a brick flue and stack, the latter 11 feet square and 153 fee high. The steel chamber has a hopper bottom; a stee conveyor mechanically conveys the flue dust to a bri quette mill in which there is a No. 2 White briquettin machine with a capacity of 50 tons per diem.

The furnaces are end-feed, and the charge is delivere to them in specially designed cars, three of which mak a train 266 inches long. There are four of these trains each moved by a 30 h.p. Westinghouse electric locomo tive, and each supplying two furnaces with charge. Th cars are run into the furnace and the charge dumpe where required. The ore and coke are drawn direc from the storage bins into the cars in proper propo tions.

Two settlers are used for each furnace, and from th second the slag flows into 5-ton slag pots or cars, whic are hauled to the dump by 9 by 14-inch cylinder 14-to Davenport steam locomotives, each one of which serve two furnaces, taking out six cars a trip. At each fu nace three cars are filled with slag, while the other thre are being dumped and returned. The slag haulage sy tem equipment includes six locomotives and 52 5-to slag cars.

No. 1 blower room is 57 feet wide by 128 feet 9 inch long, built of brick and steel, with corrugated iron roo and concrete floor. In it are 8 Connersville blower one No. 10, four No. 8, and three No. 7; total air cap city, 119,500 cubic feet of air per minute. In a part the blowing engine building, are four more No. 10 blo ers, each 30,000 cubic feet capacity. The aggregate a capacity is 239,500 cubic feet per minute, which, at 3 ounces pressure, is in excess of present requirement The blowers are all belt-driven. The No. 10 machin are each operated by two 150 h.p. a.c. motors, and th others each by one 100 h.p. a.c. motor. All blowers a direct-connected to pipes which lead to one or oth of the 60-inch mains.

The converter building is of steel, covered with co rugated iron on roof and sides; its dimensions are 4 feet wide by 240 feet long, with two lean-tos 23 a 32 feet wide, respectively. A 40-ton 4-motor Morg Engineering Company crane, 42-foot span, runs the fu length of the building. Matte is brought from the fu naces by a 10-ton three d.c. motor Morgan crane, wi 24-foot span, which runs from end to end of the fu nace building. A second 10-ton crane is kept in reser There are three 84 by 126-inch electrically operated co verter stands with 10 shells, and one stand operated h hydraulic power, with three 72 by 100-inch shells. Matt from 35 to 40 per cent., is converted to 98.5 per cer blister copper, which is poured direct into moulds pas ed under the mouths of the converters. The blast pre sure used is 12-pound. Converters are connected wi 10 by 10 by 340-foot flue chambers, and thence to 15 foot brick stack, for settling of flue dust. A slag-castin machine, Anaconda type, conveys all converter slag steel bins, whence it is taken in railway cars to fu nace feed bins for re-smelting. Quartz, coke and cl are taken to relining floor in cars and motor. On th floor there are three Allis-Chalmers self-discharge mo tar mills, and two 7-foot and one 6-foot 6-inch pa A 75 h.p. motor drives all machinery. Air rammers a used for tamping the lining of shells.

The blowing engine building is of similar materials to these of the blower room; its dimensions are, width, 55 feet 4 inches; length, 212 feet 9 inches, with an L 41 feet 2 inches wide by 73 feet long. There are three engines: One 36 by 38-inch Nordberg, capacity 3,700 cubic feet of air per minute; one 34 by 34 by 36-inch Allis-Chalmers duplex, capacity, 6,000 cubic feet per minute; and one 40 by 40 by 42-inch Nordberg duplex, capacity 10,000 cubic feet per minute; total air capacity, 19,700 cubic feet per minute, which is ample to operate all four converter stands simultaneously. All engines are belt-driven, by 200, 300, and 500 h.p. motors, respectively. One motor generator set, of 200 h.p. a.c. motor direct-connected to two 85 k.w. generators, 220 volts, operates the cranes, tilts the converters, and runs the charge system. A hydraulic triplex plunger pump, 5 by 10-inch, 250 pounds pressure, operates the small converter stand, slag-casting machine, etc. A 12 by 18-inch Rand compressor drives the tamping machines.

The electric power used at the smeltery ranges from 2,000 to 2,200 h.p. Motors have been installed having an approximate aggregate capacity of 3,500 h.p., which is considerably in excess of the horse-power at present used. About 400 h.p. is generated by the company's own hydro-electric plant; the West Kootenay Power & Light Company supplies the rest of the power used, bringing it in from its generating station at Bonnington Falls, 65 miles distant, at 40,000 volts. This is stepped down to a working voltage of 440 volts at the smeltery. Connection has also been made with a power station at Cascade, 16 miles distant, so that there are three sources of power when needed. The pumps are also in the company's power house, 100 feet below and 1,000 feet away from the smeltery. Six Smith-Vaile 8 by 10-inch triplex plunger pumps have a total capacity of 4,740,000 gallons every 24 hours.

Mention of the storage bins and sampling mills was omitted earlier. There is bin storage capacity for 12,000 tons of ore and 7,000 tons of coke; also ground storage for 12,000 tons of coke. There are two Snyder automatic sampling mills, one with a bunker capacity of 400 tons and the other of 450 tons. Attached storage bins give additional capacity of 4,350 tons. Total ore storage capacity at the works is, therefore, 17,300 tons. Assay office and laboratory are well-equipped and officered. Mechanical department is large, providing for all repairs and renewals other than castings, which are obtained from a local foundry.

The Granby Company employs about 250 men at its smelting works, and something like 400 at its mines. Ore, etc., smelted during ten years to June 30th, 1910, totalled 6,491,149 tons, of which 6,263,091 tons was from the company's mines at Phoenix. During the latter half of 1910 approximately half a million tons of Granby ore was smelted, beside some foreign ore. The aggregate to the end of 1910 is, therefore, about 7,000,000 tons.

Metallurgical Conditions.

Conditions at the Granby Company's smeltery are different to those obtaining at other copper smelteries, outside the Boundary district of British Columbia, in that the Granby Company has to treat an ore giving a very low percentage of sulphur on the charge—as low as two per cent. On the other hand the ore contains silica, iron, and lime in such favourable proportions that no barren flux, neither iron nor lime is required. If it were necessary to use an iron flux in smelting Boundary district copper ores, it would not be practicable to mine and treat them at a profit, unless the price of copper was much higher than it usually is, for the iron ore obtainable in the district in considerable quantity does not contain any marketable value. The slag from the Granby furnaces runs from 45 to 48 per cent. silica all the time, while occasionally it has contained as high as 52 per cent., which has been the maximum reached. The ore is smelted as it comes from the mine; usually it ranges from 40 to 48 per cent. silica. Smelteries in other parts generally have ores running higher than they require; on the other hand they have the advantage of a low silica content in the ore. It will be seen, therefore, that, as already stated, conditions under which the Granby Company's furnaces are ordinarily operated are quite different to those attending the reduction of copper ores elsewhere than in the Boundary district.

The low average value of Granby ores makes it imperative that labour costs shall be kept down as much as possible, consequently wherever it is practicable to use them, mechanical devices are substituted for the labour of men. This is especially the case in feeding the furnaces, there being no mixing of the charge or other handling of materials between the ore and coke bins and the furnaces. Cars, pushed by electric locomotives, receive the ore and coke direct from the storage bins and dump them into the furnaces, the mechanical arrangements being such as to admit of this being done quickly and effectively. The company's engineers have devised many appliances for labour-saving, so that economy in working methods is general throughout both mines and smeltery.

It is probable that in the early future changes will be made in the smelting practice that will admit of a further saving being made in cost of treating the Granby ores. The company has lately secured under option of purchase mines that it is believed will yield largely heavy sulphide ores. Heretofore it has been, and still is, the practice at the company's smeltery to produce a 35 to 40 per cent. copper matte at first smelting, which involves a loss in the slag of about 5 pounds of copper to the ton of ore. With the sulphide ores, above referred to, as an aid to the proposed change, it is believed that a saving will be effected, and as a consequence more profit be made out of the ores from the company's big mines at Phoenix, B.C. The ore will be smelted to a 10 per cent. matte, which will be regraded to a 45 per cent. matte for converting. It is thought that not only will the cost of converting to blister copper be less than at present, but by utilizing as fuel the heavy excess of iron and sulphur in the sulphide ores, the percentage of coke required in the charge will be reduced. It is expected, too, that the copper loss in the slag will be less by 1½ to 2 pounds per ton of ore, which, of itself, would mean an appreciably large addition to the profit to be made out of ores from the company's mines at Phoenix. Mr. Wakely A. Williams, superintendent of the smeltery, has been with the Granby Company ten years, during which time he has effected many economies in the treatment of ores.

British Columbia Copper Company, Limited.

During 1910 the British Columbia Copper Company increased the total blast furnace capacity of its smeltery at Greenwood, Boundary district, by one-third, thereby bringing its maximum treatment capacity up to about 2,600 tons per diem. This was done by increasing the hearth area of two of the three furnaces by 50 per cent. Previously all three furnaces were 48 by 240 inches at the tuyeres, and their approximate average ordinary total capacity had been about 1,800 tons daily, with a maximum of nearly 2,000 tons. Now they will average between 2,400 and 2,500 tons per diem.

The increase in smelting capacity has necessitated a corresponding increase in the plant for feeding the furnaces and taking away the molten slag; also an extension of the crane run at one end of the converter building. For slag hauling a larger locomotive, capable of handling two 25-ton slag cars at a time instead of one as in the past, has been put in. Heretofore, there have been in use two 15-ton Baldwin-Westinghouse electric locomotives for slag-handling, and three 7½-ton locomotives for furnace charging. Another charging locomotive has been added, to meet the increased capacity. The slag cars are 25-ton ladle-cars, side dumping, and each equipped with an electric motor having worm gear for tilting the car to dump its contents. The British Columbia Copper Company was the pioneer in using this style of car for slag dumping; the design has since been adopted by the Canadian Copper Company, at Copper Cliff, Ontario, and probably a dozen other smelting works, the latest being the International and the Mason Valley Company, Nevada.

The converter building is of steel, dimensions 45 by 90 feet. It has two converter stands with 84 by 126-inch horizontal shells, these taking matte of 45 to 55 per cent. copper tenor and producing blister copper 99.3 per cent. pure and carrying 20 to 50 ounces silver and 5 to 15 ounces gold per ton. The product is sent to the works of the United States Metals Refining Company, Chrome, New Jersey, for refining. The stands are tilted by hydraulic accumulators, and the shells are handled by a 40-ton 4-motor travelling crane. More converter shells have recently been added, making a total of seven. This Bessemerizing capacity is ample, notwithstanding the recent increase in the furnace capacity above-mentioned.

Electric power, transmitted from Bonnington Falls, distant more than 80 miles from the smeltery, is used in the works, in which there are installed motors having a total capacity of about 2,000 h.p. Among the motors are three of 300 h.p., each belted to one of three large Connersville blowers, which supply the blast to the furnaces.

Ore bins have a total capacity of 12,000 tons, and there is also bin accommodation for much coke, the consumption of which, with three blast furnaces running, is 8,000 to 9,000 tons monthly. A reserve of 10,000 to 12,000 tons is kept as an emergency supply should there be interruption in the regular receipt of coke from the colliery. The coke is obtained from the International Coal and Coke Company's colliery at Coleman, Alberta, distant 370 miles by Canadian Pacific Railway Company's railway line.

The company obtains the greater part of its ore supply from its own mines (including the Rawhide mine of the New Dominion Copper Company, in the stock of which it holds a controlling interest), and it endeavours to maintain an average monthly output as follows: From the Mother Lode mine, 36,000 tons; Rawhide, 20,000 tons; Wellington group, 3,500 tons; Napoleon (at Boyds, Wash.), 2,500 tons. Mother Lode and Rawhide ores are typical Boundary district copper ores, low in marketable metals; Wellington group ore is chiefly oxidized and having little value other than gold; of the Napoleon ore the sulphide goes to the smeltery, where it serves as a pyrrhotite flux to reduce the tenor of the copper matte; the oxidized ore is to be treated in a mill now being erected near the mine. There is about 100,000 tons of oxidized ore overlying the sulphide; this is to be mined by the caving system, and conveyed by an aerial tramway to receiving bins at the mill. It will be weighed at the receiving terminal and automatically sampled at the mill receiving bins. The mill is being equipped with ten stamps, amalgamating plates, and cyanide appliances, the last to be used only if the percentage of recovery on the plates is insufficient. Capacity of mill will be 100 to 125 tons per diem.

Provision is being made for increasing the ore supply from the company's mines, and thus render its smeltery independent of custom ores, if these be not obtainable in sufficient quantity. The Rawhide output is to be increased to 30,000 tons a month, while 3,000 tons will be obtained monthly from the Lone Star. The latter is a mine situated just across the International Boundary line. It has an available reserve of 300,000 tons of gold-copper ore, of a higher average copper tenor than that from the company's other mines, beside being a good matte maker. An aerial tramway, 29,000 feet between terminals, is about completed, from the Lone Star mine to the Canadian Pacific Railway near Boundary Falls, three miles distant from the company's smeltery; its capacity will be about 20 tons an hour.

Coke is obtained from Southwest Alberta, the railway distance between the colliery and smeltery being 370 miles. With three blast furnaces running, the consumption of coke is 8,000 to 9,000 tons a month. A reserve of 10,000 to 12,000 tons is kept as an emergency supply in case of interruption in the regular receipt of coke from the colliery.

The two companies are under the management of Mr. J. E. McAllister. Together they employ 500 to 540 men, of which number 118 is the normal force at the smeltery at Greenwood. The amount of the payroll of the two concerns (including that of the Napoleon) totals between $62,000 and $65,000 monthly. The approximate figures of production during 1910 are as follows: Material smelted, 456,000 tons. Contents: Gold 25,640 ounces; silver, 85,900 ounces; copper, 7,351,000 pounds. Included in the ore receipts were the following: From Mother Lode mine, 352,000 tons; Oro Denoro mine, 11,473 tons; Wellington group mine, 19,200 tons; and Rawhide mine, 54,400 tons.

Obituary

Aaron H. Kelly, of Nelson, B.C., died at Victoria on the night of February 15. He left Nelson in January, intending to pay a visit to California, but proceeded first to Victoria, where he had an operation performed for some internal complaint. He rallied after the operation, but eventually heart trouble caused a relapse, and death ensued. Mr. Kelly was 64 years of age. He was born at Fredericton Junction, New Brunswick, where he was educated, and after leaving school engaged in business there. In 1878 he went thence to Denver, Colo., where he obtained an appointment with the Rio Grande Railway, then being constructed. Later he proceeded to San Francisco, and after a time spent there as a mining broker, was some years prospecting in Arizona. Going north to Spokane, Wash., he was first associated with others in working mining property near Northport. In 1888 he went to Nelson, B.C., the discovery of the Silver King mine having attracted many men to that vicinity. Ever since then he has been interested in mining, and owned a number of mineral claims. Among others in which he was largely interested was the Dandy group, adjoining the Silver King, both of which properties were lately sold to a syndicate of British Columbians now preparing to operate these mines. The May and Jennie group, also near Nelson, is another property in the development of which Mr. Kelly spent much money. Eventually he

organized the Reliance Gold Mining and Milling Company, of which he was managing director. This company equipped the May and Jennie with a milling and cyanide plant. In connection with the latter, a 12-foot Hendryx agitator (the first installed in British Columbia), was put in, under the supervision of W. J. Elmendorf, consulting engineer, of Spokane, Wash. Afterwards much experimental work was done here by Douglas Lay, now in charge of the Van Roi silver-lead mine and concentrating mill, near Silverton, Slocan. Latterly Mr. Kelly became interested as well in oil and coal lands. His body has been sent to Fredericton Junction for interment there.

INDUSTRIAL NOTES.

In view of the growing importance of colliery and mine ventilation, Catalogue No. 26A., recently issued by the Jeffrey Manufacturing Company, is most timely. It is entitled "Jeffrey Mine Fans." Some distinctive features of these fans call for notice. The steel casing is complete, extending to the ground line, thus doing away with the usual masonry requirements. Each fan wheel is assembled in the shop and balanced on ball-bearing rollers. All parts of the fan casing are fitted up before shipment, thus simplifying erection.

The catalogue shows illustrations of many Jeffrey installations. Useful ventilating formulæ are scattered throughout.

PERSONAL AND GENERAL

Mr. C. A. Moreing is in Porcupine.

Mr. J. L. Parker has removed from Victoria to Vancouver, B.C.

Mr. R. H. Flaherty, representing the mining interests of Mackenzie & Mann, has opened an office at Port Arthur.

Mr. Samuel W. Cohen, general manager the Crown Reserve Mining Company, has recently returned from a six weeks' trip to Europe in the interests of his company.

Mr. Percy Williams, consulting mining engineer for the Canadian-American Exploration Company, Limited, is visiting Toronto and New York. He will again visit Toronto in May. Mr. Williams' headquarters are in Vancouver, B.C.

Mr. W. H. Trewartha-James, of Victoria, B.C., general manager of the Tyee Copper Company, is expected to return to British Columbia during April from a business visit to New York and England. During his absence Mr. E. J. Hearn has been acting manager for the company at Victoria.

Arrangements have been made to keep the office of the Canadian Mining Institute, Rooms 3 and 4, Windsor Hotel, Montreal, open from 9 a.m. until 10 p.m., for the convenience of visiting members. A record of evening attendance will be kept to determine whether the additional expense will be justified

Mr. M. S. Davys, for years resident at Nelson, B.C., who prior to his removal to England was one of the most active mine operators in the West Kootenay district, is expected to shortly return to British Columbia, on one of his periodical visits, in connection with several mining enterprises in which he is still largely interested.

Mr. Chas. Biesel, superintendent of the Consolidated Mining & Smelting Company's mines in the Boundary district of British Columbia, has gone to Michigan, U.S.A., to examine mining property for United States people. It is reported in the Boundary that Mr. Biesel may soon enter the employ of the company with which his former chief, Mr. W. H. Aldridge, is now associated.

Mr. O. B. Smith, Jun., of Phoenix, B.C., superintendent of the Granby M. S. & P. Company's mines, recently paid another visit to Goose Bay, Observatory Inlet, to ascertain what further progress had been made with the exploration of the Hidden Creek Copper Company's mine there, which mine is being prospected by the Granby Company under its option of purchase.

Prof. Wm. Galloway, F.G.S., of Cardiff, Wales, arrived in British Columbia about the middle of March, with the object of investigating the reported occurrence of coal on Tumbo Island, which lies in the strait between Vancouver City and Vancouver Island. He was accompanied to the property by his son, Mr. C. F. J. Galloway, B.Sc., and Messrs. Wm. Blakemore and A. E. Hepburn.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

THE ALBION MINES FIRE.

In the Nova Scotia Mines Report for 1910, Mr. Thomas Blackwood, Deputy Inspector of Mines for Pictou County, gives a full meed of credit to the usefulness of the Draeger apparatus and the trained men from the Dominion Coal Company and the Nova Scotia Steel Company in combatting the fire in the Cage Pit in January of last year. Mr. Blackwood gives a detailed account of the circumstances attending the fire, and expresses the opinion that it was purely a gob-fire caused by spontaneous combustion arising from the presence of iron pyrites together with slack coal in the old goaf. His conclusions are best given in full: "I have grave doubts if the fire would have been put out if it had not been for the timely arrival of the Dominion Coal Company's and the Nova Scotia Steel Company's men, with the Draeger apparatus and fire fighting material. The men lost no time after their long journey in getting into their helmets and going to work. It was soon evident after a few hours of constant and strenuous work that they would be successful in getting control, which they did after 24 hours, and that it was only a matter of time until the seat of the fire would be reached. As this is the first fire that I have had the privilege of seeing fought with the Draeger apparatus, I must say that I am highly impressed with it; in fact, I cannot do justice to its merits. I have already stated that I have grave doubts if the fire would have ever been under control without the Draeger apparatus. After what I have seen I think that every coal company should have them, or some others of a similar kind. I do not think that any colliery is complete without an outfit of this kind, as no one can tell at what time they may be required.

"I see by the press that the Mines Department of British Columbia makes it compulsory upon the coal companies in that province to be equipped with them. Legislation to the same end has been passed in England. I hope it will not be necessary for our Government to have to make it compulsory in Nova Scotia,

as the companies will see the wisdom of following in the footsteps of the Dominion Coal Company and the Nova Scotia Steel Company in having them installed in every colliery in Nova Scotia without being compelled to do so by legislation.''

It is said that the Provincial Workmen's Association is sending a deputation to Halifax to request the Nova Scotian Government to take steps to ensure the provision of the Rescue Station for the collieries on the mainland of Nova Scotia. Such a provision might very easily mean the saving of valuable property, and maybe even life. The usefulness of oxygen helmet apparatus for fighting underground fires is not now a matter for question. It is an established and approved fact, and there is not now a single mining country in Europe which does not compel such provision and the training of men in the use of the apparatus. The United States have recently erected a large number of stations, and with the initiative of that nation when once they commence a thing, they have fitted up a so-called rescue train, which seems to be about the last word in mine-rescue work. British Columbia and Alberta have both enacted legislation, or are in the act of doing so, and it should not be for Nova Scotia to lag behind the rest of the world, particularly when this Province can boast of having the first properly equipped station on the American continent.

In the report of the Chief Inspector of Mines in England—Mr. R. A. S. Redmayne—on the Whitehaven explosion, it is stated that the fire might have been effectually combatted in the earlier stages, ''especially had the rescuers been possessed of smoke helmets and fire extinguishers.'' In Mr. Redmayne's conclusions he states as follows: ''The almost total failure of the rescue operations constitutes a convincing argument in favour of the provision at every colliery of trained rescue brigades, and means of summoning them at short notice. The summoning could easily be effected by some form of agreed-upon signal, such as blowing the colliery steam whistle a certain number of times or continuously until sufficient help arrived.''

It seems an extraordinary omission that at many collieries where an efficient surface fire brigade is kept, provided with suitable apparatus, it should not be thought necessary to have the same provision for the underground workings, where a fire is always a far more serious matter and has always large quantities of inflammable material to feed it. On the surface it is possible to take out insurance, and the fire insurance companies insist on some measure of protection. Underground it is not possible to effect insurance, because the companies recognize the infinitely greater risk of fire and the great difficulties of combatting it. Coal companies have to be their own insurers underground. This reason alone would seem sufficient to move colliery owners to take reasonable precautions against fire, particularly when it is further considered that the whole revenue of a colliery company is derived from its underground workings.

Dominion Coal Output.

The output of the Coal Company's mines for February was 262,828 tons, comparing as follows with previous years:

1908	285,649
1909	209,656
1910	204,521

The individual mines produced as under:

No. 1	43,583
No. 2	52,762
No. 3	14,225
No. 4	28,215
No. 5	20,985
No. 6	14,753
No. 7	13,232
No. 8	11,767
No. 9	27,852
No. 10	11,327
No. 12	16,344
No. 14	6,349
No. 15	1,315
No. 16	119
	262,828 tons.

It will be noticed that there are now four mines producing coal in the Lingan district. No. 16 is the latest addition, and makes its first appearance in the output figures during February. The coal from this new field is of excellent quality, and is in great demand. During the coming shipping season between 45,000 and 50,000 tons per month will be supplied by the new mines.

At No. 2 Colliery the new screening plant and picking belts have been completed. The new exhaust-steam turbine generating plant has so far proved an unqualified success. One can go into the large power house at that colliery any time and see three 600 k.w. generating units stand idle, while the turbine is carrying the whole load of the electric power requirements, and making at the same time so little noise that a close inspection of the machinery is necessary in order to be able to tell whether or not the turbine is working. Formerly the exhaust steam that is doing this work went to waste. It is a marked lesson in possible economies of power.

The drift ice off the Cape Breton coast has been very heavy this year, and the persistently low range of temperature throughout the month of February, combined with an almost total lack of wind-storms, has helped to cement the ice-floes into unusual solidity and thickness. The shipping operations of the Dominion Coal Company have not, however, been seriously interfered with as they have been able to use the ice-free port of Louisburg. The long continued series of mild winters which have visited Cape Breton have tended to minimize the importance of Louisburg as a winter shipping port, but that it has undoubted natural advantages in this direction the weather conditions of the present winter have abundantly proved.

The jealousy which exists among the seaport towns of the Maritime Provinces is distinctly entertaining. The Halifax ''Herald'' and the St. John ''Telegraph'' both recently gave prominence to a report that Sydney harbour was blocked by an ice-barrier, which would need to be dynamited before navigation could be made possible, and that it would take a whole summer's sun to melt the obstruction. A sea-captain is reported to have told the ''Herald'' that in some places off the Cape Breton coast the ice was sixty feet in thickness! It is not for the best interests of the Maritime Provinces that such canards should be given prominence in reputable newspapers, and be passed along to the outside world as items of accurate news. We are very much annoyed when English and foreign papers speak of the severity of Canadian winters, but if such unpardonable exaggerations appear in Nova Scotian newspapers, what proportions will the story reach by the time it has been copied into the papers of the outside press? The real truth is that the first rainstorm will clean out Sydney Harbour in one night.

Safety Lamps.

There have been two gas explosions in Nova Scotia recently both directly traceable to the use of a naked light by a mine examiner in the discharge of his duties. One case occurred at the Chignecto mine in June, 1910, and in this instance both the examiner and the boy who attended him were killed. The other case was at Sydney Mines in the early part of this year. In this instance the examiner had opened his safety lamp and struck a match, an act that caused not only his own death, but that of seven other men. In view of these incidents it is a matter for congratulation that the Commissioner of Mines for Nova Scotia is introducing two amendments to the Coal Mines Regulation Act dealing with this danger. In bringing the amendments before the House the Commissioner said:

''This bill was designed to bring about the prohibition of the use of any other than locked safety lamps in the coal mines of the province. It contained the following provisions:

''1. From and after the coming into force of this Act no light or lamps other than locked safety lamps shall be brought into or used in any mine.

"2. Provided, however, that it shall be lawful for the inspector of mines to authorize the use of electric lights in any part of any mine in which such electric lighting can be used with safety.

"3. This Act shall not come into effect until proclaimed by the Governor-in-council by proclamation published in the "Royal Gazette," fixing a date not less than three months from the first publication of such proclamation, from and after which the Act shall be in full force and effect."

In moving the second reading of the second bill the Commissioner explained that the intention of the bill was to amend rule 7a of section 46, chapter 8, of the Acts of 1908. The rule provided that every mine examiner shall at all times, while in the discharge of his duties, use a locked safety lamp, and shall, unless the deputy inspector permits otherwise, be accompanied by an employee of the owner, not less than 18 years of age, who shall also use a locked safety lamp. There was reason to suspect that the rule as read had been evaded, and that officials had carried into the mine with them a locked safety lamp and also a lamp not locked, and that this had caused an explosion with fatal results. The purpose of the bill was to amend the rule so as to provide in each case that the party referred to should carry with him a locked safety lamp "and no other lamp or light."

There should not be, and there probably will not be, any objection raised by either the mine owners or the workmen of Nova Scotia against the two proposed amendments. It is the well-known experience of many mine managers that the very workmen who have complained of the introduction of safety lamps would to-day be the last to wish to return to the use of naked lights.

QUEBEC.

The mining community is still absorbed in the radical changes which have recently taken place in connection with the personnel of the Amalgamated Asbestos Corporation and its method of operation. Mr. R. H. Martin, who for the past 25 years has been closely associated with the asbestos industry and for the past several years has been regarded as the principal sales agent for raw asbestos in the United States and on the Continent of Europe, has resigned from active connection with the company. Mr. B. J. Bennett, who has for many years been manager of the Kings Asbestos Mines, Thetford Mines, the largest producer in the camp, and who for the past year has been general manager of the Amalgamated, has also severed all connection with the company. Mr. Martin, Jr., who for the past year was assistant general manager of the corporation, has also resigned.

Mr. W. J. Sharpe, M.E., recently of Pittsburg, Pa., has been appointed general superintendent of the Amalgamated Asbestos Corporation, with residence at Black Lake, from which point he will personally conduct the operations of the company. Mr. Sharpe is enacting strict rules of economy, notably the concentration of the several office forces to one principal office, at the King Asbestos Mines, Thetford Mines, with only the really essential clerical work performed at each of the several mines. Aside from strict economic method of working there will be no decided change in method of operation, rather following the plan of gradual improvement while the plants are in operation.

Work in Thetford Mines, Black Lake, and East Broughton has been very quiet since the first of the year, and indications point to active operation being resumed about 1st April. The effect of the slowing down for the winter months has been to reduce the surplus asbestos stocks very considerably. The long and short grades of fibres are pretty well cleared, with only the paper stock in excess. A plan has been suggested by some of the mining companies whereby the amount of paper stock can be reduced by grading it into the longer and shorter grades, and thus obviating the difficulty of having one grade in excess while the other grades are not sufficient to meet the demand.

Mr. C. H. Parker, for several years millwright for the Johnson Company, has accepted a position with the North Western Asbestos Company, at Casper, Wyoming, and leaves for his new position on the first of April.

Mr. J. M. Forbes, recently with the Wagner Electric Company, Montreal, has been appointed local manager for the Black Lake Consolidated.

"Harry" Williams, one of the old landmarks of the asbestos industry and for several years general superintendent of the Asbestos & Asbestic Company, at Danville, Quebec, has resigned his position and will represent mining interests in Porcupine.

Several of the mining companies had representatives in the U. S. A., and on the Continent during the past winter negotiating for the sale of asbestos. Among these were Messrs. R. H. Martin, B. J. Bennett, A. H. Martin, Walter Raleigh Kerr, W. J. Woolsey, Edward Slade, A. S. Johnson, W. R. Leventritt, George Rumple, and Col. J. J. Penhale.

One of the most important and significant mining deals yet concluded in the district took place in Arthabasca on the 13th instant, when the Ward-Ross property, west half lot 27, range V., Thetford, was sold by public auction for $710,000 to Mr. Frank Ross, of Quebec City. It is understood that the Martin-Bennett interests will control the enterprise, and operations have already begun preparatory to opening up the property. This property adjoins one at present owned by the King Brothers, Limited, and the two will be worked together. Both properties are known to be valuable, and, their location being right in the centre of the Bell & Johnson properties, give every indication of being a large producing concern.

It is interesting to note that the Ward-Ross property was the first shipper of asbestos in the district. The Ward brothers shipped their first carload in May, 1879, the second shipment being made by the Johnson Company in September of the same year. Some years afterwards the Ward Brothers became involved in litigation with the Q. C. R., with the result that the property passed out of their hands into the hands of the Johnson Company to the extent of three-quarters undivided interest. Mr. A. S. Johnson, of the Johnson Company, was the principal opposing bidder at the sale.

The Dominion Gold Fields of Canada, Beauceville, Que., has been purchasing large quantities of machinery for the new hydraulic plant which is to be erected in the placer holdings of the company, during the coming summer.

The East Canada Smelting Company, at Weedon, Que., is still operating vigorously and reporting a valuable and increasing production. The copper ore is shipped largely to the Nichols Chemical Company, at Capelton, Que., for the saving of the sulphur values for their chemical works, the resulting matte being shipped to the United States for refining.

A great deal of disappointment has been expressed over the Preliminary Report on the Chibongamon Region. It is felt that if the report had emphasized the fact clearly that the conclusions arrived at were merely to enable the Provincial Government to decide whether it were advisable for them to build a railway into the district at once or not, and not to be taken as any criterion of the wealth of the vast hinterland, it would not then be taken as a deterrent force to the prospector who might be inclined to go into this district. The Report agrees that the rock formation is all that could be desired, in fact, equally favourable in every way to the formation which extends across northern Ontario to Labrador coast. The practical mining man knows that had the party which made the report spent their time on a plot of fifty square miles their conclusions could only be taken as an outline of the geological formation and in no way final as to mining possibilities of the area; in fact, we have noted that the report made by the geological agents covering the Cobalt region, but a few years prior to the discovery of vast riches there, in no way revealed the economic wealth of that camp. Dr. Miller has wisely intimated that the geological party should confine their efforts to mapping given areas and leave the work of finding minerals to the prospector. Among mining men it is felt that a vast stretch of country containing such excellent showings and rock formations must hold an immense store of minerals, and it only remains for the government or private capital to encourage the prospector in order to have these riches speedily revealed.

ONTARIO.

Cobalt, and Other Silver Areas.

The principal factor in the Cobalt situation is still the lack of power. The McKinley-Darragh, Cobalt Lake, Nipissing, Kerr Lake, Coniagas, Buffalo, Crown Reserve, Townsite, Temiskaming, Trethewey, City of Cobalt, Hudson Bay, and O'Brien are now all using their own compressors. Many of these properties, however, have outgrown their compressor capacity since the customs air was introduced into the camp. These have now to curtail their operations and production. The consequence of the failure of power falls heavier on the prospects that have no plants of their own. These have had to shut down entirely. Probably a thousand men have lost employment since the first of the year through these causes, and the mining companies are worse off than if they had been running with their own power all the time.

Not until the thaw releases the waters of the Northern Ontario rivers will there be any relief. The British Canadian has absolutely no air at all and the Cobalt Hydraulic is in little better position. The cause is the same in both cases, the power plants were too big for the head of water obtainable.

The break-up is expected about April 10, but until then it is useless to expect any relief. The electric power from the plants is not affected and the mills have been able to run at full capacity.

During the month of February the Nipissing mined ore estimated at a net value of $185,332, and shipped ore of net value of $90,400. Air conditions alone are responsible for the drop. Development particularly was retarded very much indeed.

The principal development at the Nipissing was at shaft 122, where, after drifting 350 feet to the east on a stringer of the main vein at the 165-foot level, a shoot of rich ore was encountered.

Mr. Hugh Park, of the Nipissing, and Mr. P. A. Robbins, of the McKinley-Darragh, have examined the Keeley mine at South Lorrain for the liquidator of the Farmers Bank, and have made their report on the matter.

There is very little chance that La Rose will increase the dividend rate at the quarterly meeting. Both the Princess and the Dawson have practically had to restrict their operations to stoping out what there was in sight owing to the failure of customs air.

The Barnett properties at Elk Lake have recently yielded a very promising surface showing. There is an ore body 60 feet long by twenty inches wide of calcite and aplite, in which the leaf silver can be easily discerned. Several good surface finds have been made in the vicinity but owing to lack of interest and transportation conditions little work has been done.

The new 20-stamp mill is now running at the Hudson Bay mine, Cobalt. It is on the straight concentration plan first introduced into the camp by Mr. Bourne, at the Northern Customs plant. Underground, two new high grade stringers have been cut at the 100-foot level. There now appears a disposition to put some of the stock of the $3,500,000 company on the market.

On the Alice Lorrain Silver Mines, in South Lorrain, at the bottom of a 26-foot shaft, some niccolite and a little native silver have been discovered in a wide and strong vein. The Alice Lorrain took over the holdings of the Elkhart Mining Company.

The Nipissing made the largest bullion shipment from one mine last month, when they sent out 105 bars weighing 106,430 ounces, valued at $49,675.

In all probability the Northern Customs Concentrator Company will build a 60-stamp mill at some place in the centre of the Kerr Lake camp. They are already assured of enough ore to feed twenty stamps for some years. The Lawson is willing to make a contract for another 20 stamps, and the Kerr Lake has now come into line also. Low grade ore will also be sent for treatment from the Hargrave, the Bailey, and other mines in the section.

On his European trip, Mr. S. R. Cohen, general manager of the Crown Reserve, who has just arrived back in Cobalt, made a contract with the Kingdom of Saxony for the delivery of ore containing nearly three-quarters of a million ounces of silver for the smelters and refineries in that country and ultimately the currency.

Mr. A. A. Cole, for the T. & N. O., and Mr. Mickel, for the Ontario Government, have inspected the Gowganda and Elk Lake properties with a view to seeing if their prospects justify the building of a railroad into the country.

The King Edward mine, on Cross Lake, has been abandoned. The company as a last resort put down a shaft to the 500-foot level and did some drifting. Not finding any more ore they shut down before reaching the contact, which is believed to lie another hundred feet down. Last year the report shows a deficit of $23,152.

The mine captain and the shift boss of the Temiskaming mine were severely censured by the jury inquiring into the death of Albert Sullivan, killed by a blast in a winze. The Government will institute a suit against the company.

The Millerett mine, of Gowganda, has found high grade and milling ore in the diabase area at the 150-foot level. Drifting both ways from the shaft a narrow high grade streak has been cut in the middle of several feet of milling rock. The vein was of smaltite carrying low silver values at the 70-foot level.

It has been decided to erect a 20-stamp mill on a plot of ground leased from the Nipissing Company at the south end of Cobalt Lake for Cobalt Lake ore. Since the opening of the year fifteen or sixteen cars have been shipped and these have realized $30,000 gross.

The death of Mr. M. T. Culbert, manager of the O'Brien mine, was as unexpected as it was deplorable. He went to Toronto with the confident expectation of pulling through the operation for appendicitis with success. He has been in the camp for six years, ever since mining commenced on the O'Brien, and during all that time he has been a conspicuous figure. Around him on the O'Brien had grown up a small village with miles of underground workings and a big mill, all created under his superintendency. Mr. Culbert was considered the foremost geologist of the camp. He was this year elected the president of the Temiskaming Mine Managers' Association, and has always been prominent in Institute work.

Arrangements have been made for the installation of ten more stamps at the Temiskaming, raising the capacity of the concentrator by a third. The company decided to pay the regular 3% per cent., without the bonus, at the quarterly meeting. The lack of power, the expense of developments at the Peterson property at North Cobalt, and on the Pearl Lake claims at Porcupine reduced the income.

According to the annual report of the Wettlaufer Lorrain Silver Mines, the production last year amounted to 265 tons, containing 230,000 ounces. The development on the third and fourth levels had doubled the ore reserves, till now they stood at between 3,500,000 and 4,000,000 ounces. The company declared its intention of shipping a car of high grade every month.

Porcupine, and Other Gold Areas.

There is now no fear of an early thaw and the break-up is not looked for until about April 10. Last year the roads became impassable by the middle of March and completely disorganized the plans of late shippers. With the added time operators ought to be able to get in all their supplies before the break-up. The steel is now laid to Frederickhouse and it is expected that freight can be carried the first eight miles by April 2. The railroad will be into Porcupine by July 2.

The Burns and Goad claims in the Redstone section have been taken over on a long option by Mr. C. R. Poe, of Chicago, but the vendors have already received ten per cent. of the purchase price—about $100,000.

The Ellis Foster properties, the option on which was thrown up by the Hudson Bay Company of Cobalt, have now been taken up by Colorado capitalists, of which Mr. P. W. McCaffery is the agent Work will be commenced at once.

Extensive sampling is being done on the Rochester veteran claim of the Porcupine Central.

J. J. Byrne and Jack Hollinger have staked claims at Hobon 250 miles west of Sudbury, near the point where the Algom

Central meets the Canadian Pacific. Reliable prospectors say the new field looks good. Free gold has been found in big quartz veins.

Excellent time is being made on the Heinze property, the West Dome. The shot drills are being put down at the rate of 14 feet a day. Three shafts will be sunk under contract on the Pearl Lake Gold Mines claims, each shaft to be put down a hundred feet.

At the annual meeting of the Miller Porcupine Gold Mines it was decided to sink three shafts to the 100-foot level on the vein. The directors elected were Alex Miller, president; A. J. Murphy, J. Willocks, J. Arthur Griffith, and George Bannerman, directors.

Work at the 200-foot level of the Hollinger continues to reveal fine ore bodies. At the 200-foot level there is a vein of quartz ten feet wide apparently every whit as spectacular as at the hundred foot.

A two-stamp mill has been ordered for the Preston East Dome, but it will not be delivered until the railroad gets in. A small boiler and hoist are on their way into the property.

It is stated that the average assay from the cores on the Ross property have run $14.10. The dike upon which the diamond drill has been working runs uninterruptedly for several claims.

Mr A. G. Kirby, manager of the Nova Scotia Cobalt, has also been appointed general manager of the Moneta Gold Mines in Porcupine. This company has been organized with a capital of $2,000,000, half of which will remain in the treasury and the remainder be sold to the public. The president of the company is Sir Henry Pellatt.

The syndicate represented by the Bewick, Moreing & Company house has bought a considerable block of Hollinger stock though the control of the company still remains with the original syndicate.

ALBERTA.

Conference of Coal Mine Operators and Miners' Representatives.

The agreements between the coal mine operators and the miners being about to expire (on March 31) a conference of the parties concerned was called to discuss the terms of a new agreement. This conference was opened at Calgary, Alberta, on March 1st.

Western Coal Operators' Association.

Prior to the date the conference was called for, there was a meeting of the Western Coal Operators' Association, which includes the following coal mining companies (in alphabetical order):

Operating in Alberta:—

- Alberta Railway & Irrigation Co. (Galt Colliery) Lethbridge.
- Bankhead Mines, Ltd., Bankhead, near Banff.
- Canadian Coal Consolidated, Ltd., Frank.
- Chinook Coal Co., Lethbridge.
- Davenport Coal Co., Burmis.
- Diamond Coal Co., Diamond City.
- Hillcrest Coal & Coke Co., Ltd., Hillcrest.
- H. W. McNeill Co., Ltd., Canmore.
- International Coal & Coke Co., Ltd., Coleman.
- Leitch Collieries, Ltd., Passburg.
- Maple Leaf Coal Co., Bellevue.
- Royal Collieries, Ltd., Lethbridge.
- West Canadian Collieries, Ltd., Blairmore.

Operating in British Columbia:

- Corbin Coal & Coke Co., Corbin, Crow's Nest district.
- Crow's Nest Pass Coal Co., Fernie, Crow's Nest district.
- Hosmer Mines, Ltd., Hosmer, Crow's Nest district.

The Operators' Association elected the following officers: President, Lewis Stockett, Bankhead (re-elected); Vice-President, P. L. Jaismith, Lethbridge; Secretary-Treasurer, W. F. Little, Canmore.

District 18, U. M. W. of A.

District 18, United Mine Workers of America, has twenty-five locals, four of which are in the Crow's Nest district of British Columbia and the remainder in Alberta. W. B. Powell is president; C. Stubbs, vice-president, and A. J. Carter, secretary-treasurer. The Locals in British Columbia are at Corbin, Fernie, Hosmer, and Michel; those in Alberta are at Bankhead, Beaver Creek, Bellevue, Blairmore, Burmis, Canmore, Coleman, Carbondale, Cardiff, Diamond City, Edmonton, Frank, Hillcrest, Lethbridge, Lille, Maple Leaf (Bellevue), Monarch Mine (Elcan)), Passburg, Royal Collieries (Lethbridge), and Taber (two). The membership of District 18 on January 1, 1910, was 4,976; on January 1, 1911, it was 5,827. Its disbursements in 1910 were as follows: Officers' salaries and expenses, $5,009.75; relief, $15,087.99; "District Ledger," $14,654.90; law costs, $4,910.50; printing, $1,011.38; all other expenses, $10,530.37; total, $52,104.90.

Opening of the Conference.

The conference was opened, as already stated, on March 1. Lewis Stockett announced the names of the companies comprising the Western Coal Operators' Association, representatives of most of these being present. Beside the district representatives of the U. M. W. of A., there were present W. Rogers and Chas. Garner, both members of the International body of the U. M. W. of A.

The following were appointed a Scale Committee: For the operators, James Ashworth, R. W. Coulthard, W. F. McNeill, L. Stockett, and O. E. S. Whiteside; for the miners, A. J. Carter, J. O. Jones, W. Lees, D. McNabb, W. B. Powell, J. E. Smith, and C. Stubbs.

It was arranged that suggestions from the miners be submitted to the operators on Friday morning, March 3.

Proposals of Miners and Reply of Operators.

The miners' proposals were as follows:

1. The fixing of contract rate on all new work before the general agreement is discussed. This applies to all longwall work in No. 1 north, No. 1 south, No. 2, No. 3, No. 9, Coal Creek. Also to No. 3, Michel. Also to No. 8 south, Michel, the latter being in connection with new work. Also to longwall, Blairmore mines, Frank mines, Bankhead mines.

2. The elimination of inequalities in price paid through the district on timbering, and the contract mining rate at Michel mines Nos. 3, 4, 5, and 7. Also contract mining rates at Bear Valley, Lille, Lethbridge, A. R. and I., Royal Collieries, Canmore, and Hillcrest.

3. The adoption of general provisions of the agreement as a basis of negotiations, with amendments to be introduced as the clauses are dealt with and additions to be submitted.

4. The same day wage scale as is provided for in the agreement between the Montana Coal Operators' Association and District 27, U. M. W. of A., with proportionate advances on all work not covered by the agreement mentioned, the engineers and mechanics classified.

5. An advance of 5.55 per cent. on all contract and dead work after adjustments are made.

6. A uniform price list for supplies.

7. All agreements to expire on the 31st day of August, 1912.

Reply of operators:—

In reply to the suggestions of the representatives of District 18, U. M. W. of A., the Scale Committee of Western Coal Operators' Association would suggest:

1. In regard to the fixing of contract rates on all new work before the general agreement is reached. These prices are matters of concern under the old individual agreements, and are questions that this Scale Committee has no authority to act on, except for the making of rates to govern the same after March 31, 1911, and will have to come up in the ordinary course of the making of the agreement, and not having any special preference over other clauses or rates. We would suggest that all contract rates be dealt with in accordance with provisions that may be provided for in the new agreement.

2. The elimination of inequalities in prices, etc., is a matter that has not any special preference over other clauses, but must

be taken up in the ordinary course in the making of a new agreement.

3. We will accept the general provisions of the present agreement as a basis of negotiations, with such amendments as may be agreed to.

4. We cannot accept the Montana scale of wages for the reason that the conditions and hours are not the same.

5. The mining rates of this district are already very high, and the present market price of coal will not permit of general increase.

6. We agree to a uniform list for supplies as far as possible.

7. We see no reason for changing the date of the expiration of the agreement, and suggest that next agreement expires March 31, 1914.

In view of the suggestion made in Section 3, we are now prepared to take up the general provisions of the present agreement clause by clause.

Check-Off Clause Bars Progress.

The proceedings of several days following the reply of the operators to the foregoing proposals of the miners are shown in the following despatch from Calgary to the District Ledger, Fernie, under date Calgary, March 9. An introductory note reads: "Any press reports that differ in substance from this despatch are inaccurate." The despatch follows:

"Both parties have been occupied since Saturday, 4th inst., in an effort to arrive at some understanding with regard to the check-off clause, which, of necessity, practically interprets the question of closed shop or otherwise.

"Operators insist on elimination from agreement of any clause that makes or tends to make it of a closed shop nature, and insist on renewal of the discrimination clause at present in force to apply to the whole of the operators. On Monday a sub-committee was appointed consisting of A. J. Carter, C. Stubbs, L. Stockett, and W. F. McNeill, to discuss the matter to see if some understanding could be arrived at. Miners have insisted from the first on retaining with the Crow's Nest Pass Coal Company and the Frank and Corbin Coal Companies, the check-off clauses, which are at present in force with these companies, failing the acceptance of a similar clause to govern the whole of the Western Coal Operators' Association. Later on the miners' representatives submitted a general clause to cover whole of mines comprised in Operators' Association, this latter providing for irrevocable check-off forms being signed by all workers, and the local secretaries to examine register of employees. Operators state that this tends to closed shop and will not entertain same. Both sides insistent and discussion of other portions of agreement tied up pending settlement of this question.

"Full conference re-convened this morning, when sub-committee reported that after careful deliberation they were unable to recommend any action for the joint committee. The conference was thereupon adjourned to March 20th inst."

In brief explanation of the foregoing, it may be mentioned that under the check-off system, all workers, whether members of the union or not, are required, before commencing work with the company employing them, to sign a form authorizing the deduction from their wages of the dues of the local union. This enables the union to make use of the company as a means of supplying information relative to all men it employs and for collecting dues from the men. The three companies above-mentioned as having granted the check-off system in the past did not join with the Operators' Association at the time of its making its last agreement with the U. M. W. of A., but made individual agreements. In the spring and summer of 1909 there was a long fight over the closed shop question, but the Operators' Association remained firm, keeping the various mines represented by its members idle until eventually its contention for open shop was agreed to on behalf of the miners.

ENFORCING COAL MINES REGULATION ACT IN ALBERTA

Contraventions of the Coal Mines Regulation Act of the Province of Alberta have led to prosecutions, with the consequences stated below:

W. P. Williams, manager of the Lille colliery of the West Canadian Collieries, Ltd., was fined $40 for employing to act as a fire boss a man who did not possess the necessary certificate of competency; and John T. Griffiths, the man so employed, was fined $25.

— Pearson, a fire boss at the West Canadian Collieries, Ltd., Blairmore mine, was fined $5 for non-compliance with regulations in connection with shooting.

Geo. Darbyshire, of Burmis, was fined $10 and costs for having returned to his place in the mine after a shot had been fired and before the place had been examined by the fire boss. T. Tonge, the fire boss whose duty it was to have returned and examined the place before operations were resumed in it, was fined $20 and costs for having failed to do so.

Thomas Rawson, a fire boss, was charged with handing matches to miners for them to fire their own shots, but was dismissed owing to the papers in connection with his prosecution having been irregularly made out.

The District Ledger, the United Mine Workers of America newspaper published at Fernie, B.C., made the following comment: "The above cases were all prosecuted at the instigation of J. T. Stirling, Provincial Inspector of Mines, and we hope that the experience of these law-breakers will have a deterrent effect upon others, but if not and they are discovered, that the punishment meted out will be more severe, as it is imperative that mining, hazardous even under normal conditions, should not be knowingly made more so by wilful disregard of laws and common sense."

On March 5th the fire bosses employed in coal mines in western Alberta met for the purpose of forming an organization for mutual aid and benefit, inasmuch as they are not eligible for membership in the United Mine Workers of America. After discussion organization was effected, and the following officers were appointed: T. Bradley, Hillcrest, president; J. Finlayson, Frank, vice-president; R. Ridley, Blairmore, secretary-treasurer.

BRITISH COLUMBIA.

It is singular what little regard for facts some men have. A recent case was that of the publication in a British Columbia daily newspaper of "A Page for the Wage-Worker," from which the two excerpts printed below have been made. The first one ran thus: "Through the fighting proclivities of Messrs. Hawthornthwaite and Williams, Socialist members of the British Columbia Legislature, the Coal Mines Regulation Act has been amended to meet the approval of the miners. Strict enforcement is all that is needed to make the legislation along these lines the best in the world." This comment is in strong contrast to that of one of the supporters of the Provincial Government who, when the bill was before the House, most emphatically condemned the two Socialist members named, each representing a coal mining constituency, for having abstained entirely from joining with the miners in giving to the Deputy Minister of Mines and the Chief Inspector of Mines, information that would be helpful in making the bill thoroughly useful and effective in securing the safe working of the coal mines of the Province, as far as could be done by legislation. Several amendments of minor importance offered by these Socialist members when the bill was before the House were accepted by the Government, but practically every important change in the Act was made by the Government after conference between its officials and miners at the mines, all the coal-producing districts of the Province having first been visited by the officials for the express purpose of ascertaining the views of both mine operators and miners before completing the bill for submission to the local Legislature.

The second excerpt follows: "The coal miners of Michel, B.C. have decided to no longer accept the reports of Government appointed inspectors as to the presence of gas in the workings. Recent fatalities in Alberta, nearby, have aroused a determination on the part of the miners to either have inspectors of their own or cease work wherever it is felt dangerous to enter the mines. The

outcome of such action will probably force the Government to accede to the request of the Socialist members of the House.'' Well, not only did the Government persist in its refusal to permit the coal mine inspectors to be appointed by the miners, but the secretary of the local miners' union at Michel sent to several newspapers, for publication, his distinct denial that the miners there objected to the Government mine inspectors; on the contrary, he wrote that the men had every confidence in those officials. Their stated grievance, to secure the remedying of which they stopped work for a few days, was in connection with the running of the ventilating fans, and the company made an improvement in this connection, and in other ways met the claim of the miners for arrangements they considered necessary for their protection when working in the mines. Further, the inspectors of the local mines at Michel, which is in British Columbia, have absolutely nothing to do with mines in Alberta, the latter province having its own laws and regulations, so that if there has been any laxity in observing them the British Columbia officials are entirely free from blame, since they have no jurisdiction outside of this province. No doubt this is known to the more intelligent of the English-speaking or English-reading miners, but to those who are ignorant or illiterate it may not be known, hence the cunning of writers of such mis-statements.

Slocan—A syndicate of men interested in restoring to Kaslo the commercial advantages that accompanied the operation of the Kaslo & Slocan Railway prior to the destruction by fire last summer of a number of railway bridges and trestles between McGuigan and Sproule's, has been negotiating with the Provincial Government with the object of obtaining from this source substantial monetary aid essential to the renewal and repair of the damaged parts of the railway, and for ore-shipping facilities at Kaslo, but at the time of writing nothing definite has resulted. The syndicate has offered to buy the railway from the Great Northern Railway Company for a comparatively small sum, and to operate it after putting it in working order, so as to provide transportation facilities for mining properties from McGuigan to Kaslo, these including the Rambler-Cariboo, Lucky Jim, Whitewater group, Utica, and other mines about McGuigan basin and Whitewater camp, and as well for a number of properties situated up the south fork of Kaslo Creek, which have waggon road connection with the railway seven or eight miles from Kaslo. It is thought that if nothing comes of present negotiations, there will be but little chance of the railway being operated again, at any rate for several years.

The only mine in the part of Slocan district affected by the stoppage of traffic on the K. & S. Railway that has been shipping ore this year, notwithstanding existing unfavourable conditions, is the Rambler-Cariboo, but now that the snow is melting the road between the mine and Three Forks, on the C. P. R. Company's line from Sandon to Nakusp, via Slocan Lake, much heavy hauling can not be done. By the middle of March about 600 tons of ore had been received at the Trail smeltery from the Rambler-Cariboo, which was nearly as large a quantity as was received from that mine during the whole of 1910, the damage done by last summer's forest fires having prevented shipment during the greater part of the latter half of the year.

In other parts of Slocan district progress is being made, with mining activity around Sandon, New Denver, and Silverton. Only two mines are maintaining a substantial production, namely, the Richmond-Eureka and the Standard, though several others are expected to make a fairly large output of ore later in the year. It is probable the Standard will add considerably to its tonnage during the latter half of the current year, for it has lately been announced that a concentrating mill is to be erected and equipped, a compressor plant put in for machine drill and general power purposes at the mine, and an aerial tramway constructed from mine to mill. Meanwhile development work is being continued in adits Nos. 5 and 6, and large bodies of ore are being opened ready for extraction. Mention was made last month of progress being made with the work of equipping the Van Roi mill, situated higher up Four-Mile Creek than the Standard; also, of the Hewitt-Lorna Doone group, owned by the Silverton Mines, Ltd., and having much ore available for stoping.

Rossland—The output tonnage of this camp for the first quarter of the year may be placed at about 55,000 tons of ore shipped crude to the smeltery, and approximately 2,000 tons of low-grade ore concentrated at a local plant. The Consolidated Mining & Smelting Company's Centre Star group has produced nearly two-thirds of this quantity, with the mines of Le Roi No. 2, Ltd., next in tonnage, and then Le Roi. The production of the last-mentioned mine during the three months has totalled more than 3,000 tons.

The exploration of properties in the south belt of this camp has recently again been urged, and a proposal made that, say 20 men should each subscribe $500, the $10,000 to be thus obtained to be used in a systematic search for ore, and its development if found, the company to be a development company only, exploring properties held under lease and option of purchase, and, in the event of success, the proved property to be disposed of to capitalists to be worked on a larger scale. No steps have yet been taken to carry this proposal into effect, but it is being discussed in the camp and its feasibility being considered.

Coast—Reports received from Portland Canal district about the middle of March indicate that the season may be expected to be favourable to a resumption of mining operations earlier this year than last. The snow is said to be melting quickly and as a consequence it is thought probable work will be resumed a month earlier than in the spring of 1910. There has not been much information published lately relative to the work done during the winter on the few properties where a suspension was not necessary. The most cheering news to those interested in the progress of the camp was that relative to the first shipment in considerable bulk from a local mine, the Portland Canal Mining Company having sent down to Stewart between 400 and 500 tons of iron concentrate, containing value in gold. This shipment was consigned to the Tyee Copper Company's smelting works at Ladysmith, Vancouver Island. The silver-lead concentrate produced by the company's concentrator is to be shipped to the smeltery at Tacoma, Washington, U.S.A.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax, N.S., March 17.—Controlling interest in the tungsten mine located at Scheelite, near Moose River, Guysboro County, has been sold by A. A. Hayward to a syndicate composed of prominent Canadians. The price for the interest is about a quarter million dollars, and outside of the coal mines is the biggest ever made in Nova Scotia.

Sydney, March 17.—A mining deal has been completed here within the past week, whereby the property of the Colonial Coal Company, whose areas are situated at Little Bras d'Or has been purchased by a company of American and English capitalists, who will operate the colliery. The price said to have been paid was $200,000. W. A. MacKay retains an interest in the new concern, and it is known that there are several other prominent local men interested. The new company will make a number of improvements to the equipment of the colliery, and a busy summer is anticipated in that district.

QUEBEC.

Montreal.—It was rumoured to-day that Mr. J. N. Greenshields and associates have secured options on some of the biggest producing asbestos mines in Russia.

It is stated in the same connection that Mr. Slade, of the Black Lake Company is in Russia looking over the situation on behalf of Mr. Greenshields.

In a measure the Russian properties, though of low grade ore, were responsible for the flooding of the markets in 1909-10 and the present negotiations no doubt are with a view of adjusting the supply of raw material to the advantage of all concerned.

ONTARIO.

Toronto, March 18.—As expected, the Ontario Government has come to the aid of Little Nipissing Silver Cobalt Mining Company. On motion of Hon. W. J. Hanna, the rules were yesterday suspended to allow the introduction of a bill to authorize the company to take the necessary steps with regard to capitalization to cover issue of six hundred thousand stock.

Porcupine, Ont., March 18—In point of development the Vipond, or under its chartered company name, the Porcupine Gold Mines, ranks next to the Dome and the Hollinger. A month ago the Vipond cut the No. 2 vein at the 100-foot level, which, on the surface, has been stripped for 200 feet and shows an ore body 160 feet long.

Kenora, March 11.—An interesting mining case was heard on Thursday and Friday at Kenora, before S. Price, of St. Thomas, mining commissioner for Ontario. The case hinged on four iron claims which were acquired at different times, and in which several local parties have interests, situated near Dinorwic. The properties were taken up some years ago, originally, and it was only when an endeavour to establish a title was made by one interested party some months ago it was discovered that the other owners had not parted with their interests or were not willing to dispose of them. All the various interests were represented by lawyers, with the exception of E. R. Reese, of Winnipeg, who, while not actually interested, is stated to have the iron claims now in question under option of purchase.

No decision was given by Commissioner Price at the time, as, owing to the mass of evidence produced, it will require some considerable time to go over the record. However, it is likely that his decision will be rendered within a week or so.

BRITISH COLUMBIA.

Nelson.—That there is sufficient ore ready to be taken out of the workings of the Nugget mine to keep the mill in operation during the three months of April, May, and June, when the melting of the snow causes trouble with water and makes operation difficult, was the statement made by W. B. Pool, manager of that well known Sheep Creek property, last night. Mr. Pool came in with a brick, the product of one month's run of the mill, which assays in the neighbourhood of $5,000.

Silverton.—The new concentrator that has been erected in connection with the Van Roi silver-lead mine has been completed, and has started operations. The last piece of machinery has arrived at the mine and the plant has been started. The necessity for the new concentrator arose from the impossibility of the Van Roi Mining Company securing another long term lease of the Wakefield mill, which it has operated in the past, including last year.

Vancouver, B.C., March 15.—If negotiations now under way are carried out the Vancouver exhibition will this year have one of the finest and most attractive mining and mineral exhibits ever made in the Dominion. The management is taking special action on this line and aims to present an exhibit which shows all phases of the work. At a meeting of the board of control of the association yesterday, H. B. Brown, owner of the Bulldog mine at Hedley, discussed the matter with the managers. He said one of the chief difficulties would be the shipment of ores from the mines to the grounds, but laid before the managers plans for securing an extensive exhibit of minerals as well as the installation of a working stamp mill. After discussion Manager Rolston was instructed to take the subject up with mining companies and endeavour to arrange for a mineral exhibit which would adequately represent the interests.

COMPANY NOTES

Western Coal & Coke Company.

The annual report of the Western Coal & Coke Company contains a statement by E. B. Greenshields, president, and Charles Fergie, managing director. The latter's statement refers to the physical part of the company. Mr. Greenshields' report is in part:

For the past year the attention of the directors has been given to the developing work, and proving the reserves of coal. The main entries are four thousand feet in coal, and the main hoisting slopes are down over one thousand feet, where the coal has been found in fine quality and in regular ground. The seam of coal has been opened up on each side of the Beaver Creek valley, giving two entries into the coal. The result of the work this year shows that the physical condition of the property is even better than anticipated, and the coal reserves greater than estimated, and the directors are very much pleased to be able to state that the mine is now in a position to ship coal in paying quantities. The report received this week from the superintendent is that everything at the mine is in a very satisfactory state, and he expects by this fall to be able to ship one thousand tons of coal a day. As you are already aware, the coal has been thoroughly tested on the Canadian Pacific Railway with most satisfactory results and its coking quality has also been proved.

Your directors have made arrangements to have the railway built this summer to connect the mine with the Canadian Pacific Railway at Pincher.

A careful survey has been made of the ground, and a good route chosen which shortens the distance to 13 miles. The road will be built by a separate company, but this will be controlled by the Western Coal & Coke Company.

The difficulties that have been met with in the past history of the company seem at last to have been overcome, and the present prospect is bright with the promise of the successful operation of the mine in the near future, and of its being a large producer and shipper of the best quality of bituminous coal.

La Rose Dividend.

The directors of La Rose have declared the regular quarterly dividend of 2 per cent., payable April 20, to shareholders of record March 31. Books close April 1.

STATISTICS AND RETURNS

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending March 17, and those from Jan. 1, 1911, to date:

	Mar. 17. Ore in lbs.	Since Jan.1. Ore in lbs.
Barber	....	6,000
Beaver	....	551,513
Buffalo	....	551,513
Chambers-Ferland	....	256,900
City of Cobalt	66,000	252,280
Cobalt Lake	61,420	1,146,990
Cobalt Townsite	.....	289,740
Coniagas	69,400	934,180
Crown Reserve	65,000	508,670
Hargraves	.....	41,100
Hudson Bay	.....	122,350
La Rose	61,200	1,105,720
Kerr Lake	.....	721,592
King Edward	.....	40,000
McKinley-Darragh	65,190	1,312,940
Nipissing	.....	1,606,240
O'Brien	.....	271,320
Peterson Lake (Little Nip)	.....	58,430
Right of Way	.....	318,260
Silver Cliff	.....	98,180
Standard Cobalt	.....	44,813
Temiskaming	.....	363,419
Trethewey	48,100	229,700
Wettlaufer	.....	60,022

The shipments for the week were 436,310 pounds, or 218 tons.

The shipments from Jan. 1 to March 17 were 10,897,470 pounds, or 5,448 tons.

BRITISH COLUMBIA ORE SHIPMENTS.

The following are the figures of the ore production and movement for the week ending March 18, and for the year to date:

BOUNDARY SHIPMENTS.

Granby	25,601	237,868
Mother Lode	8,400	67,599
Snowshoe	1,868	22,338
Rawhide	112	33,052
Jack Pot	1,520	6,826
Number Seven	49	612
Other mines	.....	2,377
Total	37,547	370,672

ROSSLAND SHIPMENTS.

Centre Star	2,971	36,947
Le Roi No. 2,	420	5,106
Le Roi No. 2, milled	300	3,300
Le Roi	63	2,878
Other mines	.....	217
Total	3,754	48,448

SLOCAN-KOOTENAY SHIPMENTS.

Sullivan	1,021	7,343
St. Eugene, milled	2,775	30,525
Richmond-Eureka	57	614
Ruth	70	235
Rambler-Cariboo	70	646
Queen, milled	420	4,410
Granite-Poorman, milled	250	2,750
Nugget, milled	110	1,210
Wilcox, milled	75	825
Emerald	124	841
Standard	31	391
Yankee Girl	96	1,104
Mollie Hughes	21	29
Molly Gibson	58	249
Number One	27	27
Vancouver	26	26
Other mines	.....	1,596
Total	5,231	52,821

The total shipments for the week, including the estimated milling, were 46,530 tons, and for the year to date, 471,941 tons.

B. C. COPPER COMPANY'S RECEIPTS.

GREENWOOD, B. C.

Mother Lode	8,400	67,599
Rawhide	112	33,052
Jack Pot	1,520	6,826
Other mines	.....	240
Total	10,032	107,717

GRANBY SMELTER RECEIPTS.

GRAND FORKS, B. C.

Granby	25,601	237,868

CONSOLIDATED COMPANY'S RECEIPTS.

TRAIL, B. C.

Centre Star	2,971	36,947
Snowshoe	1,868	22,338
Sullivan	1,021	7,343
Le Roi No. 2,	420	5,106
Le Roi	63	2,878
Number Seven	49	612
Richmond-Eureka	57	614
St. Eugene	183	1,523
Ruth	70	235
Rambler-Cariboo	70	646
Emerald	124	841
Standard	31	391
Queen	115	528
Yankee Girl	96	1,104
Mollie Hughes	21	29
Molly Gibson	58	249
Number One	27	27
Vancouver	26	26
Other mines	.....	4,082

The total receipts at the smelters for the week, including concentrates, were 42,898 tons, and for the year to date, 431,104 tons.

TORONTO MARKETS.

March 24—(Quotations from Canada Metal Co., Toronto):

Spelter, 5.50 cents per lb.
Lead, 3.65 cents per lb.
Antimony, 8 to 9 cents per lb.
Tin, 43 cents per lb.
Copper, casting, 13 cents per lb.
Electrolytic, 13 cents per lb.
Ingot brass, 8 to 12 cents per lb.

March 24.—Pig Iron (Quotations from Drummond, McCall Co., Toronto):

Summerlee No. 1, $23.00 (f.o.b. Toronto).

Summerlee No. 2, $22.50 (f.o.b. Toronto).
Midland No. 1, $19.50 (f.o.b. Toronto).
Midland No. 2, $19.00, (f.o.b. Toronto).
Hamilton No. 1, $18.00 (f.o.b. Hamilton).
Hamilton No. 2, $17.50 (f.o.b. Hamilton).
Clarence, $19.00 (f.o.b. Toronto).
Cleveland, $19.00 (f.o.b. Toronto).

GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.

Coke.

March 21.—Connellsville Coke (f.o.b. ovens).
Furnace Coke, prompt, $1.60 to $1.65 per ton.
Foundry Coke, prompt, $2.00 to $2.15 per ton.
March 21.—Tin (Straits), 41.00 cents.
Copper, Prime Lake, 12.50 cents.
Electrolytic copper, 12.25 cents.
Copper wire, 14.00 cents.
Lead, 4.45 cents.
Spelter, 5.65 cents.
Sheet zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 9.50 cents.
Aluminium, 21.00 to 21.50 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, 41.50 per ounce.
Platinum, hard, $43.50 per ounce.
Bismuth, $2.00 to $2.10 per lb.
Quicksilver, $52 per 75-lb. flask.

SILVER PRICES.

	New York. cents.	London. pence.
March 8	52⅞	24⅜
" 9	52⅞	24⅜
" 10	52¾	24 5/16
" 11	52¾	24 5/16
" 13	53⅛	24½
" 14	53⅛	24½
" 15	52⅞	24⅜
" 16	52½	24¼
" 17	53	24 7/16
" 18	52¾	24 5/16
" 20	52⅝	24¼
" 21	52⅝	24¼

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous.

March 23rd, 1911.

	Bid.	Ask.
Amalgamated Asbestos	12⅞	....
Black Lake	15½	16
Dominion Coal	....	....
Dominion Steel	....	....
Dominion Steel Corp. v-div. 1 p.c.	58	59
Granby	34	35
Consolidated Mining	40	50
Nova Scotia Steel	100	..
Crow's Nest Pass	....	74

Cobalt Stocks.

Amalgamated	...	...
Bailey	.04¾	.05¼
Beaver Consolidated	.36⅝	.36⅞
Buffalo	2.10	2.30
Chambers-Ferland	.11	.11½
City of Cobalt	.17	.17¾
Cobalt Central	.07	.09
Cobalt Lake	.18¾	.19
Coniagas	6.95	7.20
Crown Reserve	2.67	2.70
Foster	.06	.08
Gifford	.02	.03
Great Northern	.18⅛	.18½
Green Meehan	.03⅝	.03⅞
Hargraves	.18	.19
Hudson Bay	100.	110.
John Black	...	...
Kerr Lake	6.25	6.50
La Rose	4.58	4.65
Little Nipissing	.04⅝	.05
McKinley	1.72	1.73
Nancy Helen	.02	.03
Nipissing	10.90	11.00
Nova Scotia	.13½	.14½
Ophir	.10	.20
Otisse	.01½	.01¾
Peterson Lake	.09¾	.10¼
Right of Way	.05¾	.06
Rochester	.03⅝	.03¾
Silver Leaf	.03½	.04
Silver Bar	...	...
Silver Queen	.03	.04½
Temiskaming	.72	.73½
Trethewey	.94	.97
Watts	...	...
Wettlaufer	.90½	.95

Porcupine Stocks.

Hollinger	9.29	9.40
Monita	.28	.30
Preston East Dome	.45	.45½
Porc. Gold Mines	.64½	.65
Porc. Tisdale	.08	.10
United Porc.	.09	.12
Porc. Imperial	.19	.20
Porc. Central	.54	.59
Swastika	.55	.58
Dome Extension	.49	.51
Pearl Lake	.53	.54
West Dome	3.19	3.19¾

New York Curb.

March 23rd.

	Bid.	Ask.
Brit. Col. Copper	6	6¼
Butte Coalition	17½	18½
Chino Copper	22¼	22½
Davis-Daly Copper	1 7/16	1 9/16
Ely Consolidated	.24	.21
Giroux Mining	6⅛	6¼
Goldfield Consolidated	6⅝	6¾
Greene-Canadian	6 7/16	6½
Harcuvar Copper	...	...
Inspiration Copper	7 11/16	7 13/16
New Baltic Copper	....	...
Miami Copper	19¼	19½
Nevada Con. Copper	18⅝	18¾
Ohio Copper	1½	1 9/16
Rawhide Coalition	....	...
Ray Central	1¾	1 13/16
Ray Consolidated	17⅜	17½
Union Mines	⅛	¼
Yukon Gold	3⅞	3 1/16

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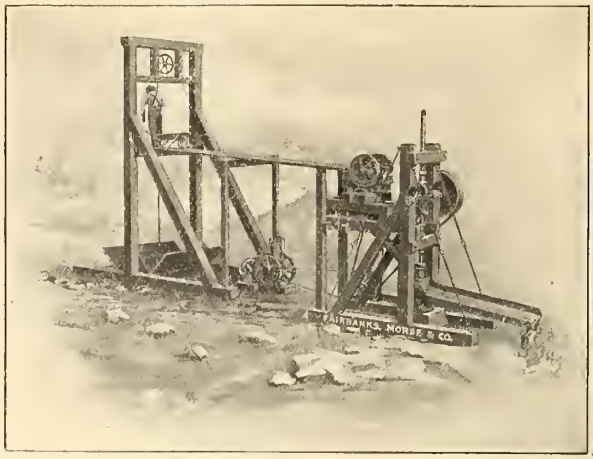

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Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map of Canada, by G. A. Young and R. W. Brock.

NEW BRUNSWICK and NOVA SCOTIA

1107. Joint Report on the Bituminous or Oil Shales of New Brunswick and Nova Scotia. Also on the Oil Shale Industry of Scotland Part I, Economics, Part II, Geology by R. W. Ells.

QUEBEC

1077. Memoir No. 7, Geology of St. Bruno Mountain, Quebec, with maps, by J. A. Dresser.

ONTARIO

1059. A Geological Reconnaissance of the region traversed by the National Transcontinental railway between Lake Nipigon and Clay Lake, Ontario. Accompanied by two maps covering the region, by W. H. Collins.
1082. Memoir No. 6. Geology of the Haliburton and Bancroft Areas, Ontario, by Frank D. Adams and Alfred E. Barlow.
1091. Memoir No. 1, Geology of the Nipigon Basin, Ontario, by A. W. G. Wilson.

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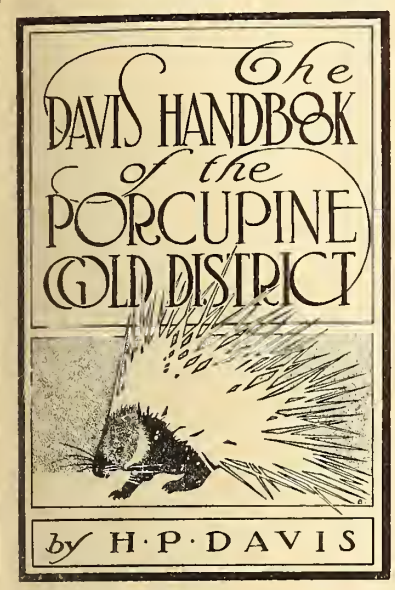

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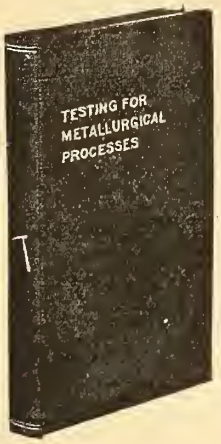

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PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Government of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unsurveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minimum being 40 acres in unsurveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

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Iron in large bodies of magnetite and hematite; copper in sulphide and native orm; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
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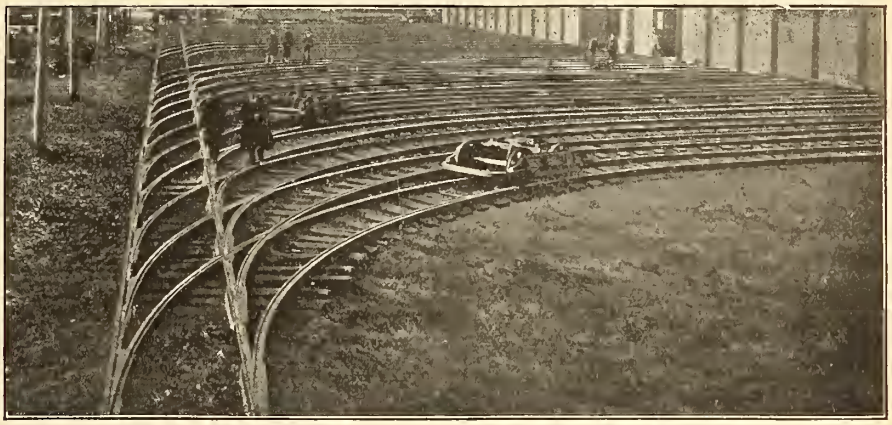

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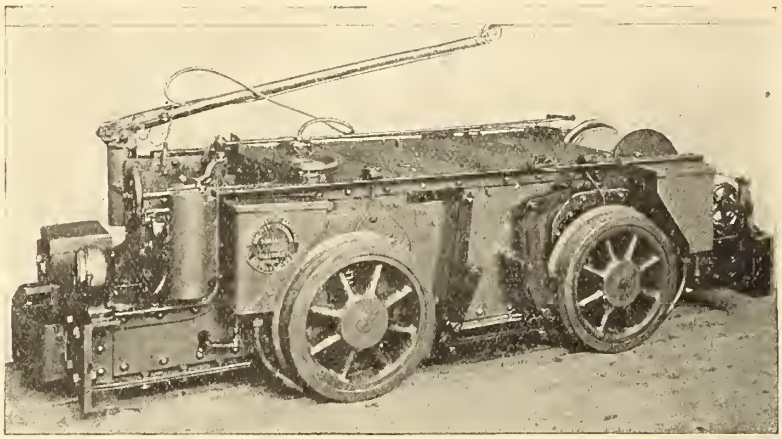

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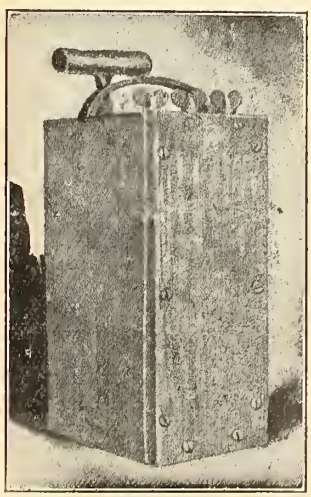

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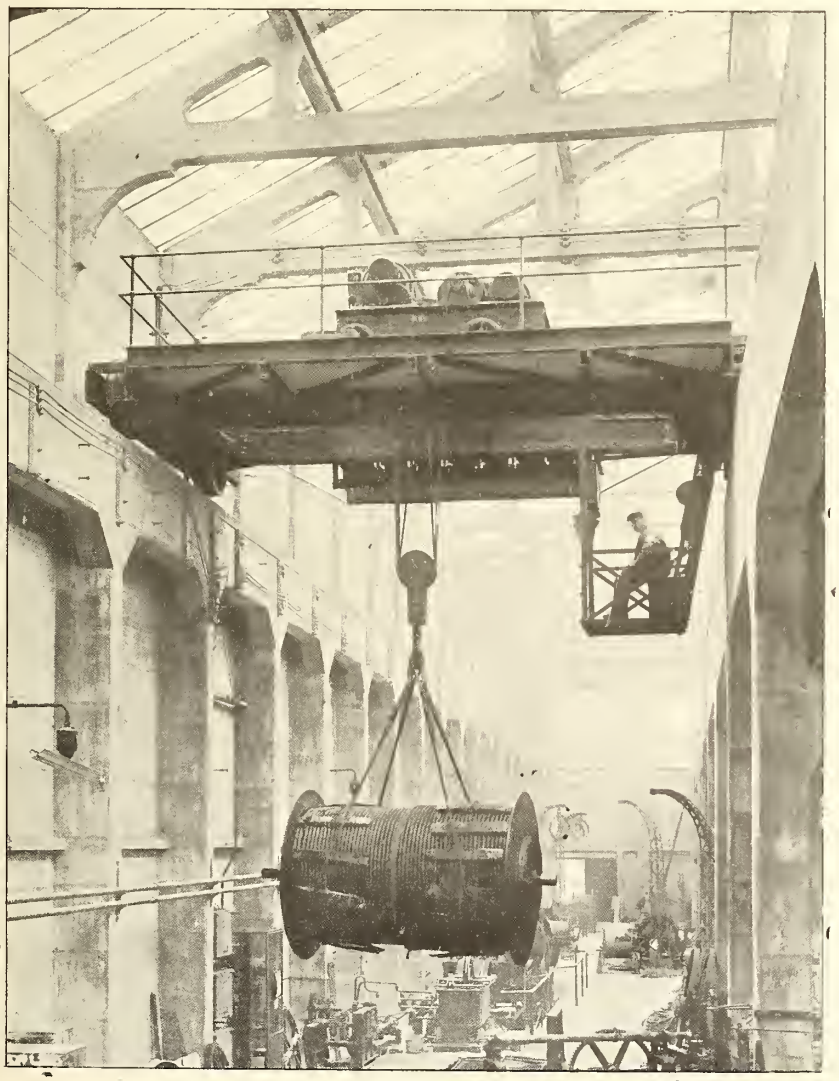

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VOL. 32 TORONTO No. 8

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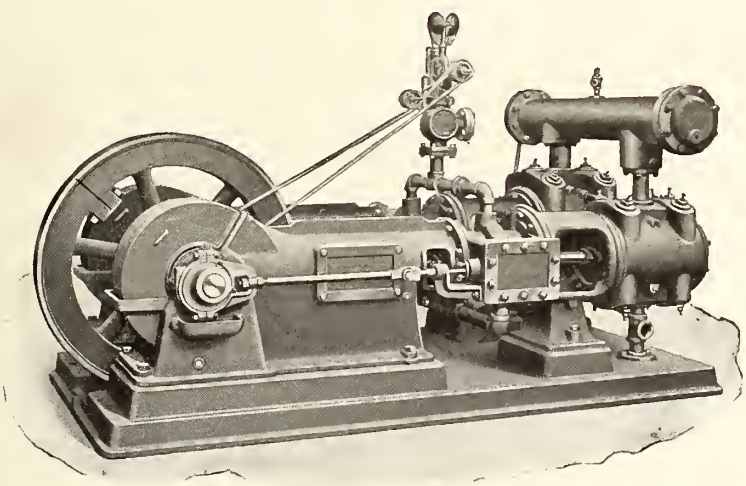

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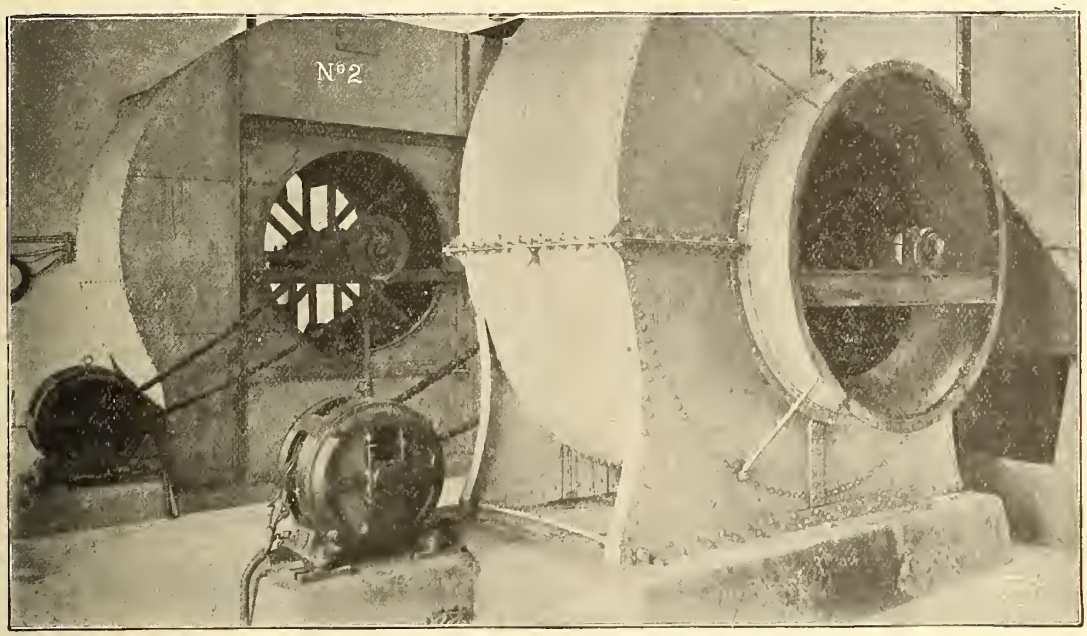

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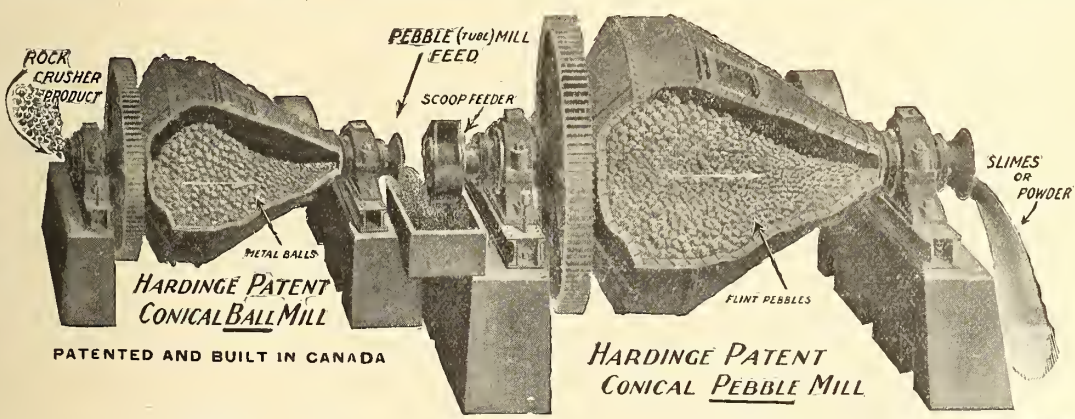

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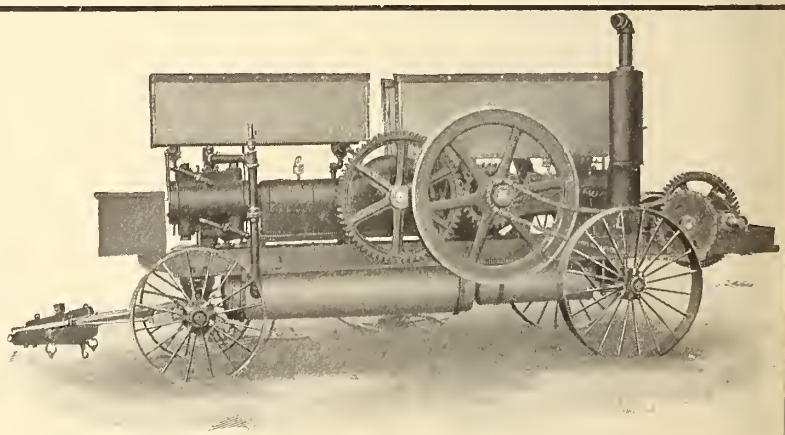

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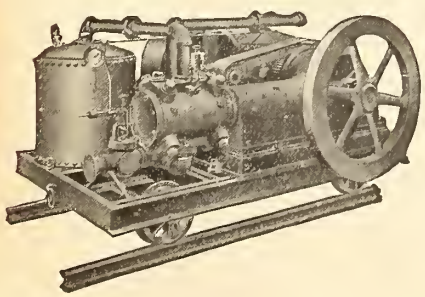

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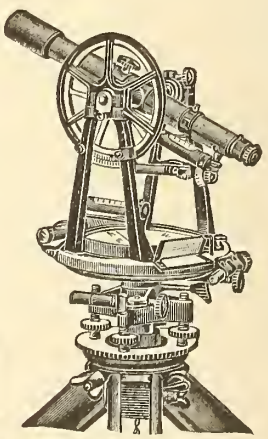

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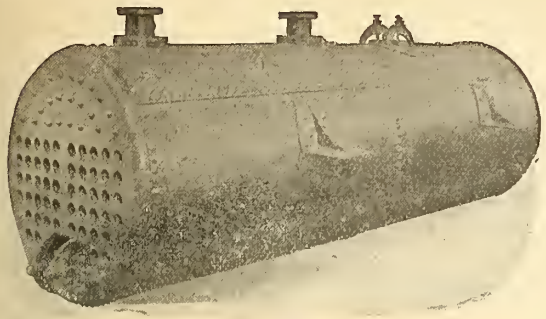

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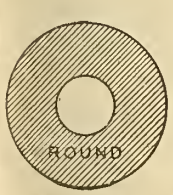

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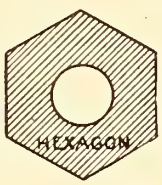

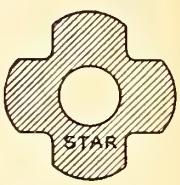

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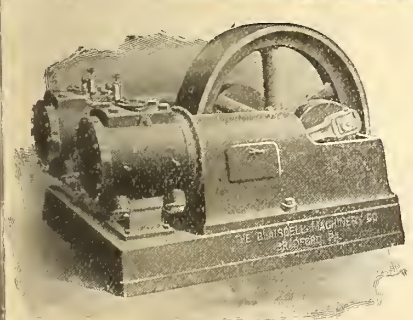

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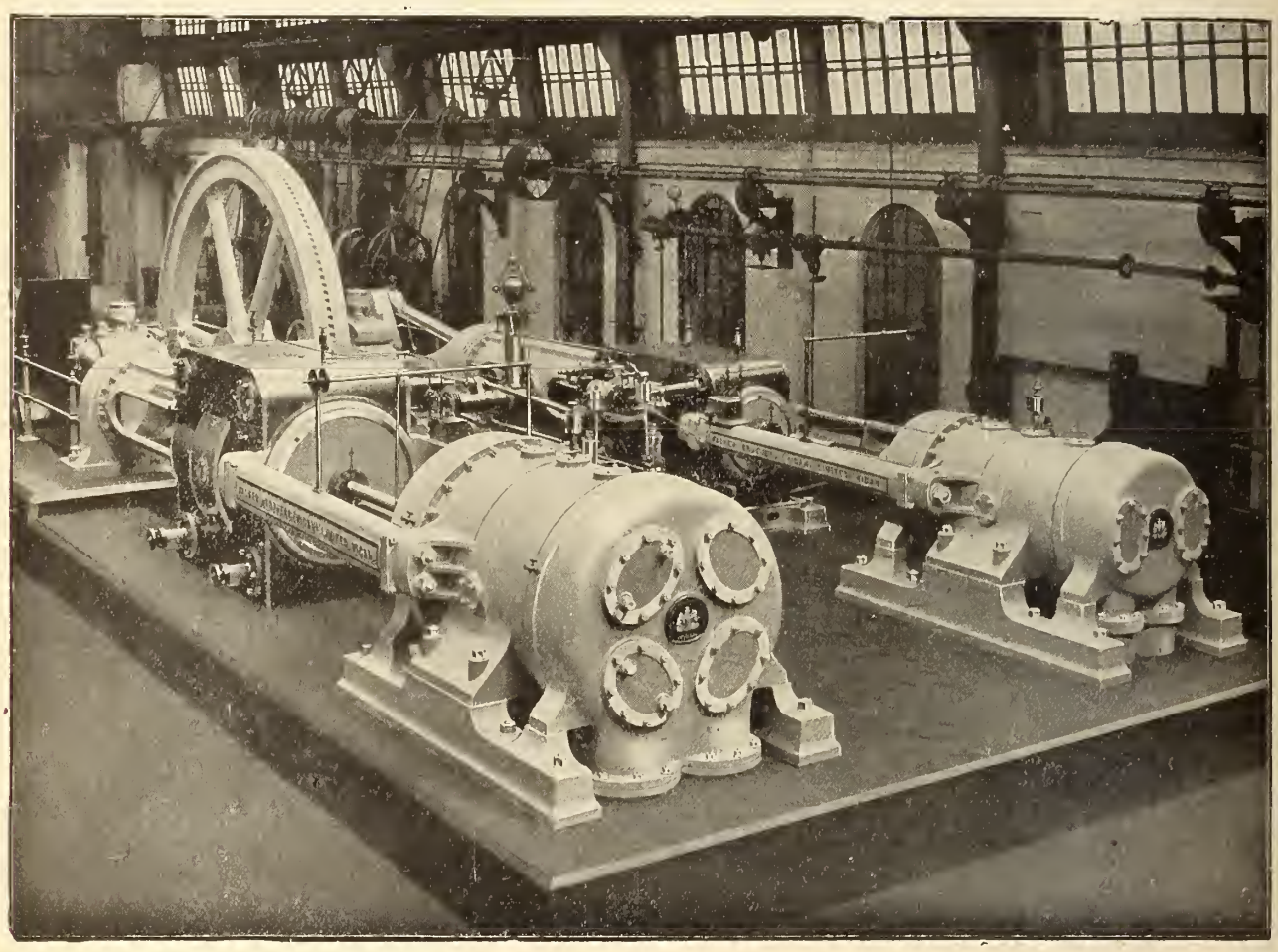

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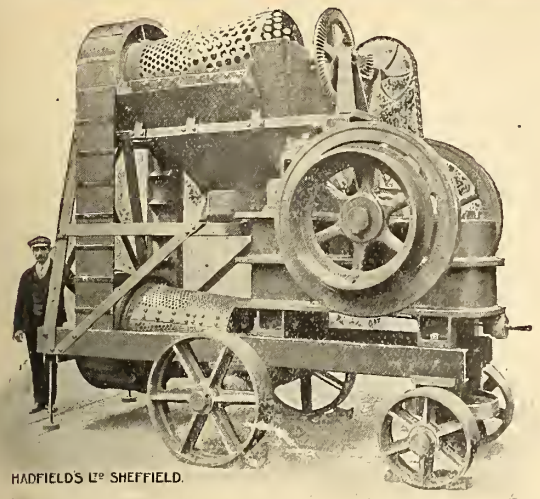

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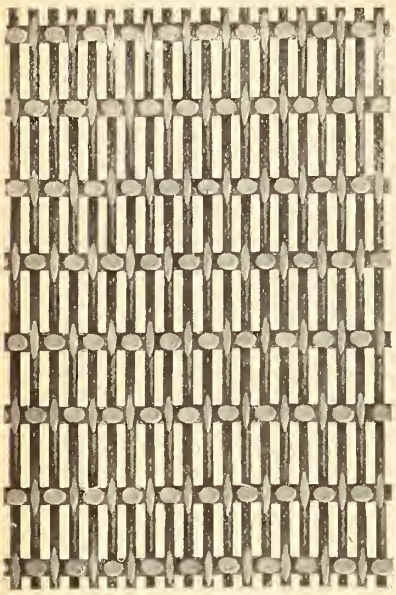

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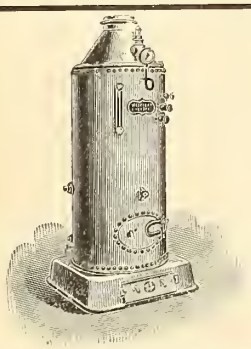

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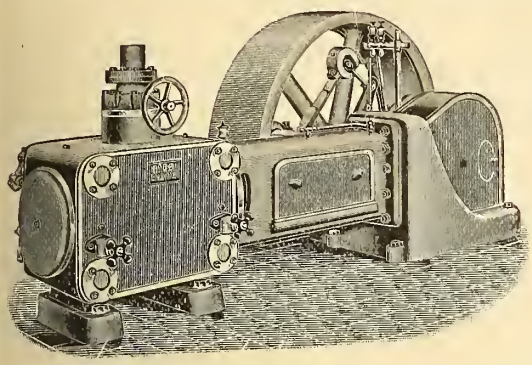

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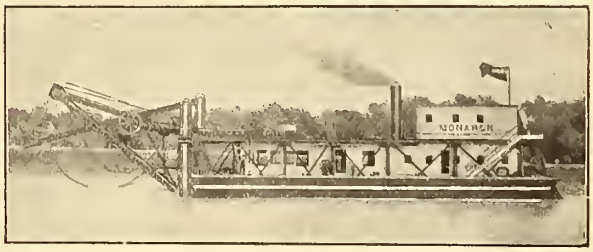

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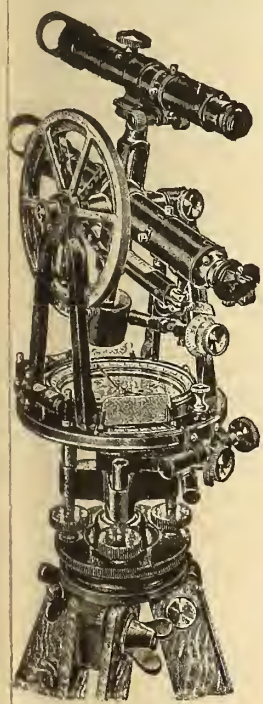

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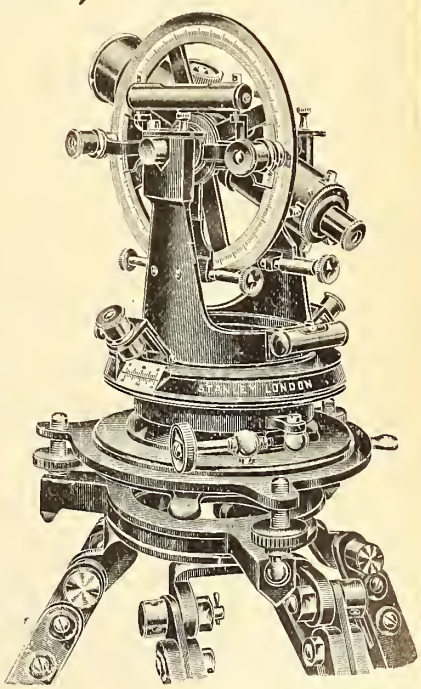

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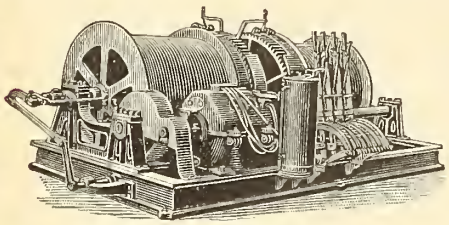

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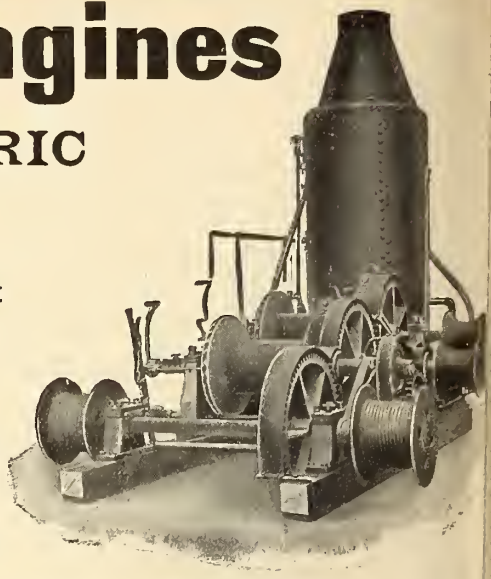

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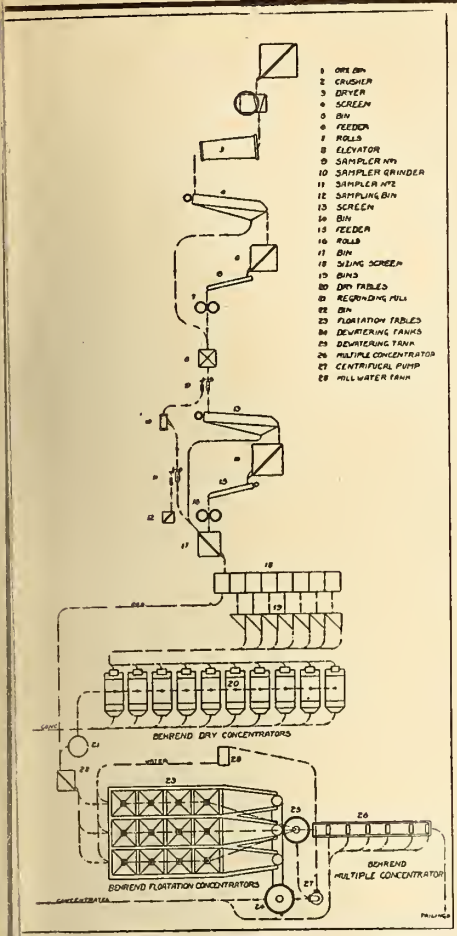

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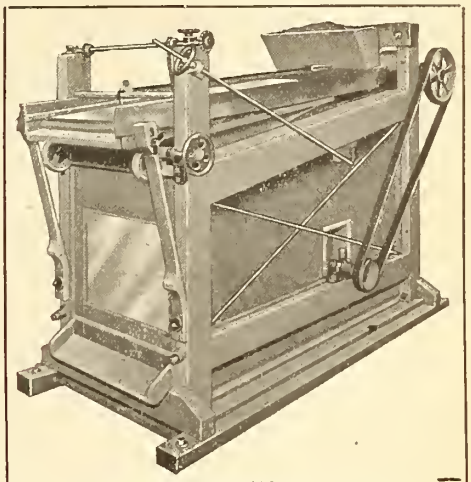

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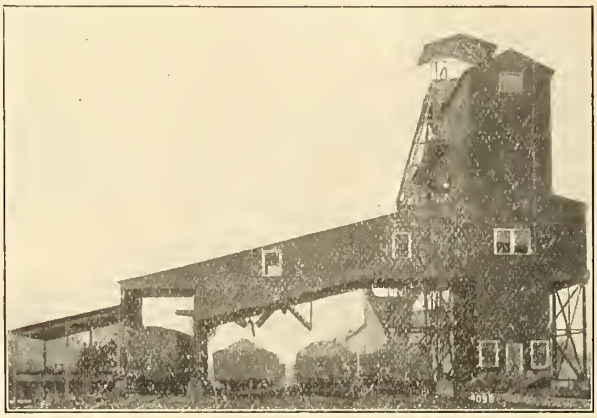

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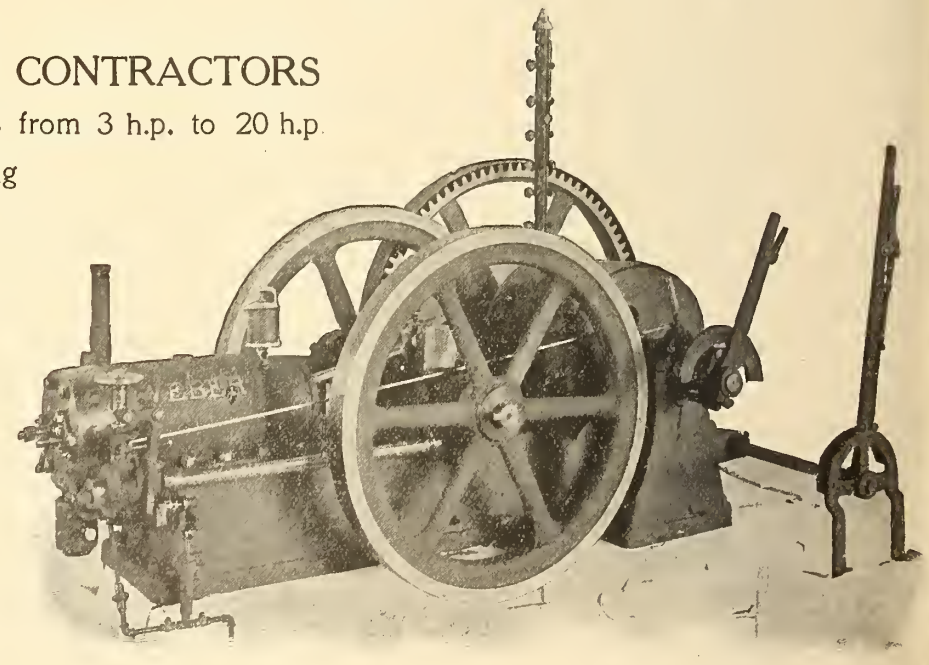

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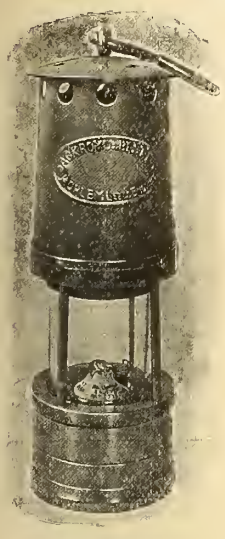

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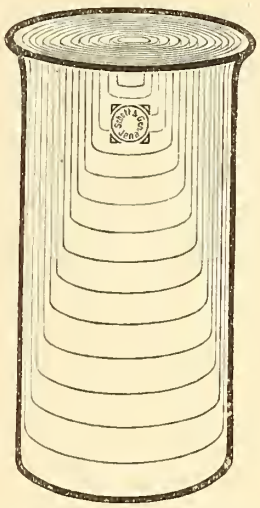

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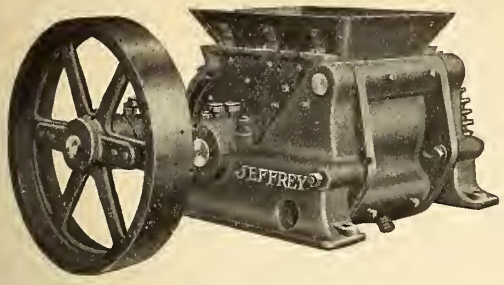

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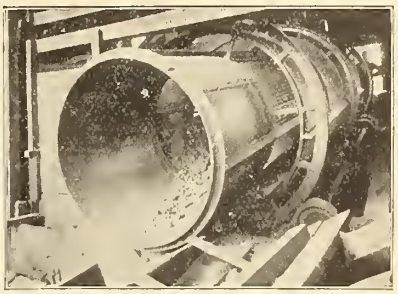

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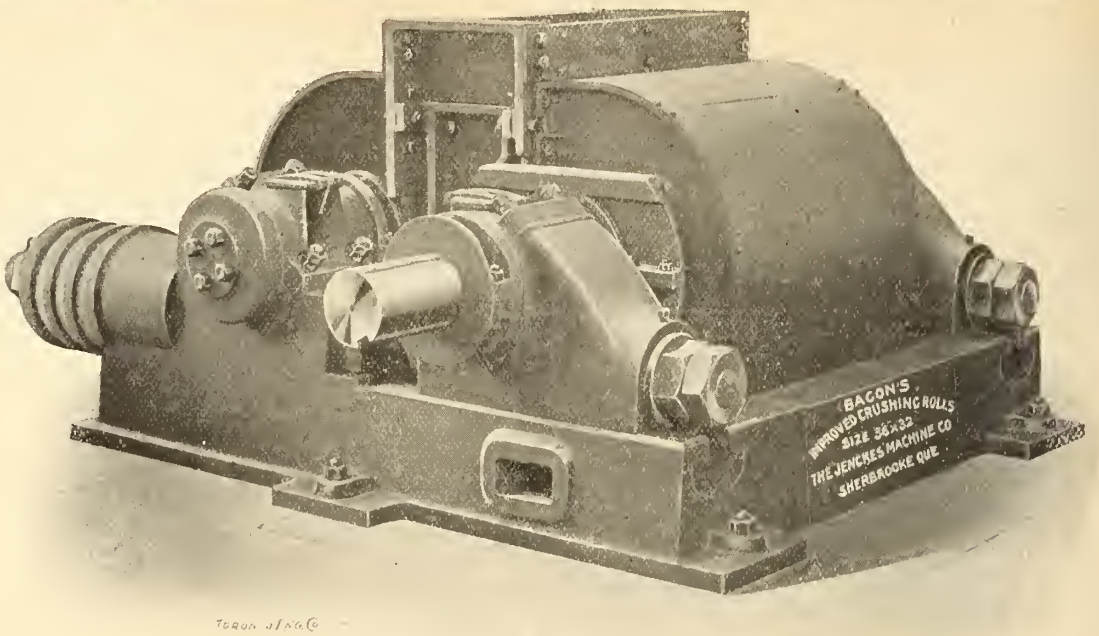

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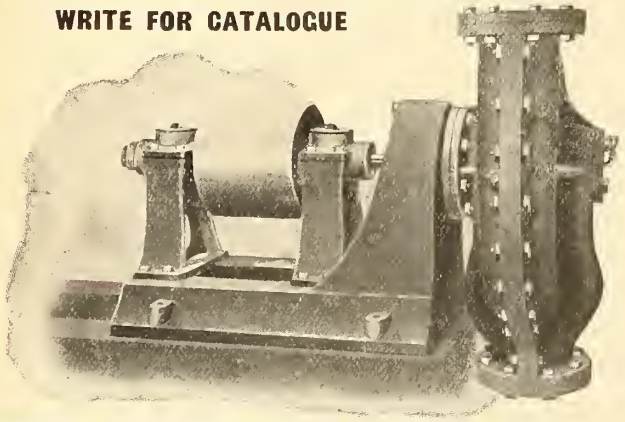

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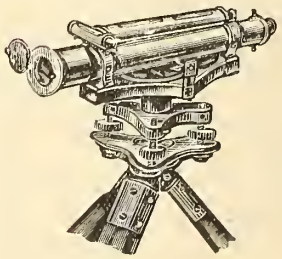

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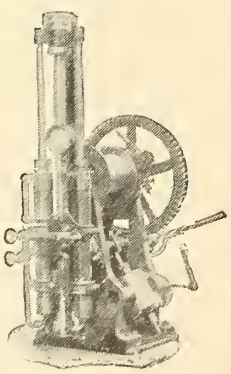

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THE CANADIAN MINING JOURNAL

VOL. XXXII. TORONTO, April 15, 1911 No. 8

The Canadian Mining Journal

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PROSPECTING IN NOVA SCOTIA.

That a radical change of methods is necessary to success in prospecting for gold in Nova Scotia is evident. The superficial extent of the province's gold-bearing rocks is estimated at between 3,000 and 6,000 square miles. The unit of land held under lease or prospecting license is an area—a space 250 feet by 150 feet. During the year 1910 work was confined to 95 areas.

Over a considerable period of years not more than 315 areas in all have been prospected or mined. At the close of the past year there were held either under license or lease 31,470 areas. Thus, placing the total gold-bearing territory at 3,000 square miles, we find that only about one-seventieth part, or 42 square miles, of the possible field has been taken up. An inconsiderable fraction of these holdings has been prospected, and a very much smaller portion mined.

These facts furnish food for thought, especially when considered in conjunction with the actual position of mining and prospecting. These conditions were illuminatingly touched upon by Mr. W. H. Prest in a paper read before the Mining Society of Nova Scotia. Mr. Prest points out the vital need of a practical knowledge of geology in prospecting a country like Nova Scotia. Familiarity with local conditions is, of course, a sine qua non. "Local experience is just as necessary," says Mr. Prest, "is just as necessary to the skilled mining engineer as it is to the prospector. The lack of practical knowledge on the part of our scientific men is only equalled by the lack of scientific knowledge on the part of our practical men." With this opinion we heartily agree. Nothing is more needed than an adjustment as between the empirical worker and the academic observer.

The day has passed when the man who "putters round the woods with a pick" can be considered a prospector. The complications of glacial and post-glacial geology must be studied and understood. The old method of uniformly tracking rich pieces of drift north is based upon insufficient knowledge. Nothing is more wasteful than indiscriminate trenching. Heavy work of this kind must be guided by close study of glacial and post-glacial action. This point is well illustrated by Mr. Prest from instances in his own experience.

Moreover, the haphazard manner in which preliminary work is undertaken is so costly that much discouragement has resulted therefrom. Mr. Prest suggests many possible and practical economies.

Two concluding paragraphs demand quotation: "I refuse emphatically to believe that there is any such thing as failure in prospecting in Nova Scotia, providing the money and practical knowledge are forthcom-

ing. . . We want geology, but only its most practical side. We want labour, but only its intelligent use; and last, but not least, we want solid financial backing."

STATISTICS AND CONSERVATION.

No one mineral commodity is subject to more extraordinary waste in mining, storage, transportation, and consumption than coal. In Nova Scotia, for instance, it can be proved that a large percentage of coal that was once available in the mine is now of no commercial value to the owners. Also there has been large waste through deterioration in storage. The same applies to our western collieries.

Both in Canada and in the United States the wasteful bee-hive even yet obtains—and for this there is yet good reason. The remedy for this condition can be only applied in homeopathic doses. No sweeping change is possible. But it is certain that the bee-hive will gradually be superseded by the retort oven, as witness the fact that 6,254,644 tons of coke were made in by-product ovens in the United States during 1909, while ten years ago the production was 1,075,727 tons. Some significance also may be attached to the fact that whereas in 1880 an average of 3,140 pounds of coal was used in making one ton of coke, only 3,020 pounds being used per ton of coke in 1909. These figures, are taken from Dr. E. W. Parker's report to the U. S. Geological Survey. Dr. Parker attributes this improvement entirely to the increased use of retort ovens.

Many more facts could be adduced from the same report. Our point, however, is that the cause of conservatism is definitely strengthened by means of carefully compiled statistics. Coal is at once our most important and our most largely wasted natural resource. Every unmined ton is appreciating yearly in value. We have only a vague idea of where we stand, of how large our reserves are, and of how enormous our waste. There could well be established at Ottawa an off-shoot of the Mines Branch to guard our natural stores of fuel.

THE WESTERN COAL STRIKE.

The strike of coal miners in Alberta and eastern British Columbia was declared on April 1st. Not less than 7,000 men are directly concerned. About 5,500 of these are members of the U.M.W.A. The mines that are closed produce an annual aggregate tonnage of about 4,300,000 tons. The suspension of coal production naturally entails the cessation of operations at the mines and smelters of southeastern British Columbia. Thus the copper industry of the west, giving employment to probably 4,500 men, will be temporarily closed.

The smallest item in all the train of suffering that strikes bring is loss to the investors. The largest is the misery that is brought upon the families of the thousands of workers directly and indirectly affected. A protracted strike breeds crimes of violence. No one can foresee the final outcome. To our mind the str is a grotesque anachronism. That it should still permitted in this country, despite our elaborate p ventive machinery, is tragical.

Already many of the unemployed miners are mov to the coast in search of employment. Soon the ca less good-nature that characterizes the inception hostilities will be replaced by rancour and open hos ity. The longer the life of the strike, the less will t mischievous organization, the U.M.W.A., be able carry out its pledges of financial support. When pinch of short rations is felt then also is felt the des for blood. The miserable drama, whose closing sc is even now being enacted in Nova Scotia, is evide a-plenty of the moral irresponsibility of the U.M.W.A leaders. To them the imposition of easily avoida hardships upon numbers of women and children i negligible incident.

In the present crisis the attitude of the Departm of Labour is not reassuring. With some regret we led to believe that the Hon. Mr. King fears to give Lemieux Act a thorough trying out. We hope t this belief is not well-founded. But it is quite appar that the U.M.W.A. intends to have its own way and flout openly any efforts of the Department that not in accord with U.M.W.A. ambitions.

Whether there shall be or shall not be "open-sho" is nominally the main issue. In reality, the objectiv the U.M.W.A. is supreme control of the coal-min situation in the west. How catastrophic such an ev tuality would be, we can judge by results in the e

In any rational and continued movement towa better conditions of work and living the coal mi of Alberta and British Columbia will have the m support of the Canadian public. In following the l of vicious foreign demagogues the miners lose all cl upon the sympathy of their fellow citizens.

UNTECHNICAL WRITING.

In the course of our duties we are called upon read a large number of professional reports and a c siderable volume of correspondence. Naturally th documents vary through a tremendous range of m demerit, and awfulness. In the main it is safe to s sert that hardly one report out of ten is prop written. Even the tenth, excellent as it may be i technical sense, falls short of what it might be bec of the careless use of the English language.

Undoubtedly many serious losses have been incu through the use of loose and ambiguous phrases. misplaced comma may alter the whole meaning sentence. Trivial typographical blunders may b ruin in their train.

As a signal example of obscurity we append a c of a letter received by a Canadian mining engin We can vouch for the authenticity of this letter. It has been reproduced as closely as possible in the im of the original. Here it is, and we defy our rea

arrive at the intentions of the writer:

Dear Sir I am droping you a line to see if
You care to Entertain a Copper &—Gold Prospect—
¾ of a
mile from Electrict Power line—4¾ miles from Rail-
road Station over good Wagon road—
there Was 93.242 of ore shiped
from there about 5 years ago—& it avriged $50.00 per to
& there Was Nothing. allowed:
them for the Gold & Silver—
the Prospectors left it to the Smelter Co—& they told
them the Gold—onley Ran from 50c. to $4.50 per ton
& the silver Was onley 60c. to 90c. per Ton & the
Prospectors—let it go for granted that it Was all true—
& they ware satisfyed With there ore as they ware
going $50.00 per ton out of it:
Now Here in the 60th there Was a shaft sank—100 ft—
deep & no difting there is about 18 in of good ore in
the shaft— & there is another Hole about 60 ft sank
some 40 years ago & no—drifting—in it—there is a
good showing in this Hole also More than 18 inches—
the fellows that owned. it: sank a hole about 50 ft
deep I think it was—& took out the 93.242.00 of ore
& shiped it they Cleaned out the other 2 Holes—& Had
a fine showing there. at that time: & I took Mr. L.
Lindsy of Los Angles Cal—there to see it.
they ware asking $50.000.00 for it then & Wanted
$5000.00 down before they would allow us to touch it
—Mr. Lindsy—told them he Would put 12 men to work
& prospect for 100-dayes & at the End of the 100-dayes
he Would give them the full $50.000.00 an he Would
give them. Whot ore he had taken out at his Expense
but one.
of the Prospectors was
held strong & Refused his offer—then We left it—
in about 2-Weeaks after that the owners fell out. quit
work: & shiped there ore & quit & Here about 9- monts
ago the fellow that Was—fair to deal With: traded:
His Partner out & I Can.
Now deliver it on a—2—years Working Bond—for
$2,000.00
No—money at all untill you have Prospected for 12.
months & if you are Not satisfyed at the end of the 12-
months pull off your Emprovements & quit.—if you
Want to go a head pay-half- of the $20.000.00 & go
ahead for 12 monts more then pay the bal—
Now there is but little to see untill the holes are
unwatered but it is No
Wile Cat & I feal—sure there is a good
Mine there & My offer—Sirtenly is Fair—
Would like to Hear from You
Yours—

TRANSVAAL MINING CAPITAL.

From returns recently furnished by the Transvaal Mines Department we learn much that will be instructive to those who seek to institute unwise comparisons between South African mines and those of undeveloped regions in this country. Of the 241 gold mining companies listed, 139 are on the Rand. Glancing at these latter, we find that 43 are dividend paying; 21 are producing ore but no dividends; 20 are in the development stage; and 55 are not working. Without the limits of the Rand there are but four dividend paying mines.

The net issued capital of the Rand mines aggregates roughly $309,000,000. The paying mines account for $165,000,000; the producing non-dividend mines, $50,000,000; developing prospects, $61,000,000; and dead mines, $33,000,000.

EDITORIAL NOTES.

Our readers are not to conclude that the illustrations representing Nova Scotian gold-mine scenes, published elsewhere in this issue, represent all that is to be seen. The province contains some admirably equipped plants, and numerous small modern stamp-mills.

Apart from scientific interest, the principal value in the reported discovery of diamonds in British Columbia lies in the excellent opening it gives for journalistic fireworks.

A custom that has survived too long is that of encouraging long-distance orators to torture us at official dinners. The annual dinner of the Mining Society of Nova Scotia, held recently in Halifax, was a noteworthy exception. At this event all speech-making, save only a short address accompanying the toast to the King, was done away with. Musical numbers took the place of the ordinary arid eloquence.

It seems highly probable that Canada will soon feel the grip, paternal or otherwise, of an explosives trust. The trust is an accomplished fact. The strangle-hold may come sooner or later.

The Board of Conciliation, appointed by the Department of Labour, decided in favour of the striking coal miners at Port Morien, Cape Breton. This decision will strengthen the hands of the miners. But it is remarkable how slightly the Department has been able to affect the grievous condition in Alberta and British Columbia, where thousands of miners have ceased work without even a colourable regard for the law.

The Porcupine boom has not gained the headway that brokers had hoped it would. The stock market is not over elastic. Not the prestige of the Bewick-Moreing people (of whom more particulars are obtainable in London than in Toronto), not the glamour of Heinze, nor yet the diffusive joy of the vendor suffices to create the wave. The press is, as a whole, praiseworthily careful.

The Cobalt Daily Nugget argues, with a large degree of reason on its side, that the Ontario Government should remit the excessive royalties that it has heretofore imposed upon certain mining enterprises in Cobalt. In its salad days the Government caught the fever that infected the whole country. It wanted to make money and make it rapidly. Now, however, such conduct would not be compatible with its larger dignity. But that same dignity would be enhanced were the Nugget's suggestions followed.

Correspondence

The Editor, The Canadian Mining Journal:—

Sir,—I am taking the liberty of writing this letter, to ask your opinion of a chemical reaction which probably might interest your readers, as it gives a simple, instantaneous method of restoring over-exposed blue prints at very little cost.

About two years ago, while making a number of blue prints, in a moment of curiosity I happened to pour some hydrogen peroxide over an over-exposed print. The print, which was burnt to such an extent as to be almost obliterated, at once assumed a rich blue colour, and the white lines came out with great intensity.

Since that time, in the southern office of the Republic Iron & Steel Company, I have continually used hydrogen peroxide to restore over-exposed prints, and have thereby saved many prints which would otherwise have been lost.

In fact, when it was desirable to make a very strong print, I have intentionally over-exposed and treated with H_2O_2, as the resultant was so far superior to ordinary blue print.

For my own satisfaction I have tried to read up the reaction and to the best of my knowledge the following represents the reactions:

To begin with, it is well to remember that ferrous salts yield with potassium ferricyanide, a deep blue precipitate of ferrous ferricyanide, popularly known as "Turnbull's Blue." This is the composition of the blue of the print, and it has the chemical symbol $(Fe_2(CN)_6)$.

Now, ferric oxalate, exposed to light, is reduced to ferrous oxalate, by the following reaction:

$$Fe_2'''(C_2O_4)_3 + light = 2\ Fe''C_2O_4 + 2\ CO_2$$

Then, the ferrous oxalate, thus formed, reacts with potassium ferricyanide ($K_3Fe_2(CN_6)$) to form the ferrous ferricyanide, cited above. The following reaction explains this change: $3\ Fe_2C_2O_4 + 2\ K_3(Fe(CN)_6) = Fe_3''(Fe(CN)_6) + 3\ K_2C_2O_4$.

The H_2O_2 then reduces to ferrous form very rapidly the ferric molecules that had either not been reduced at all, or else had undergone subsequent oxidation. When forced to reassume the ferrous form by the action of H_2O_2 these molecules were immediately attacked by potassium ferricyanide to form additional "Turnbull's Blue," thereby intensifying the print.

In using the "peroxide" the print is first washed in cold water and then spread face upwards on a table where a few drops of 1 : 4 H_2O_2 solution are dropped on its surface. The hydrogen peroxide solution is spread over the surface of the print either with the hand or a small sponge, the print again washed in cold water and hung up to dry.

Yours sincerely,
Gerald Dob[illegible]

MINING IN NOVA SCOTIA DURING 1910

Notes compiled for the Canadian Mining Journal from the Annual Report of the Department of Mines:

Nova Scotia Mineral Production.
Year Ended September 30th, 1910.

Mineral.	Quantity.
Coal raised (gross tons)	5,477,146
*Iron ore (net tons)	52,640
Pig iron made (net tons)	341,674
Ingots steel made (net tons)	409,663
Limestone quarried (net tons)	483,100
Patent fuel (coke) made (net tons)	493,167
Gypsum quarried (gross tons)	322,974
Building stone, quarried (net tons)	8,503
Bricks, made	21,305,500
Drain-pipe, made (feet)	974,819
Grindstones quarried (net tons)	325
Gold bearing ore mined (net tons)	49,557
Gold produced (ounces)	10,675
Manganese ore (net tons)	25
Copper ore (net tons)	nil
Antimony concentrate (net tons)	203
Moulding sand (net tons)	180
Scheelite (net tons)	75
Sulphate of ammonia (net tons)	3,622

*Iron ore imported, 705,351 net tons.

COAL.

During 1910, there were 4,896,896 tons of coal [illegible] an increase over 1909 of 281,183 tons. The total [illegible] duction was 5,477,146 tons, colliery consumption [illegible] counting for 515,720 tons.

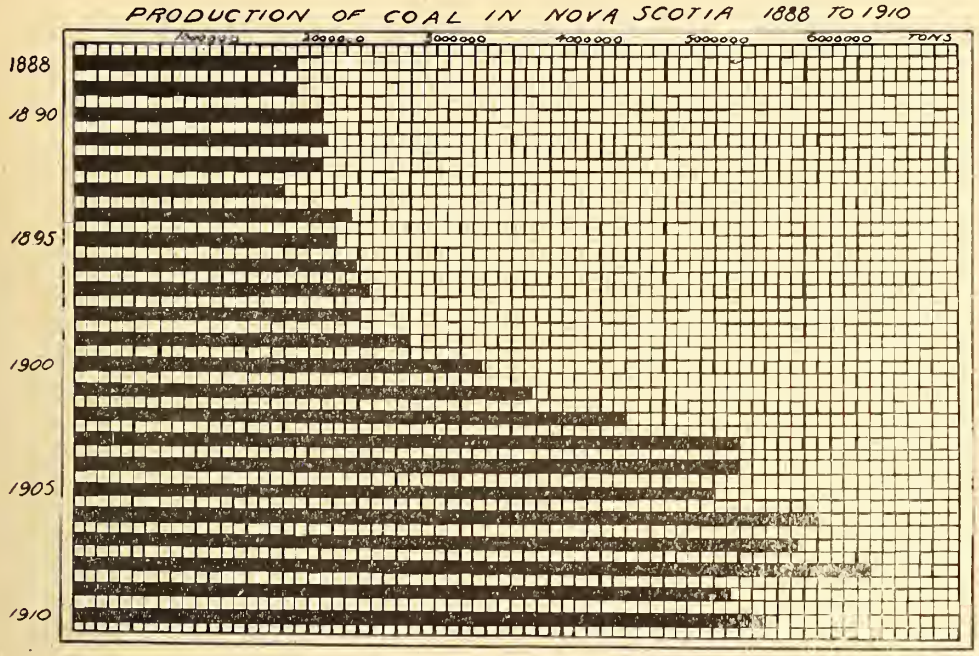
In Cumberland County the total output was 27[illegible]6 tons, as against 542,040 for 1909. The Maritime [illegible] Railway & Power Company, with 161,843 to its [illegible] was the chief producer, the Cumberland Railway [illegible] Coal Company's output being largely reduced on account of the protracted strike.

Pictou County's production was 629,599 tons, a slight falling off as compared with 1909. The producers were the Acadia Coal Company and the Intercolonial Coal Company.

In Inverness County, 364,104 tons were raised, the Inverness Railway & Coal Company contributing 107,257 tons, and the Port Hood-Richmond Railway & Coal Company the balance.

Cape Breton County output was 4,205,131 tons, as compared with 3,634,392 tons during 1909. The Dominion Coal Company, with 3,244,754 tons, and the [illegible] Steel & Coal Company, with 836,348 tons, accounted for the great bulk of the tonnage.

11,001 persons were employed during the year


PRODUCTION OF COAL IN NOVA SCOTIA 1888 TO 1910
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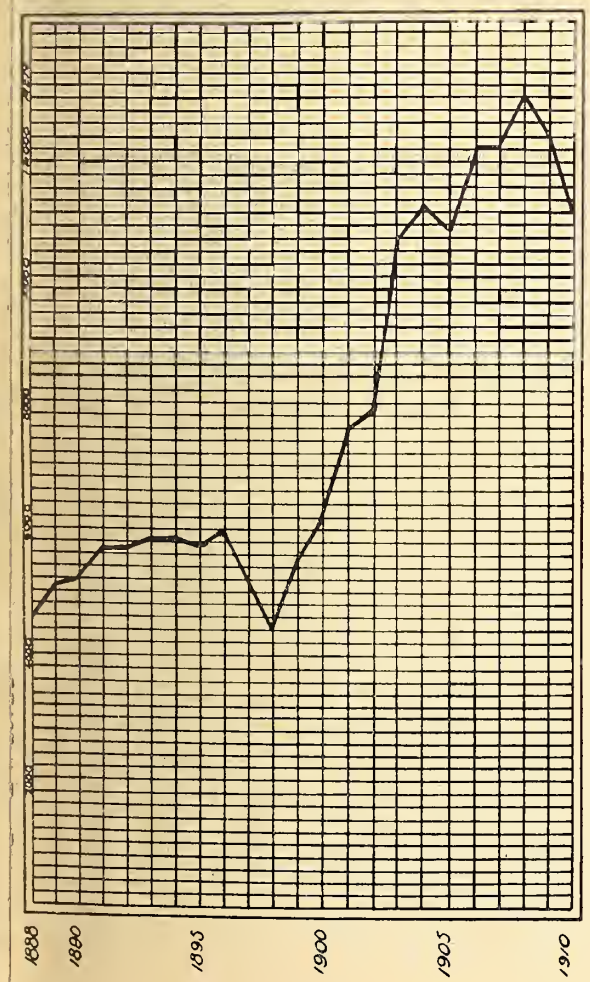
1890
1895
1900
1905
1910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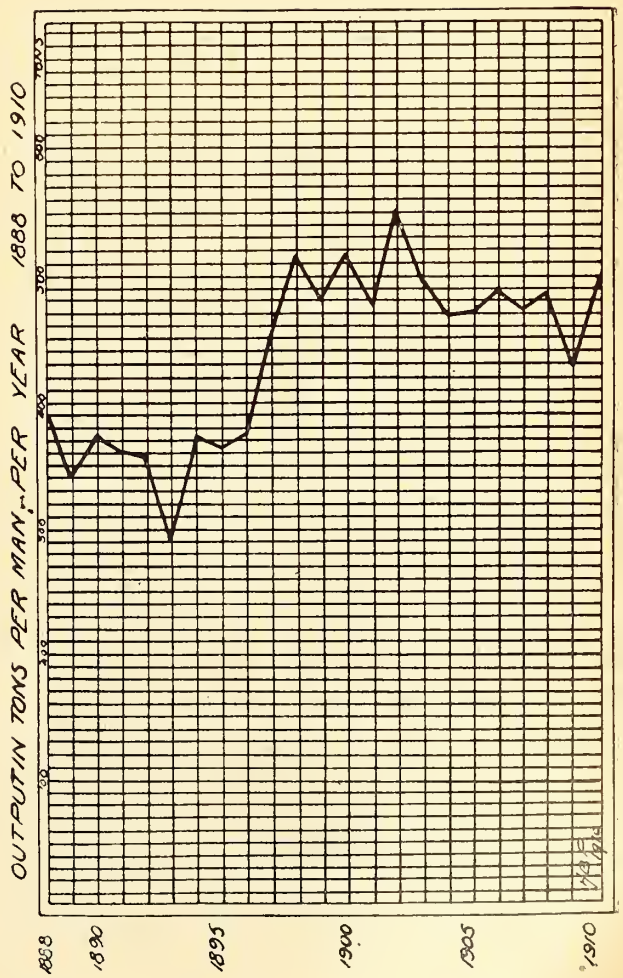
OUTPUT IN TONS PER MAN PER YEAR 1888 TO 1910
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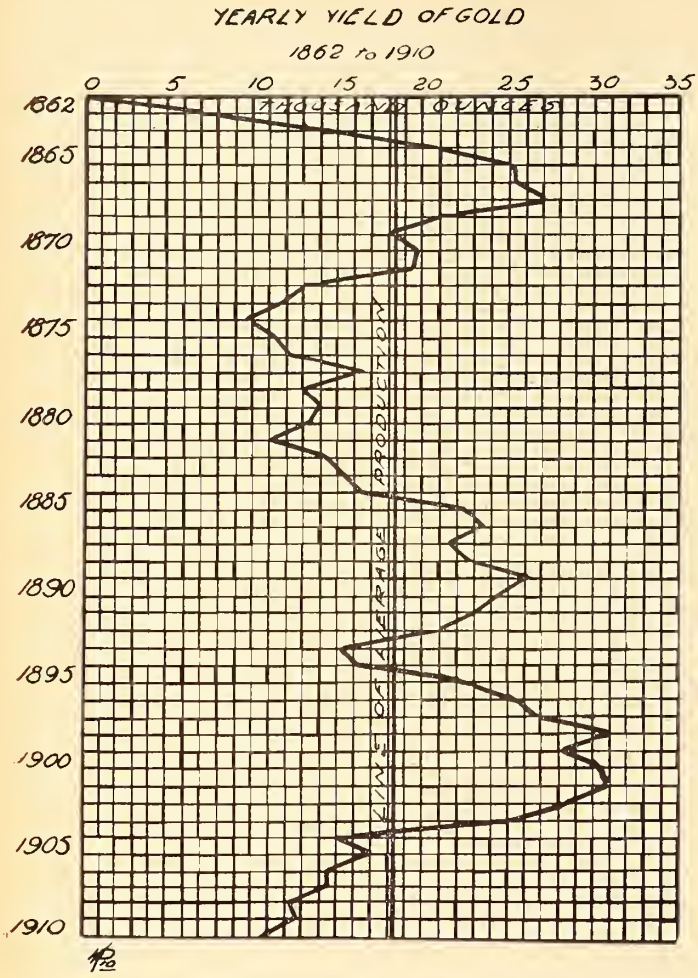
1895
1900
1905
1910



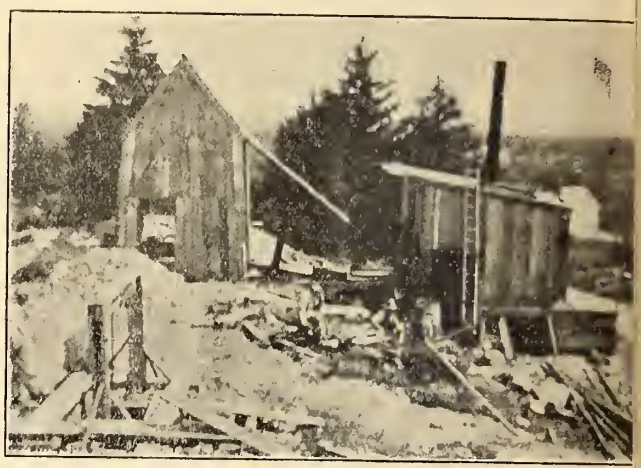
GOLD.

The total yield of gold was 10,675 ounces recovered from 49,557 tons of gold, a figure slightly below that of the previous year. The average yield—an average that is arithmetical rather than physical—was $4 per ton, higher by 4 cents per ton than that of 1909.

One serious blow to the industry was the temporary stoppage of work at the Richardson mine at Goldboro (Guysboro County) due to a cave-in of the old workings.

Twenty-five small concerns operated during the year. A considerable amount of prospecting was done that should affect favourably the results for the current year.

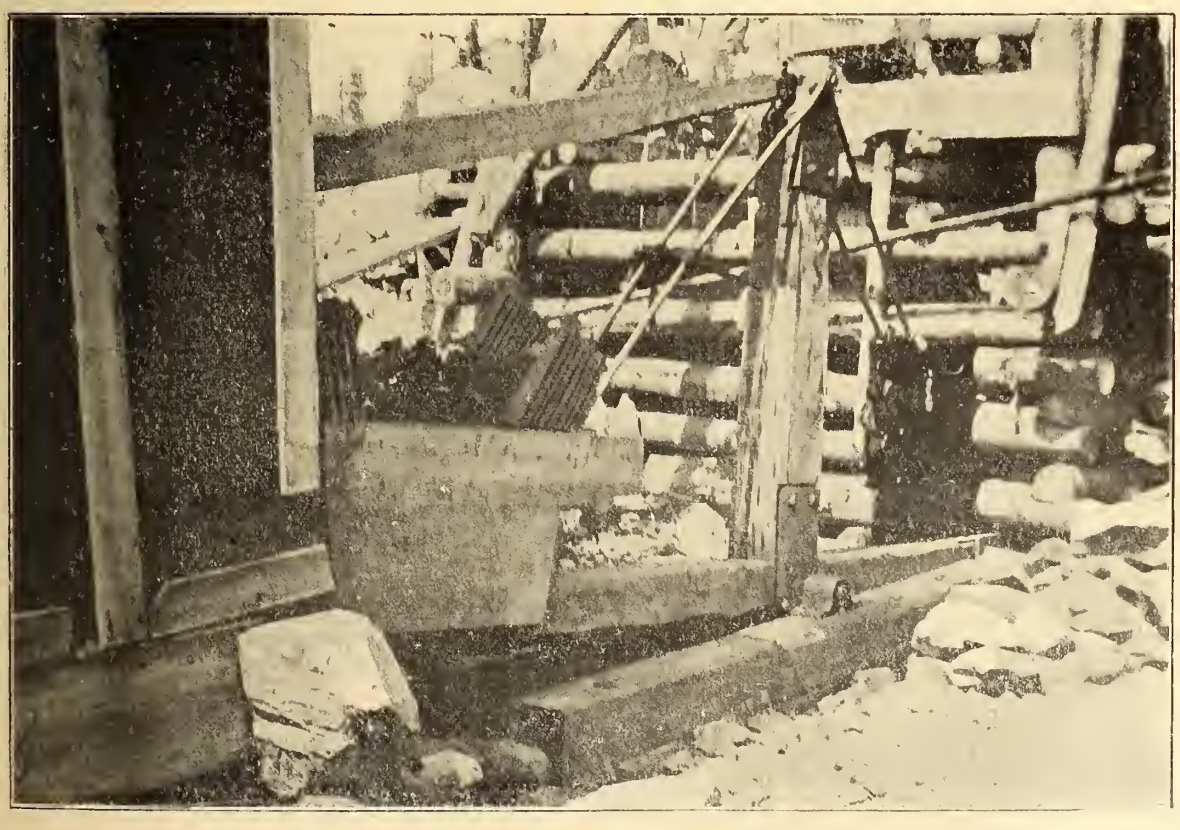
GUYSBORO COUNTY—The New England Mining Company, working the Richardson mine, recovered $7,297 in gold from 36,940 tons of ore, an average of $2



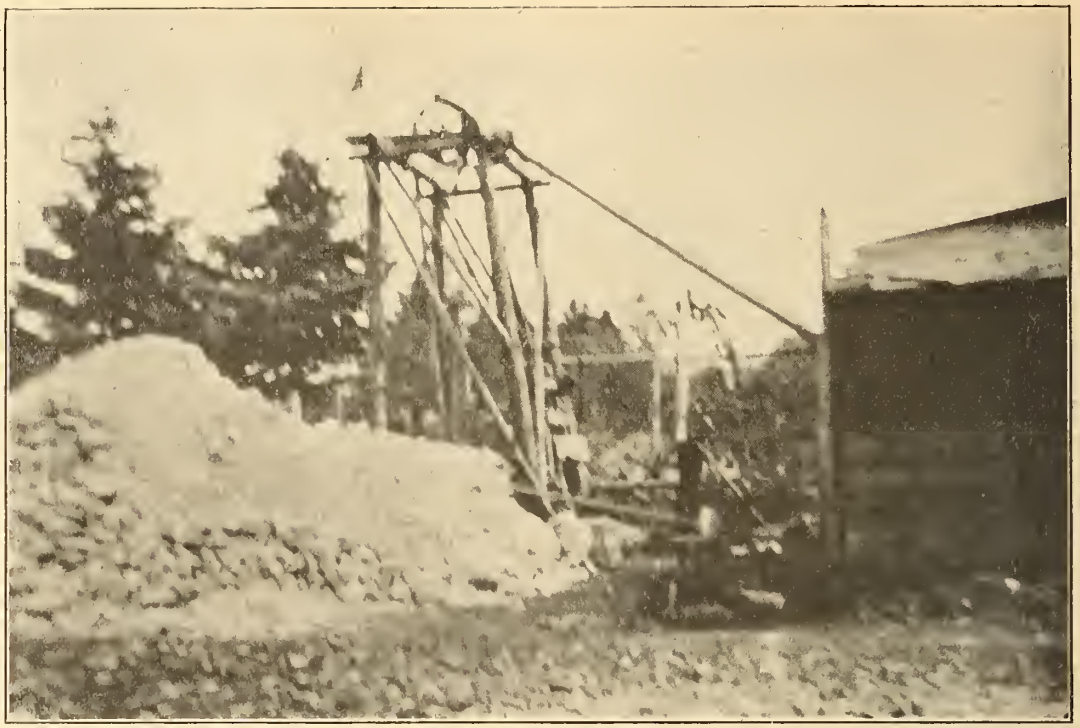
Montagu—Typical small gold working

Montagu—Veteran Miner standing behind remains of stamp-battery foundations

Montagu—Old shaft 25 feet by 6 feet sunk about 120 feet



Cornish pump at Montagu



Headframe and dump

per ton. 715 ounces were extracted from 956 tons of concentrates by bromo-cyanide treatment. 529 tons of arsenical concentrates were made and shipped to Swansea. The Richardson has yielded about $1,000,000 in its 18 years of life.

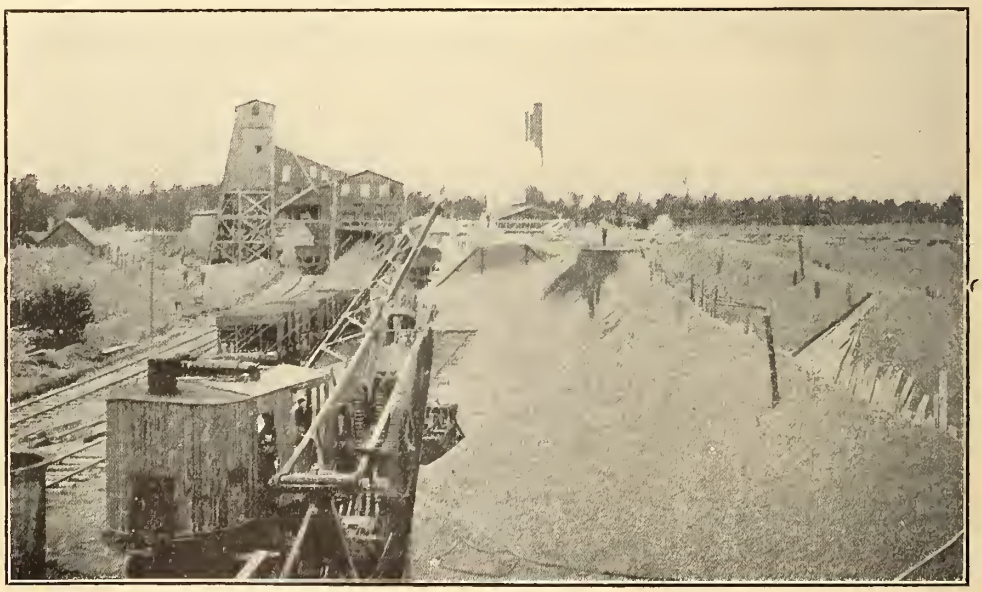
Halifax County—At Killag and Salmon River small prospects were worked. At Tangier, the Dominion Mining Company extracted 866 ounces of gold from 3,090 tons of ore. At this plant hydro-electric power is used.

The Caribou Gold Mines, Limited, at Caribou, won 273 ounces from 409 tons of ore. Fraser and McLeod, working at Fifteen Mile Stream, extracted 148 ounces from 180 tons of ore. Other small enterprises reported unimportant returns. The Petpiswick Mining Company, under the management of Mr. G. J. Partington, did much preparatory work at Lake Catcha. At Ol ham, the Oldham Mining Company, E. H. Brenna manager, won 2,481 ounces of gold from 1,260 tons ore, the average per ton being $37.41, taking gold $19 per ounce.

Lunenburg County—The Gold River mine of t Chester Basin Gold Syndicate, managed by A. B. St wart, was closed in February, 1910. The Uniac Min & Power Company, Limited, won 58 ounces from tons of ore.

Queens County—At Malaga Barrens, the Ponho Mining Company, under the supervision of W. J. Pris mined and milled 776 tons of ore yielding 326 ounc The mine was closed in June. More capital is require

Hants County—Representatives of Mr. M. O'Brien, operating the property formerly belonging



Torbrook Iron Mine, west shaft

the Pictou Development Company, mined and milled 1,834 tons of ore yielding 624 ounces.

IRON.

During the year the amount of iron ore mined in the province increased from 10,000 tons to 52,640 tons. This quantity was produced at the Torbrook mines of the Canada Iron Corporation, Limited. Shipments totalling about 11,000 tons were made to Pennsylvania and to Glasgow.

705,351 tons were imported by the Dominion Iron & Steel Company and the Nova Scotia Steel & Coal Company.

ANTIMONY.

No antimony was mined at the West Gore mine of the West Gore Antimony Company. The dump ore was milled to the extent of 5,565 tons, yielding 203 tons of concentrates.

MANGANESE.

25 tons of high-grade manganese ore were shipped from New Ross by the Nova Scotia Manganese Company. Work is being pushed vigorously and further shipments are being made.

TUNGSTEN.

75 tons of high-grade tungsten ore were shipped from Scheelite, Moose River, Halifax County. The mine is now under the management of Mr. Victor Hills, an experienced Colorado mining engineer. Many new veins have been discovered and development has brought much ore in sight. Regular shipments will commence this summer.

GYPSUM.

The growing gypsum industry had a good year, 322,774 tons being produced. Only 10,500 tons were used in the manufacture of gypsum products in the Province, the balance being shipped to the United States. 40 men were employed. Eight concerns operated.

The Mining Society of Nova Scotia

Nineteenth annual meeting at Halifax, March 29th and 30th, 1911.

The meeting convened at 10 a.m. the morning of March 29th, Mr. T. J. Brown (Manager, Nova Scotia Steel & Coal Company's collieries at Sydney Mines) in the chair. The morning session was taken up with the following business:

Reading of Minutes of last Annual Meeting.
Election of new members.
Report of Secretary.
Report of Treasurer.
Report of Librarian.
Report of Council.
Appointment of Scrutineers.
Report of Special Committee regarding Legislative matters.

Wednesday Afternoon.

The President gave an address and also read a paper entitled "The Great Black Cities." In this paper he described the underground workings of a mine, drawing comparisons between it and the ordinary city life. This was followed by two moving picture films—one illustrating the workings of an underground mine, explosions, care for the injured, etc. The other film showed the manufacture of steel from the open-hearth to the finished article.

Mr. C. H. Wright (Manager of the Halifax branch of the Canadian General Electric Company) then read a paper on "Electrical Apparatus for Mining." This paper was illustrated by a number of very fine lantern slides.

Mr. C. J. Coll (General Manager, Acadia Coal Company, Stellarton, N.S.) followed with a paper entitled "Use of Permitted Explosives in Coal Mining."

After both these papers there ensued lengthy discussions.

This completed the afternoon session.

Wednesday Afternoon.

The Annual Banquet, which is always an event of prime importance, took place at the Halifax Hotel. Among the invited guests were:

Lieutenant-Governor MacGregor.
Hon. A. K. McLean, Attorney-General of Nova Scotia.
Hon. G. H. Murray, Premier of Nova Scotia.
Hon. William Templeman, Minister of Mines.
Hon. Christopher Chisholm, Commissioner of Public Works and Mines.
Members of the Geological Survey, Ottawa.
President of the Canadian Mining Institute.
President of the American Mining Institute.
President of the Nova Scotia Society of Civil Engineers, etc.

Thursday Morning.

Prof. E. A. Holbrook (Mining Department, Nova Scotia Technical College, Halifax) read a paper entitled "Modern Gold Mining Practice and its Application in Nova Scotia."

Mr. John Preston (Manager, Colliery of Nova Scotia Steel & Coal Company, Sydney Mines) read a paper entitled "Description of Light Weight Motor Driven Reciprocating Pump."

Mr. W. F. Jennison, C.E. (of Truro, N.S.) read a paper on "Gypsum." This is the first paper on gypsum that was ever read before the Mining Society of Nova Scotia. It was listened to with keen appreciation and was interestingly discussed.

Mr. W. H. Prest (of Bedford, N.S.) read a paper on "Prospecting in Nova Scotia." Mr. Prest's thoughtful paper is referred to in the editorial columns of this issue.

The meeting then adjourned until 2.30.

Thursday Afternoon.

Mr. H. E. Coll (Manager, Acadia Coal Company, Stellarton, N.S.) read a paper entitled "Regulations Governing the Use of Explosives in Coal Mines." In reading this paper, Mr. Coll used paraphernalia to illustrate the safe handling of explosives, etc.

This paper was followed by the following:

Dr. Ora W. Knight (State Assayist for Maine, U.S.A.) "Research Work on Certain Nova Scotia Gold Ores."

Mr. G. J. MacKenzie (Mines Instructor, Westville, N.S.) "The Coal Dust Problem."

All these papers were discussed and votes of thanks passed those furnishing them.

The President then read the result of the ballot. A vote of thanks to the retiring President was moved by Mr. C. J. Coll, and seconded by Mr. G. J. Partington.

The meeting broke up singing "For He's a Jolly Good Fellow."

This meeting was probably one of the best in the history of the Society in point of papers read, but on account of the lateness in the month, which was un-

avoidable, a number of the members found it impossible to attend.

Mr. D. B. Dowling, of the Geological Survey Department, Oottawa, read a paper on the "Coal Mining Industry of Alberta and British Columbia.

Mr. J. C. Murray brought to the notice of the meeting the work being done by the Special Committee of the Canadian Mining Institute in codifying the mining laws of the Dominion.

The officers elected for the current year were:

President—G. J. Partington.

First Vice-President—Prof. Sexton.

Second Vice-President—Thos. Cantley.

Council—C. E. Starr, Hiram Donkin, R. H. Brown, H. E. Coll, A. L. McCallum, A. A. Hayward, Hon. R. Drummond, G. W. Stuart, John Johnston.

OUR EUROPEAN LETTER

British mining markets dull — Lowering cost of getting British coal — Some comparative expenses—Royal Commission on Mines and its opinion on ventilation —Salt Union and the Bowman-Hodgkinson process—A submersible electric motor for pumping out flooded mines—Shaft sinking against water by cement injection—Russia's backward gold industry.

(Exclusive correspondence of Canadian Mining Journal.)

London, March 18th, 1911.

Mining descriptions on the British share markets continue to make only a very poor show, there being very little demand on the part of the public and nothing to stimulate the demand. The best that can be said of most of the big features such as South Africans is that the declines in quotations this year have been small. South Africans particularly have suffered in response to the persistent liquidation in Paris where several agents de change have risen. Tin mine shares preserve a certain buoyancy but the fluctuations in the price of the metal do not conduce to buying.

So far as British coal mining is concerned that interest which is always aroused in any new method which would have the effect of materially lowering the cost of getting British coal has been excited in connection with a paper recently read by A. E. Booth before the Midland engineers. The contents of the paper are all the more significant, taken in conjunction with evidence brought before the departmental committee appointed to inquire into the working of the special rules. For instance, one passage given in the evidence by D. M. Mowat, general manager of the Summerlee Iron Company, of Coatbridge, Scotland. This gentleman said: "There is no doubt that a coal-cutting motor was one of the machines which had improved tremendously in the last ten years. Ten years ago they had a breakdown once a month. In Scotland there are practically no compressed air machines being installed. Electricity has been in use for thirty years, and we have never had an ignition of gas arising therefrom." It was also noted that five more cutters driven by electricity were being put in, and a further installation was in contemplation. In other parts of his evidence, however, he explained that the Scotch coal mines he was referring to were not what is known as of a fiery character —that is to say, there were never any great outbursts of gas sufficient to cause big explosions; but, nevertheless, the fact that electric power has been employed with apparent success for so many years in Scottish coal mines is of great significance.

At the outset of Mr. Booth's paper he said that machine-cutters resulted in a higher output from a given length of "face." He then proceeded to describe at great length certain new types of conveyors, which are designed for use on thin seams of coal in conjunction with machine-cutters. The features of some of these contrivances have hitherto been quite unknown in coal mining practice. He furnished a great mass of technical details dealing with the mechanism of the various types of conveyors, which would be quite out of place in these columns. One of the points which he emphasized was that the trials of these devices had been the most successful where the apparatus had been especially designed for the local conditions.

In speaking of the advantages of these new methods he fully admitted that the changes involved in the organization of a coal mine by the introduction of mechanical cutters and conveyors created many difficulties for the management, but he strenuously argued that if the problem was approached with determination and perseverance a satisfactory result could be obtained. Not the least among the difficulties surrounding the introduction of new machinery in coal mines was that connected with the labour question. The machine-cutting and conveying installation made it necessary to allow a group of men to work together under the instructions of a foreman, in parts of the mine somewhat remote from other operations. The character of the whole arrangement and the kind of discipline necessary to carry on the work with success, giving the new machinery a fair chance of justifying itself, have to be carefully thought out, and the personal element duly allowed for. Under adequate and good management, however, it was shown that considerable economies could be effected in the winning of coal, and particularly so when the operations were on thin seams.

As showing the actual comparative cost of working a 2-foot, 8-inch seam as between three systems, the following figures were cited:

Working Costs per English Ton.

	By hand.	Machine cutting.	Coal cutting and conveyor
Getting, timbering, etc..	$0.48	$0.30	$0.22
Stonework..	.16	.14	.06
By-work..	.08	.10	.04
Sundry costs	.10	.10	.04
Moving conveyor..	...	...	.06
Total per ton	$0.82	$0.64	$0.42

All over the United Kingdom the great thick seam of coal are being steadily exhausted, and more and more attention has, perforce, to be given to the thinner seams. Without going into the technique of the matter, it may be noted that with the old-fashioned handwork the getting of coal from thin seams is full of difficulty, besides being essentially more costly, and

therefore, in the majority of cases, commercially impracticable. But, assuming that the mechanical methods described in this paper prove to be sound and practicable in actual working, the whole aspect of the coal situation in this country will be profoundly modified. The commercial difficulties connected with the thin seams will largely disappear, and the available supply of good coal will be immensely increased.

Also, according to Mr. Booth, the use of the apparatus he described would bring about a permanent increase in the percentage of "round" coal, which follows upon the use of face conveyors. This appears to solve one of the ever-present and pressing problems in the working of all thin seams—namely, a reduction in the amount of small coal.

The third report of the Royal Commission on Mines was issued on March 16th. In their second report the Commissioners expressed the opinion that it would be desirable to have such a standard of ventilation as to prevent the appearance in any open and readily accessible position of a fully-formed "cap" on the lowered flame of an ordinary safety-lamp, burning the oil in common use, and that the men should not be allowed to work or pass where this standard is exceeded. Since that time they have studied the subject more closely and now deal with the percentage of gas which should be allowed by this standard, and recommend that it should be made law that no men shall work or pass in the ordinary course of their employment in places where there is more than 2½ per cent. of gas in the general body of the air. If a higher percentage is found, no one ought to go or work there, except under special supervision, for the purpose of removing the excess of firedamp or otherwise securing the safety of the mine. Such an enactment, the Commissioners think, ought specially to point out that this provision is not to be taken as a standard of ventilation, but is in addition to the existing duty of adequately ventilating the mine. For mines worked with naked lights, a similar rule is proposed, with the substitution of 1¼ per cent. for 2½ per cent.

At the annual meeting of the Salt Union, held on March 17th at Liverpool, good results were recorded despite the over-production in the trade. Chairman J. H. Cox naturally referred to the Bowman-Hodgkinson patent, concerning which so much matter has appeared in the press lately, but he refused to commit himself to any expression of opinion regarding the value of this process as the trial tests have not commenced. However, he asked the shareholders not to listen to all the "tittle-tattle" that went on with respect to this patent. Exhaustive tests are to be made at the Northwich works of the Salt Union, and it may be held that as an option has been acquired over the United Kingdom rights, the process is regarded seriously.

As readers of the Canadian Mining Journal will be well aware, the inventor claims to increase enormously the output of salt from a given quantity of brine, and at the same time, as might be expected, to reduce the operating charges correspondingly. One is inclined to wonder what is to become of all the salt which is threatened to be produced by so fundamental a change in the volume of output, but apparently the reply to this query is that lower selling prices will promote consumption—particularly in the East. Whatever may occur in this connection, however, it is clear that important developments are impending in the salt industry, and on the whole the tendency appears to be towards increased profits for the Union.

Experts of the British and other Governments inspected on March 8th a demonstration of the Macdonald submersible electric motor in London. It is claimed that this invention will revolutionize the methods of pumping out flooded mines or sunken ships, as the motor works equally well whether sunk in water or running on dry land, while it can be employed for working coal-cutting machines without the slightest danger of "sparking." The type of motor working on March 8th was of 10 h.p., and it is capable of discharging 30,000 gallons per hour to a height of 30 feet. It ran without a hitch during the hours of observation. Captain Young, of the Liverpool Salvage Association, which has done great feats in the raising of warships and other vessels, expressed enthusiasm about the invention. "There is, as you know," he said, "an agitation against the use of electric motors in coal mines, especially in working the cutting tools. This motor can be placed in a tank of water and attached to the machine and the switches, and, being thus submerged, does away entirely with the danger of 'sparking,' Again, ordinary electric pumps in a mine are rendered useless by a rush of water, as in South Wales recently, but this motor works in water, though it is unenclosed except for a light covering to keep floating debris from the working parts. From my own point of view, that of salvage, it will be of importance as a first-aid pump, as it requires no suctions, no primings, and can be lowered in a chain sling and commence operations immediately."

The Poetsch freezing process for the sinking of shafts in water-bearing ground is a well-known one. There has been now developed in France, in the chalky formation of the Pas-de-Calais coalfield, the process of shaft sinking against water in fissured ground by injections of cement. This is suitable for any fissured water-bearing rocks, but is of no use for a soft-running ground such as quicksand.

The principle is that a number of boreholes of suitable dimensions are sunk at equal intervals in the form of a ring surrounding the proposed site of a shaft. Cement and water injected through these bore-holes by means of a force-pump find their way into all the cavities and crevices of the ground surrounding each hole, in which the cement sets. As the cement from one hole penetrates the rocks surrounding it, that coming from the adjoining hole is encountered and a cemented, water-tight wall is formed round the proposed site of the shaft. In this way it is possible to get rid of the water troubles that occur in the process of sinking. The equipment for the process is small and inexpensive as compared with that required for making an ice wall by the Poetsch process, besides which, when once the cement has set, the work of the plant is finished, whilst with the Poetsch method the machinery has to be kept at work until the shaft has been sunk and lined, a considerable extra expense being thus incurred. As a result of these savings, the cost of sinking by cement injection is only about one-third that of the Poetsch process. The practical advantage is that water is almost completely shut out, and a masonry lining, if necessary, is made more secure, though the solid wall of concrete makes the lining almost superfluous. The danger to shaft sinkers is greatly lessened, as they have not to cope with continual water troubles when sinking, and, in the event of repairs to shaft lining being necessary later, the existence of the permanent cement wall practically shuts out all water from the shaft, whereas with the Poetsch

freezing process the water is held back only by the tubbing.

Although in the past twenty years Russia has increased her production of gold by 50 per cent., yet this is nothing in comparison with the increase in other parts of the world. The reasons are found for this backwardness of Russia in a production for which nature has particularly fitted her in the following: Russia lacks roads and railways, and cannot get at her gold with the facility necessary; she is hampered by legislative and administrative orders that put serious obstacles in the way of private ventures, and she has not the superabundant capital required to place the industry of gold-getting on a satisfactory footing to compete with other goldfields the world over.

The necessity of paying closer attention to the gold-wealth of Russia can be argued on the following lines: Gold alone of all the industries is capable of creating colonization in waste places of the kind found over a great part of the regions of the empire known to be auriferous; it is an industry that is not subject to the same uncertainties of markets and prices as other productions of all kinds are; on the contrary, it creates markets for all other goods, for it has been estimated that for every unit of gold got out of the earth from 2,000 to 2,500 units of other goods must be provided for consumption by the workers. Owing to redundant harvests, Russia is now exceptionally well situated in the matter of gold, which continues to come into the country in return for grain and other commodities; but this cannot be reckoned on to last forever, and Russia, with her gold value, must get more gold out of her own territory if she is to avoid difficulties in maintaining her gold value.

The measures proposed in this direction are various. New laws for Siberia, involving either some form of local self-government or the placing of administrative powers in the hands of the gold-getters, whose organizations, in fact, do administer for all practical purposes no small part of the wilder districts of Siberia and the regularizing of the practice of "gold running," which at present is illegal, but so profitable as rarely to incur penalties at the great distances from the seat of authority at which it is practised. The "gold-running" is treated as highway robbery, and most severely punished. In all other countries it is called "prospecting."

LABOUR DIFFICULTIES IN WESTERN COAL DISTRICTS

By E. Jacobs.

The Canadian Mining Journal has already published a list of the various companies concerned in the labour difficulties affecting the collieries of the Crow's Nest Pass district of British Columbia, those situated near the Canadian Pacific transcontinental railway in Alberta, and most of those in Alberta about Lethbridge and westerly along the Crow's Nest Railway. A list of the twenty-five locals comprising District No. 18 of the United Mine Workers of America was also printed, and detailed information was given showing the preliminary proposals of the representatives of the miners, together with the reply thereto of the Western Coal Operators' Association consisting of sixteen coal mining companies operating on the several districts above-mentioned. Further, the chief obstacles to progress towards making a new agreement between the operators and the U.M.W.A., the latter representing the employees—namely, the question of open or closed shop, the check-off system, and the discrimination clause, were briefly stated. Since then negotiations, which on March 9 were postponed for eleven days, have been resumed, but unfortunately without any agreement having been come to, for on March 24 the conference was "declared off," and the representatives of the mine operators and miners dispersed. The situation was shortly indicated in a message from Calgary, where the conference had been held, to the "District Ledger," the union miners' newspaper, published at Fernie, B.C. This brief message was: "Negotiations at an end. Adjourned sine die."

There was no discussion of the rates of wages to be paid in future to the various workers, for notwithstanding that at different times, first the operators and then the miners suggested that consideration of the wages scale be proceeded with, this was not done. The main issue was the check-off system, and in relation to this both sides remained firm—the miners' representatives insisting on an effective check-off system being provided for, and the operators refusing to concede the point to the extent asked on behalf of the miners.

What Happened in 1909.

A review of matters connected with proceedings 1909, when the agreement which has just expired w made (but not until after the mines then represent by the Operators' Association has been idle thr months), will perhaps make the position to-day mo clear. In March, 1909, the agreement made in 19 being about to expire, a conference was held at Ma leod, Alberta, between the operators and represent tives of the employees, and all differences adjusted, that the agreement reached was referred to the m employed at the various mines for their approval or r jection, with the result that a large majority in favo was reported. The then president of District 18, U. W.A., Mr. Frank H. Sherman, who had been too ill take part in the conference at Macleod, however, d not approve of the agreement, which permitted "op shop" at the several collieries concerned, and contain a "Discrimination clause" which effectually weaken the union in its efforts to prevent non-union men wor ing in the coal mines or at the coke ovens, so he a the secretary for District 18 called a strike and order the men to stop work at the expiration of the old agr ment. The main object of this arbitrary action was compel the other operators to yield to the union's d mands, as had the Crow's Nest Pass Coal Compa which had withdrawn from the Operators' Associati and made its own agreement with the miners, w were granted the check-off system, so vital to the su cess of the union locally, and, too, there was in th agreement no discrimination clause to restrain t union from interference with non-union men. The C bin Coal & Coke Company had not joined the Oper

ors' Association, so it, also, made its own agreement with the union. Likewise the Canadian American Coal & Coke Company (now the Canadian Coal Consolidated, Limited), of Frank, Alberta, made a separate agreement, and, too, the Tabor district, east of Lethbridge, met the requirements of the U.M.W.A. It will be here mentioned that the Crow's Nest Pass Coal, Corbin, and Canadian Coal Consolidated companies are now included in the Western Coal Operators' Association, so that all the companies producing coal and coke in southeastern British Columbia and all the larger producers in Alberta (the total production in Alberta in 1910 was 3,036,000 tons, of which 2,800,000 tons is stated to have been produced by companies in the Operators' Association) are acting together against what they regard as the unreasonable demands made by the United Mine Workers of America.

President Lewis Appealed to.

Following the strike of April 1, 1909, at the mines represented by the Operators' Association, the operators appealed to Mr. T. L. Lewis, international president of the U.M.W.A., in Indianapolis, Indiana, U.S.A., to compel the members of the organization to carry out the Macleod agreement, which it was claimed had been practically accepted by the locals of the U.M.W.A. A representative of the president was dispatched to Canada, and negotiations looking to a settlement of the dispute and a resumption of operations, for which the miners were known to be anxious, were commenced, but the operators declining to give way, union representatives applied to the Labour Department, Ottawa, for a Board of Conciliation and Investigation under the Industrial Disputes Investigation Act, 1907, which was granted. In the application for the Board of Investigation it was asked that, among others, the following clause be included in a new agreement: "The company will require each person employed by them, or to be employed by them, as a miner, mine labourer, or otherwise, in or about the mines and coke ovens of the respective companies, to sign this agreement, as a condition precedent to continued employment of the person already employed or to be employed. The agreement to be placed in a book together with a legal check-off clause and signed by all employees."

Strike Called Contrary to Act.

In their reply the operators said, in part:

"2. The applicants have caused the said strike to be declared at each of the said collieries named, and the Board should enquire into the dispute existing at each and all of said collieries.

"3. That the discontinuance of operations at the said collieries is the result of a strike ordered by the President and Secretary of District 18 of the United Mine Workers of America contrary to the provisions of the Industrial Disputes Investigation Act, 1907."

In the agreement the operators, in their reply, submitted should be adopted by the Board it was provided that:

"(f) No check-off clause or deductions should be allowed other than as provided for by the laws of the Province of Alberta and British Columbia."

Board of Investigation in 1909.

The Board of Conciliation and Investigation was granted. The operators were represented by Mr. Colin McLeod, of Macleod, Alberta; the miners by Mr. Frank H. Sherman, president of District No. 18, U.M.W.A. These having failed to jointly recommend a chairman, the Government appointed Rev. H. R. Grant, of Fernie, B.C., to that position. The Board was practically in continuous session from May 20 to June 16, during which period much evidence was taken. The chairman and Mr. Sherman eventually made a majority report. Mr. McLeod, in his minority report, said: "Having in mind the agreements which existed between the parties prior to April 1, 1909, and the Macleod agreement, which was approved of on a referendum vote, I have compiled an agreement based on these agreements, which I would recommend to the parties for acceptance," etc. Regarding a check-off clause, Mr. McLeod said: "The applicants are undoubtedly entitled to a check-off clause in their agreement, but the check-off clause submitted by them being inconsistent with the laws in force in British Columbia and Alberta, should not be accepted, and the check-off clause of the old agreements should be continued, the same being shown in the proposed agreement submitted herewith." The "Check-off" and "Discrimination" clauses proposed by Mr. McLeod were as under:

"Check-off—The company will give to the United Mine Workers of America full recognition and concede the check-off system, that is to say, upon the individual request in writing of any of the company's employees, the company shall deduct such moneys from their wages each month as is designated for dues, assessments, fines, and initiation fees, in other words, the company will retain from the wages due employees any sums they may have given orders upon the company for in writing payable to such officers of the United Mine Workers of America as may be designated in such orders.

"Discrimination—No person shall be refused employment or in any way discriminated against on account of membership in labour organizations, and there shall be no discrimination against any employee who is not a member of a labour organization by members of such an organization."

Findings of Board Not Accepted.

The report of the Board was not accepted by the miners, so the mines represented by the members of the Operators' Association remained idle for three months, during which period neither side yielded. Eventually the officers of District No. 18, U.M.W.A., desisted for the time in their endeavours to secure "closed shop" and the concession of the check-off system as demanded by them earlier, so on June 30 an agreement was signed by the Operators' Association and District No. 18, U.M.W.A. The official Labour Gazette mentioned that this agreement "is practically the same as the findings of the Board of Conciliation and Investigation."

The position when operations were resumed in the summer of 1909, therefore, was, that the U.M.W.A. had by then succeeded in getting "closed shop" and the "check-off system" at the three collieries and the coke ovens of the Crow's Nest Pass Coal Company, the Corbin Company's mine, and the Canadian-American Company's mine at Frank, while the mines represented by the Western Coal Operators' Association, beside not having conceded either of these, had in their agreement a "discrimination clause" similar to that above quoted.

The Union's "Check-off" Clause.

In the agreement between the Crow's Nest Pass Coal Company, Limited, and its employees, as represented by District 18, United Mine Workers of America, the term of which agreement began April 1, 1909, and ex-

pired March 31, 1911, the following clauses were contained:

"The company will require each person employed by it, or to be employed by it, as a miner, mine labourer, or otherwise, in and about the mines and coke ovens of the said company, to sign this agreement, as a condition precedent to continued employment of the person already employed or to be employed."

"Check-off System—The company will give to the United Mine Workers of America full recognition and concede the check-off system; that is to say, upon the individual request in writing of any of the company's employees the company shall deduct such monies from their wages as is designated, for dues, assessments, fines, and initiation fees; in other words, the company shall retain from the wages due employees any sum they may have given orders upon the company for in writing, payable to such officers of the United Mine Workers of America, as may be designated in such orders, which shall be continuous orders, not revokable while the makers remain in the employ of the company; except that the employees embraced in the article headed 'Employees not under Jurisdiction,' may revoke orders as above given by them."

Operators' Association Now Stronger.

The Crow's Nest Pass Coal Company, the Corbin Coal & Coke Company, and the Canadian Consolidated Coal Company (formerly the Canadian-American Coal & Coke Company) having joined the Operators' Association, and there not being any company in a position to make a large production of coal and operating between Lethbridge and the western boundary of the Crow's Nest district (the McGillivray Creek Company, with a new mine near Coleman, Alberta, is stated to have an output capacity of about 300 tons of coal a day; it has not joined the Operators' Association), the operators along the Crow's Nest Railway west of Lethbridge, and those on the main line of the C.P.R., are acting together, so the United Mine Workers of America have not the advantage this time of lack of practically complete organization among the operators as they had in 1909. On the other hand, the U.M.W.A. is also stronger now than two years ago, for it now has in its 25 local unions a membership of 5,827, nearly all in the affected districts.

Men Affected and Coal Tonnage.

The number of miners affected by the present difficulty has been variously stated in recently published press despatches at a minimum of 7,000 and a maximum of 15,000. The latter is certainly a grossly exaggerated estimate, although if the strike be continued over several months, so as to necessitate the cessation of work at copper mines and smelteries and the taking off of freight trains, it is not unlikely the larger number of other men would be affected, directly and indirectly. In the summer of 1909 the number affected was stated at 2,100 directly and 10,000 indirectly; if the number of men employed at that time by companies not then included in the Operators' Association be added, the total of those directly affected would have been between 4,000 and 4,500. The average number of men employed in 1910 at British Columbia mines and coke ovens in the Crow's Nest district was approximately 3,100; the gross tonnage of coal produced was 1,529,000 short tons. No corresponding official figures are available for Alberta, but since it has been stated in press despatches that the mines in that province affected by the labour trouble produced 2,800,000 tons of coal last year, it may be regarded as quite probable the number of men employed in and about those mines was in excess of 4,000. So it would appear that not less than 7,000 men will be directly concerned, and, too, it may be conceded that, since there are 5,800 members of the U.M.W.A. nearly all in the affected districts, fully three-fourths of the 7,000 are union men.

Far-Reaching Effects Probable.

The possible far-reaching effects of a prolonged struggle between the operators and the miners have already been suggested by a brief reference to the copper mines and smelteries and the railways, that haul their ore to the smelteries, and fuel and other supplies for both mines and reduction works. A cessation of work at the mines and smelteries of the Boundary and Trail Creek districts would be disastrous, not only to those directly engaged in connection with copper mining, but also to all classes of trade largely dependent upon the mining and smelting industries for their chief support.

Chief Points in Dispute.

The prospects for an early agreement do not appear to be encouraging. The representatives of the miners offered to leave preamble, check-off, and discrimination clauses as at present, that is, to proceed with conditions as they have been—namely, closed shop and an effective check-off system with several companies, and open shop and discrimination clause as before with others, but the operators would not agree to any clause at all binding even a few of their number practically to the closed shop, or to a check-off which would tend in that direction, nor would they grant the general advance of 5.55 per cent. in wages asked for, only in some cases, but not in those cases—pillars and timbering—in which the union claims the pay is totally inadequate. So a deadlock was reached, and the conference ended.

The union knows that the Industrial Disputes Investigation Act has in the past been openly broken and that with impunity, so the suggestion of the Minister of Labour that the law must be observed is not likely to be heeded for the reason that in the past it has not been enforced.

Two dredges with steel hulls, said to be the first of the kind built in the West, are being constructed in San Francisco for the Yukon Gold Dredging Company. The dimensions of each are: length, 93 feet; beam, 3 feet; depth, 8 feet. They will have a bucket capacity of about 15 cubic feet, and will be operated by electricity.

The Board of Trade of Nelson, B.C., which is the most important town in the Kootenay district, recently unanimously adopted the following resolution, a copy of which has been sent to the Provincial Secretary: "Resolved, that this Board of Trade bring the attention of the Provincial Government the requirement in this district of a Mining School; either as branch of the Mining School to be connected with the Provincial University about to be erected at the coast, or in connection with the Nelson High School, and would further draw the attention of the Provincial Government to the Mining School in connection with the High School at Sudbury, Ontario, which is supported by the Ontario Government, and request that the British Columbia Government have inquiries made as to the operation of the same; and would further urge the erection and operation of a similar school in Nelson."

Plan and Purposes of Experimental Coal Mine of the U. S. Bureau of Mines, near Bruceton, Penna.

By George S. Rice, Chief Engineer, Bureau of Mines.

The explosibility of coal dust in air having been successfully demonstrated in the 100-foot gallery of the United States Bureau of Mines at Pittsburg, and in the longer galleries at Lievin, France, and Altofts, England, the next step in the investigation of coal dust explosions by each of the experiment stations was to determine the exact conditions under which such explosions took place. When these conditions were understood, tests of various preventative measures could be undertaken with some degree of precision. Prevention, or at least, limitation of explosions in mines was, of course, the real objective of the stations.

The gallery at Lievin, a short length of which was erected in 1908, was gradually lengthened to a distance of 820 feet, and an increase to 1,600 feet is under contemplation. The gallery at Altofts, also erected in 1908, was about 950 feet long as originally laid out. In both these galleries the limitation of strength prevents safe loading with pure coal dust for more than a distance of 400 to 500 feet; on loading beyond this distance the galleries are sometimes ruptured. The managements of these stations have expressed the desirability of making tests of coal dust in longer and stronger galleries, since it is impossible to solve all the problems surrounding an explosive wave in the short distances now available; moreover, methods of limiting an explosion which were successful with a loading of coal dust for a length of 300 or 400 feet, would probably not be so with a longer loading or a larger explosion.

The Director of the Bureau of Mines, Dr. J. A. Holmes, and his technical staff, at any early date appreciated these unavoidable limitations of a surface gallery, hence desired to obtain an underground gallery or mine opening, which would not only enable the tests to be made on a larger scale than is possible in external galleries, but in which experiments could be made under actual mining conditions. In such an underground gallery there would be no restriction as to the extent and violence resulting from explosion experiments, provided a suitable location was secured. Moreover, the methods of limiting and preventing explosions, the real objective of all such investigative work, could be tried out under real mining conditions.

It was foreseen that the greatest difficulties in experimenting in an underground gallery would be:

(1) To obtain certain desired natural conditions.

(2) Having obtained those, to carry out and control the experiments in a scientific way, and be able to get complete records in the face of violent explosions.

After a long search a location for the experimental gallery, or mine, has been selected near Bruceton, Pa. From 2,500 to 3,000 feet of straight entry can be driven from the outcrop in the Pittsburg seam. In some of the mines operating in the seam, in the past, great explosions have occurred.

The entries will probably be either level or slightly rising, except for irregularities, so that there will be no serious problem of drainage. The entries enter from a steep sidehill and a cover of from 60 to 160 feet is obtained. The openings are well located with reference to explosion effects, as there are no houses in the vicinity, except those in connection with the plant. The mine is fairly close to a railroad (one-third mile), so that the coal dug in advancing the entries can be loaded on railroad cars. By damming a ravine close at hand, water can be obtained for a boiler plant and fire protection. Natural gas for experimental purposes and for use in a gas incline engine and fan engine is obtained from a pipe line which passes a few hundred feet from the mouth of the mine. Finally, the situation is near enough to Pittsburg to allow convenient movement of the engineers and physicists between the testing station there and the mine. The location of the mine is twelve miles southwest of Pittsburg on the Wheeling Division of the B. & O. R. R. The coal and necessary surface surrounding the mouth of the mine, has been obtained at a nominal rental from the Pittsburg Coal Company.

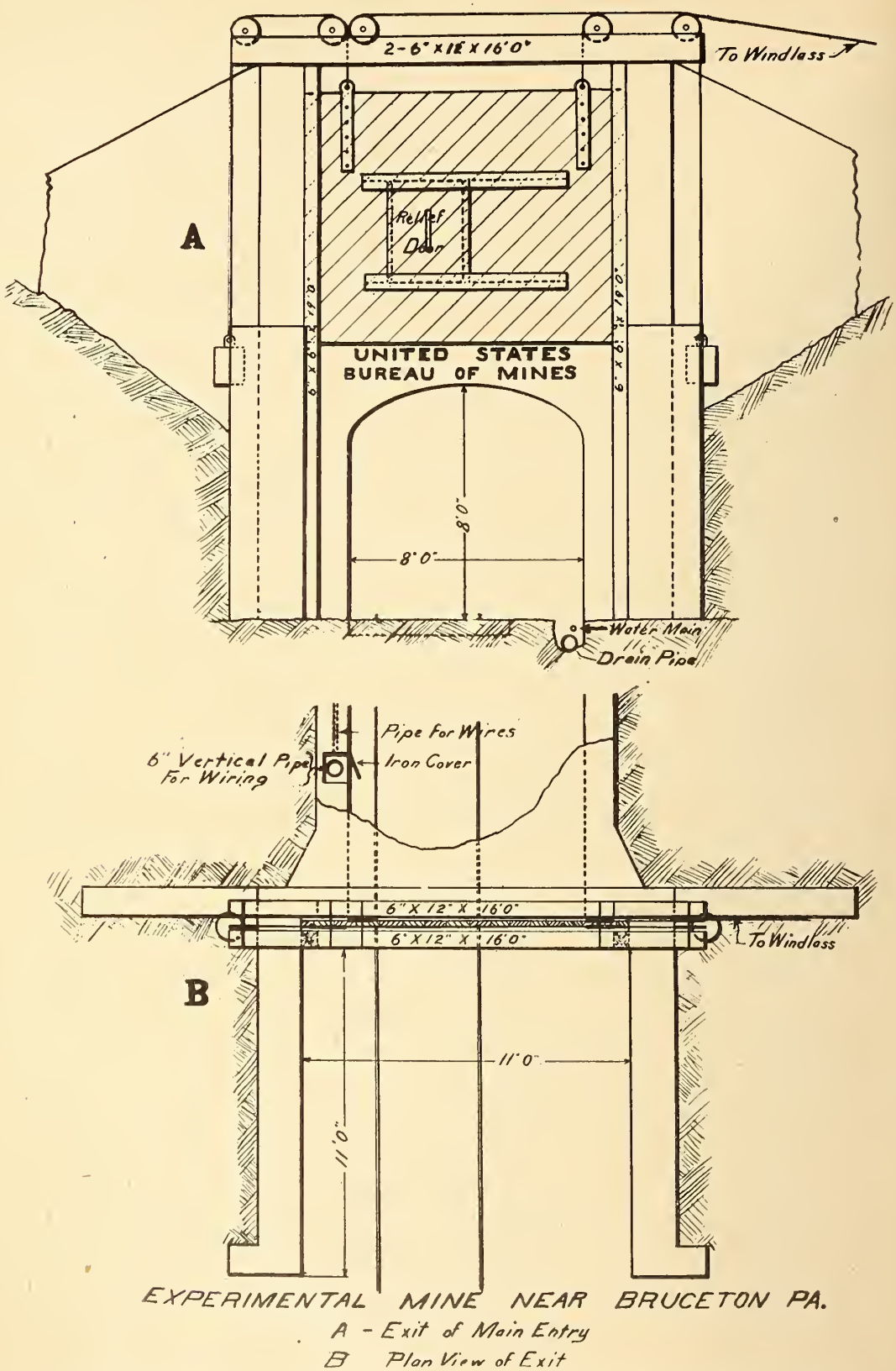
Progress and Development—After a long continued search for the best location, which would give the desired conditions, the present site was picked, and about the middle of December permission was obtained from the Secretary of the Interior and the Director to proceed with the laying out of the mine. The surveys already having been made, the outcrop was uncovered and two parallel entries with forty feet of pillar between them, were started. At the time of writing this description (March 16, 1911) these entries have been driven in under cover over 200 feet. The right hand one, which will be considered the main entry, was started in the lower part of the coal seam, taking the top of the limestone, which is 5 feet below the coal seam, as a floor. Between the limestone and the coal seam there was at this point a hard shale; the entry was excavated in this and in 3 feet of the lower part of the coal seam, leaving up for a roof about 2½ feet of the main seam.

After going in about 50 feet in this manner, the floor was gradually raised on an upgrade until the excavation was wholly in the coal seam and the draw slate above it. The so-called "draw slate" is a soft shale or clay which comes down immediately on mining the coal. Above it, as is generally the case in the Pittsburg seam in this district, there is 1½ to 2 feet of so-called "roof coal," which is generally of poor quality and interspersed with layers of shale.

The parallel entry, which will be called the air course, was driven wholly in the coal seam. It is not intended to use the mouth of this entry in explosion tests. For normal driving this air course will be the return, and ventilation will be obtained by a small fan driven by gas engine located at the top of a small upcast shaft near the mouth of the air course. This shaft will be offset from the air course about six feet.

There will be another entrance to this air course joining at about 150 feet from the mouth, and which will enter at an angle of about 55 degrees, on the opposite side from the main entry. At the mouth of this side approach there will be placed a short length of

*This paper prepared for Western Society of Engineers by permission of the Director of the Bureau of Mines.



EXPERIMENTAL MINE NEAR BRUCETON PA.

A - Exit of Main Entry

B Plan View of Exit

concrete gallery with explosion doors, and beyond that a round steel gallery 120 feet long, 20 feet of which will consist of removable sections that can be rolled out of the way when it is desired to isolate the 100-foot gallery. This part will then be identical with the 100-foot steel gallery at the Pittsburg station, with one exception, a branch off same a short distance from the inlet to which a large reversible fan will be connected. The object of having this steel gallery, which is 6 feet 4 inches diameter, separable from the r is so that experiments similar to those conducte Pittsburg can be made. The gallery at Pittsburg continuously occupied with the testing of explos that systematic testing of coal dust cannot be un taken in it. When the removable sections before tioned have been rolled to one side and a steel lowered in place to cover the connection into the course, experiments can be conducted in the isol

llery without interfering with operations in the mine.

Dust Tests in Mine—At the start it is intended that al dust explosions will be originated in the steel llery and the explosion will enter the air course rough the branch, pass up same to the last open osscut, through the latter into the main entry and t to the mouth of same. The crosscuts will be driven a circle tangent to the entries. This will require e 45-degree turn and one semicircular turn of the plosion wave, a condition which seems to cause no stacle in a real mine explosion, nor does it cause fficulty in the Altofts Gallery. The records of exriments in that gallery show that on the return side, at is, towards the exhaust fan, the dust, carried by e air current and the advance compression wave of e explosion, has been inflamed and the flame has ssed around a number or all of the five right-angled rns in that gallery.

The purpose of this method of initiating explosions i the outside gallery of the experimental mine is to oceed from the known conditions in the gallery (as veloped at the Pittsburg Gallery) to the unknown nditions prevailing in mine entries. There is also other object, that while entries are being driven it ll give double the length of travel for the explosive ve and thus allow the trying out of the mathemati- l instruments, before the final explosion experiments ich may be originated in the interior of the mine.

Fire Damp—Besides making investigations of the plosibility of coal dust in pure air, it is intended to ke tests with small percentages of methane in the . It is generally recognized that a very slight mount of methane, even as low as ½ per cent., may rease the chance of ignition of coal dust and more dely extend an explosion that has once been started.

The location of the experimental mine is fortunate having a natural gas pipe line near it. This line xes gas from some gas wells in the same ravine. It intended to take a branch from this gas main for e in a gas engine hoist and in a gas engine for driv- a small ventilating fan. It will also be used for e purpose above indicated, of introducing when deed small quantities of gas into the mine.

Natural gas has very nearly the same composition as e marsh gas of the coal seams, the difference being at in addition to the methane (CH_4) there is from to 15 per cent. of ethane (C_2H_6) This slightly ries the properties of the mixture of air for its combstion, but the difference for practical purposes is gligible.

The gas will be piped to certain points and by a stem of mixing with the ventilating current will be rried through in whatever proportions may be reired, approximate percentages will be determined rough meter measurements and precise determinans by sampling the air and gas mixture and analyzg. It is considered that this line of investigation of e effect of small percentages of methane is most imrtant, and the need for it has been expressed by forn critics of coal dust experimentation now carrd on.

Concrete Lining—It is anticipated that great explosive force will be developed at the mouth of the in gallery; hence it is intended that the timbering ich is now in place must be supported by reinforced ncrete walls and arching. The latter will present a ooth surface to the explosive wave and thus prevnt great falls at the mouth of the mine, the occrrence of which would lead to heavy expense and day in clearing up after each experiment.

It is the plan to concrete the approach leading from the steel gallery to the air course, and it may become necessary to concrete between this connection to the mouth of the air course, although it is not intended to load that portion of the air course with coal dust. It is expected that the explosion wave entering from the gallery entrance will not have gained sufficient momentum at the junction with the air course to break down doors or stoppings erected between that point and the mouth of the air course, but will be deflected into the air course toward the face.

Method of Driving Entries—The method of driving entries is the usual one employed in the Pittsburg coal seam. The coal is undercut and shot down with explosives, which in this case are of the "permissible" type, electrically fired. The coal is loaded on pit-cars, which are hauled by mules, to the mouth of the mine, thence over an outside tramway with slight descending grade, to the head of a rope incline. Trips of cars are lowered, by the hoist under brake, to a trestle and tipple located on a siding of the B. & O. R. R.

Buildings and Apparatus—It is necessary to have a considerable number of buildings; these are now under construction. There will be a boiler house with boiler to furnish steam for the several engines, including the fan engine. A crusher and grinder house will be necessary to grind up the dust for the experiments; as much as four tons will be necessary when the mine is fully developed. There will be a blacksmith shop containing small equipment for the necessary repairs and an engine house for the incline engine. There will be a combined office and observation room for observations and the starting of explosions, in connection with which there will be a small laboratory for field analyses of gas and mine air samples. Several small buildings, including a barn for the mules, have already been constructed.

Ventilating Fan—The ventilating fan for the experiments must be of such size as to create all the conditions which may surround an explosion in a mine. It is desirable to obtain high velocity in restricted areas, say, 1,500 feet per minute over a considerable distance. A capacity of 80,000 cubic feet per minute at a pressure of 2 inches water gauge and 15,000 cubic feet per minute at a pressure of 6 inches water gauge, is specified and has been guaranteed by the builders. The fan is made reversible, so that experiments may be conducted with dust explosions going against the air current as well as dust explosions going with the air current. The Altofts gallery fan is not reversible and the explosion portion of the gallery is at the intake end.

Pressure and Recording Instruments—The important objectives of the experiments are to obtain the speed of the explosion as indicated both by pressure and by flame; the variation in pressures at different points along the course of the explosion; the temperatures; and the samples of the gases immediately preceding the inflammation of the dust or gas and immediately following the inflammation at a given point. Such experiments will require apparatus of an extremely sensitive nature.

A similar set to those used in the Altofts gallery has been purchased from the Cambridge Scientific Instrument Company, of England. These were designed primarily for external galleries, but it is believed there will be no serious difficulty in arranging them in steel plate boxes sunk into the coal rib. It may be found necessary to design new and additional apparatus.

An important point in the use of the recording instruments is their driving, also the making and breaking of electric circuits. To connect these instruments with the outside will require the wiring to be done in such a way that it will not be torn out by the explosions. It is proposed to place the wiring in pipes placed in a groove in the coal rib and at the mouth of the mine; these pipes will be set in concrete but arranged with suitable boxes at short distances apart so that the wires may be gotten at.

It is evident to make the wires safe under the enormous pressures which are expected, which may run up several hundred pounds or more per square inch, will need great care. To obtain the currents for the instruments will require a very steady running generator engine set. It is expected to obtain a set which will be sufficiently large to allow some lighting with incandescent lamps in and around the mine.

Limiting or Preventing Explosions—The real importance of the experiments is not the mere study of explosion waves, although of great scientific interest, but to study methods for preventing or limiting explosions. It is, therefore, proposed to experiment with all the important methods that have been suggested up to date as described in U. S. G. S. Bulletin 425 and Bureau of Mines Circular No. 2, among which may be briefly recited, watering by water sprays, by exhaust steam sprays and by deliquescent salts (calcium chloride) and by rock and shale dust in various ways. It is believed these experiments tried out in a mine on a sufficiently large scale can effectually demonstrate the relative efficiency of the various methods.

Explosives—A secondary purpose of the experimental mine, and by no means an unimportant one, is the study of explosives which have been placed on the permissible list for use in gaseous and dusty coal mines—testing them under actual working conditions in coal.

Dust Production—Another purpose to which the experimental mine can be put is in studying the relative production of inflammable dust by different types of machines which undercut or shear the coal.

Gasoline Locomotives—Still another purpose is the testing out under mine conditions of gasoline motors to determine the safety of the apparatus in actual use and the degree to which the air may be vitiated by the exhaust gases.

Electrical Devices—It is probable that many electrical mining devices can be tried out under actual service, together with tests of insulation of wiring.

Concrete, also Steel Timbers and Props—The growing scarcity of mine timbers, as well as the danger of fire from their use, suggests the importance of testing reinforced concrete timbers and ties; also steel props and ties in the experimental mine.

The relative advantages of brick arching and reinforced concrete for lining the main entries can also be studied, and under severe conditions.

It is probable that the equipment will be sufficiently installed by the first of May to try some preliminary experiments. In the meantime the entries are being driven as fast as possible.

The next general meeting of the Western Branch of the Canadian Mining Institute is to be held at Trail, B.C., on or about May 18. As the headquarters in British Columbia of the Consolidated Mining & Smelting Company of Canada, Limited, owning the large smelting works and refinery in operation there, are at Trail, it is expected there will be a good attendance of members and an interesting meeting.

Pit Bottom Arrangements for Large Outputs.

(Written for the CANADIAN MINING JOURNAL by W. A. Clifford.)

The sketch plan of mine herewith was prepared for the discussion of a paper contributed by Mr. E. H. Fohl, consulting engineer of Pittsburg, to the Mining Institute of America, at its December, 1 meeting in the Carnegie Technical School. The of the paper was "Shaft Bottoms." Particular r ence was made to the manner of distributing the from that point, and especially to protecting the working at the pit's eye in severely cold weather.

Mr. Fohl advocated the use of undercasts for crossing, but the writer is not clear whether he posed to drive them in natural strata underlying coal.

The subject is one of great practical importanc coal operators and mining engineers, in view of fact that at no very remote date deep mining wil volve costly installations, and therefore the win of extensive areas from a single plant, with large put to insure financial success.

In his endeavours to obtain sketch plans of s bottoms where large outputs are obtained, the w was not successful; therefore, as a forlorn hope an endeavour to atone for his failure, he hurri prepared a sketch plan to illustrate what he ha say at the meeting, and at the request of the Ed of the Institute, now put his remarks in a less sultory form than when uttered verbally.

In these days of fierce blasts, where the roadw of a mine have to bear strains akin to those pres the walls of a great gun barrel during firing, the o cast has been found to be the weak point. Carb oxide poisoning, rather than burning, has now co quently become the chief contributor to the gre increased death roll in colliery explosions. Overh air crossings of the most substantial construction h been destroyed, like a house of cards, thick wall reinforced concrete proving altogether inadequat resist the force of such explosions as have occur where coal dust played the most active part.

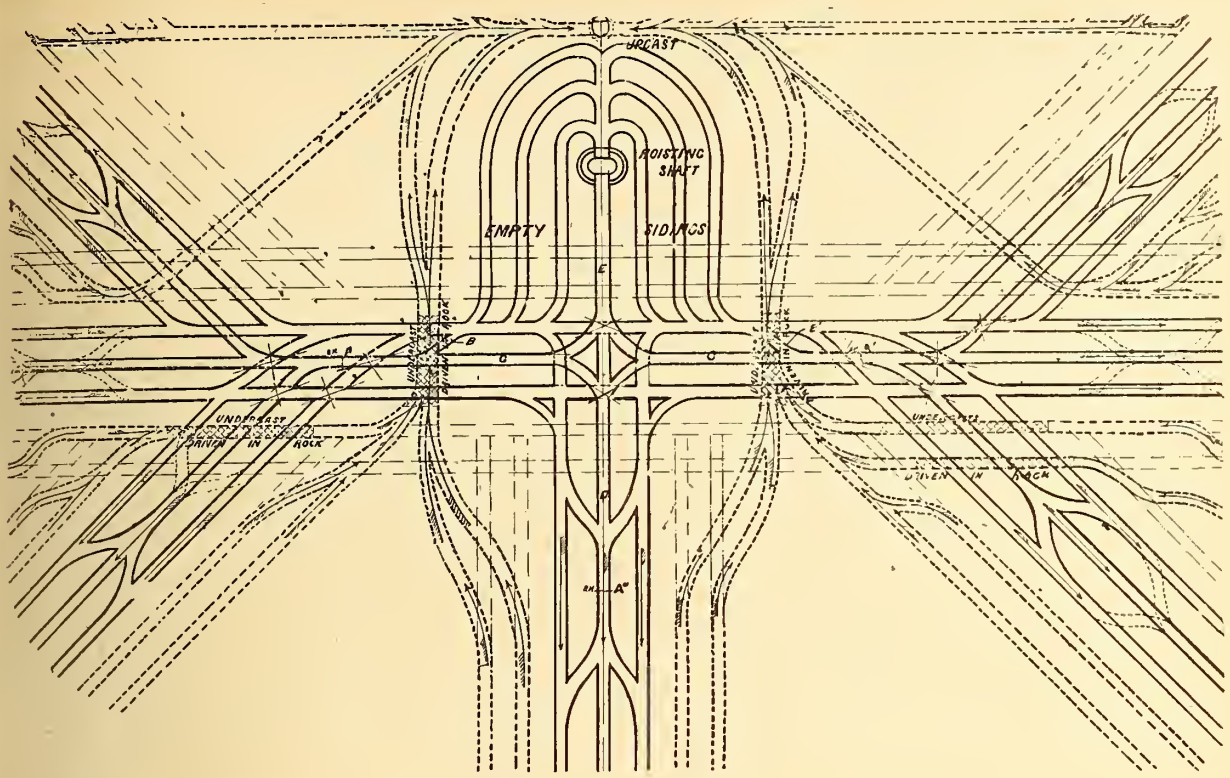
The writer agrees entirely with Mr. Fohl, that best and safest form of crossing for a fiery min the undercast, and he would hardly limit this to w floor conditions and drainage admit its use, but w rather add that it is worth while to provide aga adverse conditions to gain the advantages offered air crossings driven in the solid under the floor.

Two systems of that form are known, and h their advocates among the leading mining author in Europe.

The first consists of driving the channel conve one air current across another, through the s strata overlying the coal, beginning at the floor l and gradually rising to a crown or summit dire over the road to be crossed, then by descendin similar grade to the one it rose by, until the coal f is reached or "footed" on the other side.

The other system proceeds by passing down gr to a point directly below the road to be crossed, t rising on the other side until another point or airwa is reached, level with the roof and floor of the coal.

The first system has been used in a few mines, du the last half century.



The second system has been applied in a very limited number of cases, where the conditions of floor, pitch, and drainage, appear naturally to invite its adoption, and perhaps it might be added where mining practice was specially resourceful and intelligent.

The British Government in the Mines Regulation Act of 1862, fixed 10 feet as the thickness of natural strata between the upcast and downcast shaft. This was calculated to resist any blast that could obtain with the average ventilation of that day, but the writer would be inclined to fix the distance between the floor of an air crossing drift and the roof of the road it crosses, at something greater than 10 feet, depending much upon the strength of the interlying rock.

Both the overcast, and the road it crosses should be lined with masonry at, and a little distance beyond, each side of the crossing. With an air crossing below the coal, the undercast road only need be lined with masonry. The overlying road acts as a natural relieving arch to the crown and haunches of the lower one, by carrying most of the pressure of the superincumbent strata. This allows a thinner division between the two roads, and consequently a smaller bending of the air current, a matter of some consequence where the initial volume, or a primary split is involved.

In the outline plan shown, a large output is contemplated, and the coal is hauled from the working places to a number of bank-heads or summits. formed by raising the roads at the summits, and by grading each way, or by lowering the hoisting shafts bottom and cutting away the floor to the several bank-heads. The grade from the bank-heads to the shaft should be even and about 2½ per cent.

The choice of methods of forming these bank-heads, or summits, must be carefully considered. In the former case mentioned, raising the road by material shot down from the roof, the bank-heads will be approached from the workings by a gradient, necessarily either steep or long, or against the load. In the latter case, lowering the landing at the shaft and cutting away the floor to grade, the lift at the pit bottom, hereafter described, must be higher, which is undesirable—15 to 20 feet should be the limit. Good judgment would look at the problem as presented in the particular case, and probably strike a compromise by blowing down some top, and blowing up some floor, the disposal of the dirt being taken into account; but the efficiency of the job, will be the paramount consideration. Taking up some floor in the empty sidings and adjacent engine roads, should be carefully considered. The greatest efficiency, the smallest prospect of repairs, and the smallest first cost, will always be kept in sight. The kick-back switch shown in Mr. Fohl's sketch and followed by the writer, in the one presented to the Institute along with his talk, has been changed to that now shown to meet the contemplated larger output, which further thought suggested.

The kick-back arrangement involves the risk of stopping the whole pit, which is too serious a matter, especially with a large output Empty roads curving towards the main haulage roads as shown in sketch, are not new. They were employed by one of our past presidents, Mr. F. A. Schellenberg, at the Westmoreland shaft 40 years ago, and the writer knew modifications of them in the north of England and Midlands as long ago as 1867.

The operation of the plan described herein, and shown graphically in the sketch, is very simple. The coal is hauled from the workings by locomotives over the bankheads, or delivery points, each of which points is identified with a particular producing section of the mine. In operation the locomotive having hauled its train over the summit, drops down a steep shunt, B or BI, to the back road and thence to the empty siding.

Thus released from the control of the locomotive in front of them, the waggons commence their unaided journey down the incline towards the shaft, as fast as those in front of them move on, impelled by the same power of gravitation, until they ultimately reach

their goal, and are in their turn hoisted to the surface, making way for those behind them, which are subsequently hauled over the same bankhead.

The empty locomotive having dropped down the shunt and made its way to the empty sidings, has taken and delivered another empty train inbye, in exchange for a full one, and is now pulsating its way to its bankhead to deliver it. The process goes on repeating itself. From every district of the mine trains are being hauled over the bank-heads with the most perfect regularity and alacrity that efficient equipment and close supervision can induce during working hours.

Several district roads feed into central arterial ones, CC, which in plan shown range in straight lines, longitudinally towards the boundary of the coal to be worked. These two, and perhaps another one, D, at right angles to them, deliver their coal into the wide arched pit porch, E, of considerable length, with four tracks laid in a line with those on the cages. There are opposite each cage controlling devices to automatically or otherwise release, as the cage strikes the bottom, just as many waggons as the plant is designed to pull at one time, and no more. The full waggons by gravitation assisted by power, or by power alone, push the empties from the cage to the platform of an elevator at the back of the shaft, and the same movement automatically raises stops, which hold the waggons in a fixed position upon the elevator platform. During the time a hoist is being made to the surface, the elevator platform, which slopes in the direction the empties must travel when released, is raised to the landing. The stops which secure the waggons on the platform are automatically dropped, as soon as the landing is reached, by mechanism which cannot operate sooner. The waggons run out on the rails of the empty roads and gravitate to the proper point where the locomotive can reach them and haul them into the workings to be refilled.

Over the entrance to the empty porch or mouthing, a man or boy sits to operate the lift, and by means of switch levers at his side to distribute the waggons as they are lifted. To enable him effectually to perform these duties, he occupies an elevated seat or platform, from which he can see all that goes on in the shaft bottom on the one hand, and the landing and travelling of the empty waggons on the other hand.

It will be apparent that the purpose of providing the somewhat extensive empty sidings on each side of the pit, is to keep up the supply of empties in the case of any temporary hitch in winding, or stoppage at the top, where the large standage of full waggons between the bank-heads and shaft provide for continuing hoisting when the supply of coal from the hauling roads is from any temporary cause curtailed or stopped. For a mine hoisting 1,200 an hour, the writer conceives that a standage of 350 to 400 empty cars is not too much.

The operator at the lift can divert cars to either side whenever the demand calls for it. And that he may know just how many cars are standing, simple electrical devices, with illuminated dials, at the entrance to each switch road, may be contrived without any serious stretch of ingenuity as nothing requiring any mental application should be allowed to distract the attention of a man engaged in such a strenuous occupation.

To prevent the smashing of waggons turned down grade at the switches, when they come in contact with those already standing in the empty road, artificial retardation must be resorted to, the simplest form of which is undulations of grade in the empty road designed for the purpose.

The details of this paper and the drawing are not claimed to be new. Some portions of them will be found in the arrangement in nearly every modern colliery. The writer has brought these scattered elements of good practice together, and incorporated them in a fairly complete scheme, by what may be termed a process of mechanical synthesis.

It is for practical men who peruse this description to assimilate what they consider good, and reject what they may deem not good.

The writer, however, feels the utmost confidence that, as an engineer, he could carry the scheme into practice without serious modifications, and also without any abridgement of capacity.

The sketch as drawn is too much crowded—the pillars thin—and hence it does not represent what would be good practice in actual construction. This condensation has been done to get the sketch into small space and in no way affects the principle of operation of the scheme.

Safely and effectually to work such a mine as projected above, one mainshaft of good size or two small main shafts, would be required. The structure of these shafts or shaft should be such that an explosion could not render them useless.

As will be seen, the plan contemplates the complete separation of the intakes from the returns, except those parts of the mine where coal is being worked. And as fast as a working is finished, a substantial air-tight stopping should be put in at each end of the pillar pierced with tamped stowing between them, in order to restore the wall separating the intakes from the returns, to as near as possible the original strength of the coal pillar.

Fresh air laid on to pass principally along the two outside roads, in each set, the middle road being a hauling road, up to points not shown, just behind the several bank-heads, the two outside roads being in consequence of this arrangement, ordinarily free from dust. The air in the middle road to be scaled to more than the sanitary requirements of the men working in it, so that in case of an ignition of the dust, the flame will have a chance to die out for want of oxygen, instead of vigorously travelling inbye, and wrecking the shaft, as now usually happens.

In case of longwall working the pit pillar would require to be of very ample size.

Hon. Wm. Templeman, M.P., Dominion Minister of Mines, is stated to have promised the Board of Trade at Chilliwack, B.C., that Mr. Charles Camsell, of the Geological Survey, who spent the field-work season of the last four years in the Similkameen and Nicola districts of British Columbia, will make a reconnaissance survey of the Steamboat Mountain promising mining field, which has come into prominence in the coast cities of British Columbia during the past year. The new field is in Yale district, and has thus far been reached chiefly by way of Hope, on the Fraser River. Provincial Government parties will, it is expected, make trails in from Chilliwack, on the west, and Princeton, Similkameen, on the east of the Hope Monntains, which, if done. will open a second and third route to Steamboat Mountain region. As yet not much development work has been done, but many mineral claims have been staked, and assay returns from mineral specimens from some of the claims encourage the hope that much gold-bearing ore will be found there.

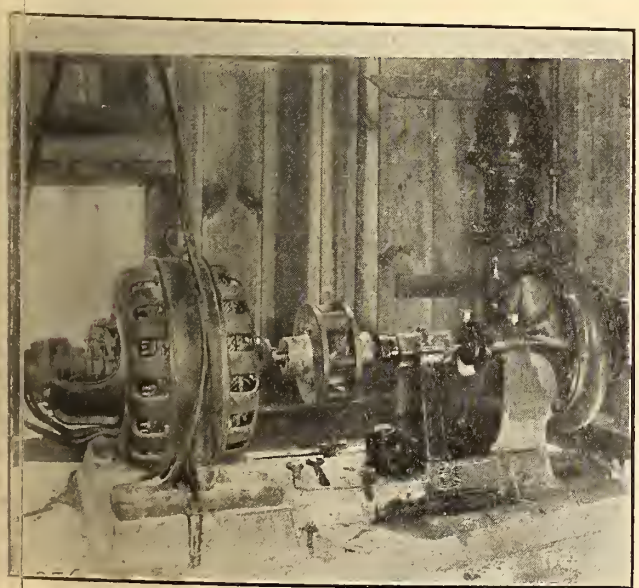
Electric Pump Replaces Steam Pump in Stone Quarry.

The view of the quarry shows the steam engine partly dismantled and left to rust out its days in the weather, also the shanty in which the new pump is installed and the suction and delivery pipes. The view inside the shanty shows the motor and the pump, installed across the end of the shanty close to the suction

and delivery pipes. As the motor is about 2½ feet high an idea may be had of the relative sizes.

This outfit, consisting of a No. 6 high duty American centrifugal pump driven by a 30 h.p. Westinghouse alternating current motor running at 690 r.p.m., was installed over a year ago by the Kankakee Electric Light Company, in the stone quarry of McLaughlin & Master, Kankakee, Ill., to keep the quarry dry, and has been giving excellent service ever since.

The pump delivers 1,100 gallons per minute against a discharge head of 55 feet and a maximum suction of 25 feet pumping the water from the quarry sump. The water is started and stopped by a ball float and master switch in the pump house and a magnetic starter on the bank above the quarry. The pump works automatically, running eight hours out of the twenty-four; that is, the sump fills in one hour, and the pump empties it in a half-hour.



The owners of the quarry were somewhat skeptical of the powers of the pump when it first appeared on the scene and called it a "toy," and it did look diminutive beside the steam pump. When the pump was connected and ready to work they came around confidently expecting that this new device would be totally inadequate and that the firm was going to "get in wrong." But when the equipment dug right into the load and pumped water in a large stream and never once hesitated until the sump was emptied, their surprise and speedily their pleasure was great. So pleased were they that in 24 hours after the pump began work orders were given for the complete abandonment of the steam equipment.

The motor application is a particularly good one. The first point of excellence is the use of a flexible coupling between the pump and the motor, which permits slight inaccuracies in the alignment of the two shafts. Some form of flexible coupling should preferably be used on all installations where the motor is direct connected to any two-bearing machine. The second point is the excellent concrete foundation provided even though the pump and motor are mounted on the same cast iron bed plate

SHEEP CREEK GOLD MINING CAMP, B.C.

Mr. W. M. Brewer, of Victoria, B.C., recently stated, for publication, that he considered Sheep Creek, in Nelson mining division of the West Kootenay district, the best camp he had seen in British Columbia.

"I consider it the best camp," he said, "for the reason that the Nugget ground is 6,000 feet above the sea and the Queen 2,000 feet below, with the Mother Lode workings 500 feet deeper than the Nugget—that all are in the same geology, though there is no relation between the veins of the various properties.

"On the Nugget there are oxidized gold-bearing ores on the surface and in the workings, 400 feet below they are still getting the same kind of ore. From it fully 80 per cent. of the value can be saved by amalgamating. In the Mother Lode, while a large proportion of the ore is free-milling it becomes more of a sulphide. The Queen is 200 feet below the level of Sheep Creek and here the ore is thoroughly sulphide, but they claim that there is in it sufficient free-milling quartz to save about 60 per cent. of the value on the plates.

"All of the development on the Nugget and the Queen has been paid for out of the bullion received from the mills on the properties—a 4-stamp mill on the Nugget and one of 20 stamps on the Queen. The Nugget is owned by a company, the stock of which is largely held in Vancouver. The Mother Lode has been developed by outside capital and is now arranging to put in a mill.

"In addition to these properties there are the Kootenay Belle group, the Clyde, and Fawn groups, all located in the same geological formation made up of alternating belts of schist and quartzite with some dikes of igneous rocks as intrusives. The general trend of the veins is easterly, while that of the country rock is northeasterly. In all these the fact that the veins are true fissures, cutting through the quartzite diagonally, is very noticeable. In value saved, they vary from $12 to $25 per ton on the mill runs. What is the extent of the area of the camp? That is problematical. Whether there will be any mines of value found outside the quartzite and schist zone remains to be proved."

Outlook for Placer Gold Mining in British Columbia.

By E. Jacobs.

The preliminary estimate of the mineral production of British Columbia in 1910, published by the Provincial Bureau of Mines in the first week of this year, shows a small increase in the value of placer gold as compared with 1909. The production in the latter year was the smallest during a fifteen-year period—1895-1909—both years inclusive. The officially recorded value of production in these years, respectively, was $477,000 in 1909, and $481,683 in 1895. There were, however, several earlier years in which production was still smaller, as follows: In 1891, $429,811; 1892, $399,526; 1893, $356,131; and 1894, $405,516. That for 1893 was the lowest on official record, the statistics commencing with 1858, which year was credited with an output valued at $705,000. Thereafter, for twenty-three years—1859-1881—the yearly production was always in excess of $1,000,000, with that of 1863 ($,913,563) as a maximum, and of 1880 ($1,013,827) as a minimum. Since the discovery, in 1898, of the Atlin placer gold field, there have been five years in which the output was in excess of $1,000,000, with that for 1899 ($1,344,900) as the highest. The avxerage yearly production for twenty-five years, 1858-1882, was $2,$25,986, with an aggregate for that period of $50,649,656; that for the next twenty-five year period, 1883-1907, was only $755,978, and the aggregate $18,899,447. The addition of $1,606,000 for the last three years, 1908-1910, will show the aggregate value of the production of placer gold during all years to 1911, namely, $71,155,103.

It will be seen, then, as compared with the past, the production of placer gold in quite recent years has been small in this province. There is, though, good reason to look for an increase this year, and, given a fairly large water supply, also during a number of years to follow. A heavy snowfall in Cariboo district during the winter now closing warrants expectation that there will be plenty of water for the ensuing season's gravel-washing. In addition, larger and more productive hydraulicking operations are expected in the Quesnel mining division of Cariboo than for several recent years, for it is probable the water-supply system of the Quesnelle Hydraulic Gold Mining Company will be sufficiently advanced towards completion to admit of hydraulicking being commenced about the middle of next summer, and being continued during fully three months thereafter. If this expectation be realized, there is likely to be at least $100,000 recovered by that company before the season shall close, for it expects to operate under conditions that will be more than usually favourable, owing to physical advantages connected with its water-supply system and the lay of its gold-bearing gravel beds. In the Cariboo mining division, too, the outlook is regarded as being decidedly promising, for Mr. John Hopp's several placer mines about Barkerville have been provided with facilities for a larger water supply and equipped with additional hydraulicking appliances, with the object of moving a larger quantity of gravel, and recovering more gold than in past years. In this division there are, as well, several hydraulic enterprises equipped for working on a smaller scale, the combined production of which will contribute an appreciably large amount to the total recovery of gold in this district.

Conditions in the Atlin field are also promising an increased yield of gold, although the North Columbia Gold Mining Company, now the largest producer in this district, was able to operate to a large capacity last season, with a correspondingly enlarged production as compared with that for 1909. Several other operators may be expected to add considerably to the total for this field, though not to a similar extent as the North Columbia Company, which possesses an abundant supply of water, and has large areas of gold-bearing gravel favourably situated for being quickly moved.

There also appears to be a prospect of an increased recovery of placer gold in East Kootenay next season than for some years past, preparations having been made last season to operate a hydraulicking plant on Perry Creek, in Fort Steele mining division. To allow of the gravel being moved more quickly, a steam shovel has been put in, and other arrangements have been made to carry out the undertaking on a scale that will facilitate the recovery of sufficient gold to make the enterprise a profitable one.

With much attention being given to the country now being rendered more accessible by the construction of the Grand Trunk Pacific Railway through central British Columbia, it is not too much to expect that there will be done more prospecting for placer gold along some of the many streams considered likely to be found auriferous, but these are uncertain prospects as compared with those previously mentioned in connection with the Cariboo, Atlin, and East Kootenay districts. The last are of themselves sufficiently promising to justify the opinion that the production of placer gold will, at any rate for several years, show a steady increase and will attain to larger proportions than the average of the last three years.

Missouri Zinc

Canadian readers of the Journal, especially those connected with the zinc and lead industry, will be interested in the following tables reproduced from the annual mining edition of the Joplin Daily Globe:

All the zinc blende in the Joplin district is purchased on a base price per ton of concentrates running 60 per cent. zinc contents. A penalty of $1 per ton is imposed for every per cent. that the concentrates fall below this base in zinc tenor, and a corresponding bounty is allowed for each per cent. above 60. A similar penalty is added for iron contents and all settlements are made on dry weights.

The prices of zinc blende for 1910 fluctuated from $46 base in January to $40 in March, $36 in April, and in August, ore sold as low as $35, with a steady advance to $48 in November, and the year closed with a gradual decline. The lead market suffered in the same manner. In 1907 lead concentrates sold as high as $88 and $90 per ton, whereas the average for 1910 was in the neighbourhood of $52.

The imports of zinc ore for 1910, according to the United States Bureau of Statistics, amounted, all told, to 72,854 short tons, with a metal content of 25,82 tons, equivalent to a 36 per cent. average metal content.

With the exception of 1907 this metal content is the largest ever imported and the ore tonnage is the largest ever imported with the exception of 1909 and 19.

The importation of spelter shows a decrease of

cent., notwithstanding a reduction in duty from to 1⅜ cents per pound.

The following table, compiled by the United States Geological Survey, gives the imports of zinc ores from Canada and Mexico since the year 1904, in tons of 2,000 pounds:

	Calamine. (free).	All other (dutiable).	Total
1904			
Canada	.....	.....	.....
Mexico	.....	2,264	2,264
Total	.....	2,264	2,264
1905.			
Canada	913	3,150	4,063
Mexico	6,180	11,894	18,074
Total	7,093	15,044	22,074
1906.			
Canada	423	.....	423
Mexico	47,778	7,213	54,991
Total	48,201	7,213	55,414
1907.			
Canada	.....	1,112	1,112
Mexico	84,984	17,021	102,005
Total	84,984	18,133	103,117
1908.			
Canada	634	6,772	7,406
Mexico	22,900	23,451	46,351
Total	23,534	30,223	53,757
1909.			
Canada	4,330	5,694	10,024
Mexico	61,054	45,191	106,245
Total	65,384	50,885	116,269
1910.			
Canada	.....	4,927	4,927
Mexico	.....	67,927	67,927
Total	.....	72,854	72,854

Chili exported to the United States in 1910 over 13,000 tons of zinc ore containing a little over 13 per cent. zinc, but the zinc content was lost in the process of smelting for lead.

These figures show that Canada's proportion of the zinc imports is very small. On the other hand, the Canadian ores were of a much higher grade than those imported from Mexico.

The following table shows the production and value of the zinc and lead ores from the various camps in the Joplin district:

DISTRICT'S RECORD ORE PRODUCTION.

The Output in Pounds and Amount Paid for Lead and Zinc Ore by Camps.

Camps.	—BLENDE— Pounds.	Value.	—CALAMINE— Pounds.	Value.	— —LEAD— Pounds.	Value	Total Values
Webb City-Carterville, Mo.	215,713,555	$4,515,466	.....	.....	47,716,005	$1,258,799	$5,824,265
Joplin, Mo.	98,758,190	2,075,844	2,573,690	$ 42,744	14,426,465	379,608	2,498,196
Duenweg, Mo.	37,999,160	780,960	6,413,180	85,543	5,761,160	149,293	1,015,796
Galena, Kan.	38,589,230	801,557	287,220	3,364	4,136,710	108,729	913,650
Alba-Neck City, Mo.	37,168,990	805,190	87,040	1,076	403,150	10,439	816,705
Miami, Okla.	20,311,390	332,250	.....	.....	6,775,025	176,489	508,739
Granby, M.	10,692,790	194,424	19,217,190	250,474	826,000	19,739	464,637
Aronogo, Mo.	16,828,545	347,059	.....	.....	2,576,050	70,828	417,887
Spring City, Mo.	4,900,480	99,436	8,375,000	106,068	3,818,980	98,617	304,121
Badger, Kan.	12,982,930	273,589	.....	.....	925,630	25,675	299,362
Aurora, Mo.	8,368,820	171,379	6,615,475	79,642	454,475	11,550	262,551
Carthage, Mo.	11,111,170	238,611	349,450	4,288	36,620	866	243,765
Quapaw, Okla.	7,937,720	167,068	.....	.....	443,420	11,109	178,177
Carl Junction, Mo.	6,680,480	143,210	.....	.....	48,370	1,151	144,361
Lincite, Mo.	6,314,860	133,829	.....	.....	242,880	6,212	140,041
Carcoxie, Mo.	4,721,820	97,256	2,500,065	32,370	29,770	817	130,443
Cave Springs, Mo.	3,511,500	73,124	.....	.....	18,370	408	73,532
Cotts City, Mo.	1,678,855	35,444	.....	.....	30,320	780	36,224
Leeds, Mo.	681,490	13,781	173,670	2,146	.....	...	15,927
Wentworth, Mo.	166,540	3,577	226,080	2,720	.....	...	6,927
Seneca, Mo.	.....	.....	108,250	1,331	124,650	3,383	4,714
Greenfield, Mo.	.....	.....	273,710	3,325	37,000	962	4,287
Peoria, Okla.	.....	.....	111,320	1,228	.....	...	1,228
Springfield, Mo.	10,510	210	.....	.....	.....	...	210
Total shipments	545,129,025	$11,303,264	48,211,340	$616,319	88,831,050	$2,335,432	$14,255,015
			2,400,000	27,600	2,100,000	58,800	266,400
Surplus in bins	9,000,000	180,000					
Total production	554,129,025	$11,483,264	50,611,340	$643,919	90,931,050	$2,394,232	$14,521,415
Shipments by States:—							
Missouri	465,307,755	$9,728,800	47,812,800	$611,727	76,550,265	$2,013,430	$12,353,957
Kansas	51,572,160	1,075,146	287,220	3,364	5,062,340	134,404	1,212,914
Oklahoma	28,249,110	499,318	111,320	1,228	7,218,445	187,598	688,144

British Columbia is the largest producer of zinc ores in Canada, and the bush fires in the vicinity of the zinc mines account for the large decrease in the zinc ore exports to the United States. The railway used for transporting the major portion of the tonnage was entirely destroyed for a distance of several miles.

"Comparing the Canadian imports of 1910 with 1909 and 1908, it will be noted that they fell off over 50 per cent., when in reality the mines have increased their productiveness and may be expected as heavy importers as soon as the transportation can be replaced. More attention has been given zinc production in British Columbia the past year than any year since 1907, and the whole province has entered into the work of making the mines producing zinc, profitable, and to that end have been securing the aid of the Dominion Government in the experiments on electric smelting, so that the ores of that country can be smelted at home and thus escape the loss occasioned by the high freight rates and tariff to American zinc smelters."

This statement by the mining editor of the Joplin Globe, who is an accepted authority on the Joplin district, shows that the zinc smelters of the United States are thoroughly conversant with conditions in Canada. If the smelters of the Oklahoma and Kansas districts can make a profit importing our high grade ores, in the face of the high duty and almost prohibitive freight rates, surely there is an excellent opportunity for a centrally located smelter, where the Canadian ores could be reduced to spelter, and then exported to the United States if the Canadian product could not compete successfully in the open markets of the world.

Portland Canal Mining Company

The directors of the Portland Canal Mining Company, Limited, have received from Mr. W. J. Elmendorf, manager of the company, the following communication, under date March 21·

"The proposed addition to the concentrating plant of the Portland Canal Mining Company is for the sole purpose of handling more ore at a decreased cost per ton and thereby assuring larger profits, not only in the aggregate, but per ton of ore treated. Furthermore, it is exactly along the lines contemplated by the management from the beginning of the mill construction. No new devices are to be employed, and none of those now in the mill, and used in the very satisfactory run of last fall, are to be discarded

"The plants of concentrating machines, as installed, consists of four jigs, handling 5, 3, 2 and 1 mm. feeds; one Wilfley table and one Overstrom table, for the finer sands; and two vanners for the slimes. Experience showed that while all the machines used were satisfactory, the Wilfley table was pre-eminently so. Not only did it most successfully handle its own size of feed but, on this particular ore, it was equally efficient on sizes up to 2 mm. This was determined by diverting No. 3 and No. 4 jig feeds on to it. Moreover, it showed a capacity almost equal to a jig of these sizes. At the coarser sizes, 5 and 3 mm., the capacity of jigs greatly increases and it is for this and other reasons advisable in any concentrating mill to treat as much ore in a coarse condition as is feasible.

"The proposed plan of changing the 2 and 1 mm. jigs to 5 and 3 mm., thus giving two No. 5 and two No. 3 jigs, at least doubles the jig capacity. In order to handle the increased 2 and 1 mm. feeds to keep pace with this increase, six more Wilfley tables should be provided. The Wilfley and Overstrom tables now in the mill, and the vanners, will be used on the fi ores. In order to be sure to meet the increase in co centrating facilities with crushing capacity, it is al proposed to provide a larger crusher. Our prese one will be used later, when a further increase in t mill is warranted, as the orebodies in the mine a developed.

"The purchase of these machines and their nec sary connections, and a simple piece of constructi involving no foundation work, but merely the exte sion or enlargement of our concentrating floor, a other minor changes, cover the proposed additio These will cost about $15,000, and will give more th 75 tons daily capacity.

"Unless some most unreasonable delay occurs, t plant should be complete and running within 90 da from date, if the machinery is ordered at once."

The additional machinery recommended by Mr. El endorf has been ordered, so that the larger outp from the mill, as indicated in the foregoing commu cation, may be expected to be made after about t middle of next summer.

Slow Progress on Zinc Problem.

The Liberal Association, Nelson, B.C., has receiv the following letter from Hon. William Templema Dominion Minister of Mines:

"I have your letter of Feb. 8, inquiring for inform tion concerning experiments that are being conduct by the Government in connection with the reduction zinc ores.

"I may say with regard to this matter that the d partment has secured the co-operation of Dr. Ingal the well known mining engineer of New York, who now devoting his attention to this problem.

"Dr. Ingalls has investigated various proposals th have been made in technical literature and expe mental practice for the treatment of zinciferous or but he does not think that any of the proposals so f submitted would afford any solution to the proble He is also in touch with people in America and abro who are working on problems of a similar charact

"While none of this work seems to be directly a plicable to the conditions of British Columbia, some it contains the germs of what may be useful ide The experimental work done by the Canada Zinc C at Vancouver and Nelson has been thoroughly r viewed. The manager of that company courteous placed the plant at Nelson at the department's disp al, but Dr. Ingalls did not deem it advisable to und take experiments upon a large scale anywhere un certain fundamental conditions had been determin upon a small scale.

"Certain plans of experimentalization have be formulated, which include electric smelting. T metallurgical laboratory at McGill University is bei used for these experiments, Dr. Alfred Stansfield, the university, an experienced electro-metallurgical e perimenter, having immediate supervision over t work.

"Experiments with the British Columbia ores b gan during November, and are now in progress. It too early yet to forecast what the result will be, b Dr. Ingalls states that the tests have afforded valuab information respecting conditions affecting the desi of electrical furnaces for zinc smelting.

"Experimental work in new fields, involving the designing and construction of apparatus, is necessarily slow, and particularly so in the case of a metal possessing the peculiar properties of zinc.

"It is proposed to carry on the experimental work on a large scale in British Columbia, as soon as the preliminary work has indicated some advisable way."

Personal

Managers of hydraulic placer gold mines in British Columbia who have spent the winter away from the districts in which their respective mines are situated, are returning to prepare for the expected early opening of the hydraulicking season. Among them are Mr. John Hopp, of Seattle, Washington. whose mines are in the Barkerville district, Cariboo; Mr. John B. Hobson, of Victoria, B.C., who is opening a new mine near Quesnel Forks; Mr. Howard W. DuBois, of Philadelphia, Pa., who is in charge of the construction of a 17½-mile ditch in Quesnel mining division for the Quesnelle Hydraulic Gold Mining Company; Mr. J. M. Ruffner, of Cincinnati, Ohio, president of the North Columbia Gold Mining Company, which last season recovered about $150,000 worth of gold from its placer mines in Atlin district, B.C., and others. There was a heavy fall of snow last winter in the chief placer mining districts of British Columbia—Cariboo and Atlin—and a long and profitable season is expected to result from the consequent large supply of water for mining operations.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Safety Lamps.

Apropos of the fact that the Government of Nova Scotia is about to make safety lamps compulsory in all the coal mines of the Province, it is interesting to note that the centre of controversy in England has shifted from the question of the merits of safety lamps as compared with naked lights for mines, to the question of whether some so-called "safety" lamps are really what their name implies. The necessity of having nothing but closed lights is not now the subject of argument, and is taken for granted. It is, however, pointed out that there is a great and unnecessary variety of safety lamps, some of them containing more or less objectionable features which have been brought into prominence by recent disastrous explosions. It is now proposed that safety lamps shall be submitted to a series of rigid tests in explosive mixtures under varying pressures and velocities of air, and that only those lamps which prove themselves safe under such conditions shall be permissible for use in coal mines. A piece of land has already been secured by the British Home Office in the centre of the South Yorkshire coalfield where experiments along the lines mentioned are to be carried out. The idea has met with very general approval from mining men in Britain, and there can be little doubt that before long we shall have "permitted" safety lamps as well as "permitted" explosives in coal mines. In doing this the British authorities are only following in the steps of Continental Governments who long since adopted similar regulations. The circumstances surrounding the behaviour of safety lamps under varying conditions of pressure and amid certain explosive mixtures are more complex than might be thought at first, and definite data will be welcomed by all concerned, and particularly by the mine manager.

The Springhill Situation.

As forecasted in last fortnight's issue of the "Journal," the town of Springhill has been placed under the jurisdiction of a police commissioner, who arrived in the town with thirty picked constables on the 3rd of April. That it was high time the authorities took cognizance of the topsy-turvy condition of things in Springhill is evident from the fact that on the previous Saturday two of the town constables were arrested on a charge of interfering with the constables of the Cumberland Coal & Railway Company in the discharge of thoir duty, and were taken to jail. The appointment of a police commissioner is in some respects a strong measure, but it was necessary, and there should be no excuse for a state of affairs which allows men who are willing to work to be deterred from exercising their desire because of bodily fear and intimidation practised openly and in secret. Six strikers returned to work on the first day of April, making twelve during the same week. Most of these men were small property holders and types of the best class of miner in Springhill. There can be but little doubt that they, and many others, have been forced to remain out on strike because of the intimidation which has been allowed. That this is the case will speedily be shown when the new commissioner has taken charge.

In spite of the injunction against picketing made by the courts some time ago, this has been continued all along. A long list of defendants were arrested and tried for contempt of court. They were convicted, but an appeal was taken to the full bench in Halifax. The conviction has now been confirmed by the higher court, and an application to stay proceedings pending appeal to the Privy Council was refused. The defendants will therefore have to appear before the court for sentence.

A letter from the president and secretary of District 20 of the United Mine Workers of America has been sent to all the coal companies in Nova Scotia asking them to attend a joint meeting in Halifax on the 17th of April to draw up a wage schedule and agreement for the Province of Nova Scotia. This interesting communication, which is similar in contents to one sent out before the strike of 1909, concludes by stating that failure to attend the meeting will be taken as a refusal to consider a wage schedule and that the U.M.W.A. will take tho steps best calculated to achieve their object. When it is remembered that in Cape Breton the U.M.W.A. havo three unsuccessful strikes to their credit; that in Pictou County they have no following of any kind, and that in Cumberland County their influence is waning, it will be seen how farcical is the pose of this beaten and discredited organization as the representative of the miners of Nova Scotia. Some of the demands of the U.M.W.A. are understood to be the eight hours day, a minimum wage for labourers of $1.75 per day, and $2 per day for shift men.

The archaic platform of this organization is well set forth in a circular which has been widely distributed around the mining districts by the District Executive of the U.M.W.A. The opening paragraph of this leaflet postulates as follows:

"Hitherto the experience of the wage-earners of all countries and times, has been that every amalgamation of capital, every introduction of new machinery, has been made for the specific purpose of cheapening production by the elimination of numbers of wage-earners from the payrolls of their employers, and consequently resulting in an ever-increasing number of partially or wholly unemployed, and a gradual lowering of the

purchasing power of the earnings of those who do hold a job."

This is nothing more nor less than the ancient exploded doctrine which led to rick-burnings in our great-grandfathers' time, and is on a par with the remainder of the written and spoken eloquence of the organizers of the U.M.W.A. The miners of Cape Breton have had a hardly-earned lesson in the folly of listening to these strike-creators, and in the shameless self-aggrandizement and dishonest use of union funds practised by the leaders and organizers of the U.M.W.A. Many earnest and honest men who were beguiled into striking two years ago lost all they possessed, and suffered the degradation of license and idleness, and at the same time gradually opened their eyes to the fact that their so-called leaders were waxing fat and prosperous. It will be a long time before these men are again induced to strike for a shadowy grievance. The U.M.W.A. have shot their bolt in Nova Scotia, and missed the mark.

Dominion Coal Output.

The Coal Company's output for March was 323,869 tons, comparing with previous years as follows:

1908	346,529	1909	253,622
1910	243,747		

The individual collieries contributed as under:

No. 1	50,330	No. 9.....	31,607
No. 2	66,963	No. 10.....	14,706
No. 3	16,152	No. 12.....	21,574
No. 4	30,414	No. 14.....	8,432
No. 5	27,848	No. 15.....	1,834
No. 6	18,641	No. 16.....	754
No. 8	17,191	No.	323,869
No. 7	17,423		

This is a comparatively large output for March, particularly when it is considered that No. 6 and No. 3 mines were both idle for about a week to make extensive spring repairs. It will be noticed that the Lingan mines are steadily increasing in outputs, and that almost 33,000 tons of the total output comes from that district.

The prospects for open navigation during April are not of the best. The main body of Gulf ice has not as yet come down, and it looks as though navigation would be more interfered with by drift ice this spring than has been the case for several years past. Be that as it may, the April outputs will almost certainly be above the corresponding month of previous years, as the Coal Company has sufficient rail business to enable it to maintain shipments.

All indications are pointing towards a record year of coal shipments from Cape Breton. Both the Dominion Coal Company and the Nova Scotia Steel Company are anticipating larger outputs this summer than ever obtained previously, and these together with the unusually ample storage banks which have been accumulated during the winter, will, if no labour troubles arise, make the coming summer a very busy one in the coal business.

ONTARIO.

Cobalt.

Cobalt, April 8.—The Cobalt camp is still in the main tied up through the lack of customs power. This is the latest spring the North has known for some time, and not until the ice goes off the river will there be any relief. The trouble at the Cobalt Hydraulic plant at Ragged Chutes on the Montreal River commenced when the heads of the intake pipes blew out last fall, then followed low water and the consequent insufficient pressure to consumers in Cobalt. The Hydraulic now has storage dams on Temagami, and these will make the present condition of affairs impossible next year. At the present time the hydraulic pressure varies between 60 and 90 pounds, not sufficient to run the drills with any efficiency. Their customers who have large enough compressors, like the Coniagas and the Temiskaming, are using their own power entirely at the present time. Others, like the Nipissing and the La Rose, are supplementing what power they can get from the Hydraulic, with the power from their own compressors. But in this latter case operations have had to be restricted, and the output of the mine seriously curtailed. The operators worst hit by the lack of power are those who in view of the imminence of the customs power did not put any plant in at all. They have had to shut down entirely. The other customs plant serving the camp, the British Canadian, had an adequate service later than the Hydraulic, but the water has fallen so low now at their plant, at the Matabitchouan River, that there is absolutely no pressure at all. They neglected to make arrangements for the passage of logs over their storage dam, and the Government compelled them to open the dams and so let out the water. Next year there will be no trouble of this kind.

The ice is not likely to go off the rivers permanently until the end of this month, and until then the output from the camp as reflected in the shipments will be small.

The mines working in the immediate vicinity of Cobalt Lake have felt the effects of the failure of the air least. Proceeding from the Hudson Bay along the west ridge, the Coniagas, owing to the large compressor, was only affected for a few hours. Operations at the Buffalo have been so extended since the customs air was installed that the compressor is now insufficient and here mining has been curtailed to a considerable extent. The City of Cobalt has adequate power for its needs, and is now producing at a higher rate than at any previous period of its existence. The Townsite is also crippled to a considerable extent. On the other side of Cobalt Lake the La Rose with its subsidiary mines, the Lawson and the Princess, has felt the effect of the air trouble probably as much as any mine in camp. At the present time no development at either the Princess or the Lawson is possible, and the main La Rose has to furnish all the ore for dividend requirements. The Nipissing, with its half-dozen mines scattered over an area of two miles, has also found it impossible to carry on much development work. They, however, have such great ore reserves that it has only entailed the pulling down of stopes made some years ago. In the Kerr Lake area the Crown Reserve with its 22-drill compressor is also independent of the power companies. The Kerr Lake is considerably handicapped, however, and the Lawson and the Hargrave have had to shut down. In South Colemans the Beaver has only been able to run two drills. But this company is now installing the second half of its Rand compressor, so that in the future it will be quite independent of any air trouble. The Temiskaming has adequate power of its own. Owing to the air failure a number of promising prospects in this section of the camp, for instance the Ophir, the Lumsden, and the Fisher Eplett, have had to discontinue operations. Both companies have maintained the electric power for the mills, so that this very important department of the silver industry has not been in the least disturbed.

The production of the Coniagas for the months of February and March will make a record for this company. In the last two months in 1910 the Coniagas produced nearly 1,000,000 ounces. In the second and third months of this year this record will be considerably exceeded. For the past two years nearly all the ore from the Coniagas has come from development, now the ore previously put into sight is being taken down. The mill, the second largest in the camp, is treating on an average 75 tons a day, and making an excellent extraction.

From the Gowganda camp during the last ten days of March several shipments have been made. The Calcite Lake Mining Company, situated about seven miles from Gowganda, shipped between nine and ten tons. This is their first appearance on the list of producers. The Miller Lake O'Brien sent out about 20 tons of their high grade ore, while the Millerett despatched 22 tons. It is understood also that a few tons of ore went over the winter roads from the Hudson Bay claims, at Hangingstone Lake. All this ore came from below the 100-foot level. The Millerett would have made much larger consignments this

ar if they had not been more concerned with the building the mill than the mining of ore.

In the diabase section of the Millerett at Gowganda, excellent high grade ore has recently been struck at the 150-foot level. At the 70-foot level of this same shaft, the silver values in the smaltite vein were very low. The discovery that this vein in the diabase has become richer as it was sunk upon is considered a very important development in the camp.

The Beaver has now definitely joined the list of Cobalt dividend payers. There had been some debate as to whether the surplus on hand should be used in the erection of a concentrator or in the payment of a dividend. It was felt, however, that the erection of a mill was somewhat premature, and the mine is now gone on a 2½ per cent. basis.

Porcupine.

Excellent results have accrued from the development work on the 200-foot level of the Hollinger mine. The quartz vein here is, if anything, wider than that on the upper level, and the ore is now fully as rich. In all computations of ore in sight no estimate has been made of low grade ore in the mine, although it is known that the schist carries values. At least one parallel vein promises to add very considerably to the reserve. On the Vipond property, adjoining the Hollinger, there is now a drift of 150 feet at the 100-foot level, all in ore. The ore streak in the vein is about 3 feet wide, and the ore from this in the little Nissen mill is running about $40 to the ton. Outside this 3 feet there is a considerable amount of $10 to $1 ore. A cross-cut has been started to intersect the other parallel vein of the property. Operations on the Rea mine have added much in value to the Porcupine gold claims adjoining.

There has been a considerable influx of prospectors into what is known as the Keekeek country. Here something like 6000 acres have been staked under the Quebec laws. The pioneer in this district is Samuel LeRoy, with a good free gold find at Keekeek Lake. While the assays from the veins are not very high they are very consistent, and the veins are both larger and better defined than in Porcupine, or in any portion of the gold district so far prospected in Northern Ontario. Little work has been done so far on the claims. The field is easy of access in the summer time, and it is probable that the better terms the Quebec Government is offering prospectors will lead several thousand men who have been operating Ontario for the past two or three years to cross the provincial boundary.

ALBERTA.

Blairmore, Alta., April 4.—On March 31 the agreement between the miners in District 18 of the U.M.W.A. and the Western Coal Operators' Association expired by time limitation, and as the parties were unable to settle upon any basis for the signing of a new agreement nearly 6,000 miners ceased work on April 1. Sixteen mines with a daily output of 12,000 tons are closed by this action.

On March 2 the operators and district officials of the miners met in Calgary in joint conference for the purpose of negotiating the renewal of the agreement. On March 23 the operators presented the following resolution:

'That, whereas we have already spent upwards of a fortnight negotiating and have as yet arrived at no definite conclusions, and in view of the fact that the present agreements expire on the 31st of the present month;

'It is resolved that in order to prevent the possibility of a suspension of work on that date the following procedure shall govern each party to the negotiations which may take place between now and that date:

'1. That we proceed with the discussion of the agreement, and such clauses with any amendments or rates as we may agree upon to be embodied in and become part of the new agreement.

'2. Such clauses or rates as we may not be able to agree on to be set at one side and on the completion of our negotiations to be submitted to a Board of Arbitration for final adjustment.

''3. The finding of such Board of Arbitration to be binding and final and to be accepted by both parties.

''4. Said Board to be composed of two members appointed by the Western Coal Operators' Association, and two members to be appointed by District 18, U.M.W.A. and presided over by the Chief Justice of the Province of Alberta, or any justice of the Supreme Court of Alberta appointed by him.

''Meantime, should an award not be arrived at by the Board of Arbitration by the 31st inst., the miners will continue to work and the operators to operate their mines under the present agreements, and any award made shall apply as from April 1, 1911.

The miners did not agree to this, and then the operators presented the following offer for settlement:

''The general provisions of the Western Coal Operators Association agreement with the date of expiration fixed at March 31, 1913, and with the Discrimination Clause as at present and made a matter of record in the same way.

''An increase of 5.55 per cent. on all day wages of the Western Coal Operators' Association scale and on contract prices except on pillars and timbering.''

The next day, March 24, the miners submitted the following reply:

''In reply to the proposals of the operators we desire to say:

''1. We will sign no agreement that is conditional upon the relinquishing by ourselves of the closed shop as it exists at this time at the Crow's Nest Pass Company's mines, unless such a check-off clause as that presented by ourselves be made one of the terms of the agreement.

''2. That we will not agree to the general application of such a discrimination as now applies to part of our membership.

''3. That the advance offered is not general and only applies to part of the employees.

''4. That the advance quoted is not sufficient to bring men employed on the day wage scale up to the rates paid in adjoining districts.

''5. That no provision is made for the eliminating of inequalities at the mines already specified.

''6. That no provision is made for the fixing of contract rates on mines where no contract rates exist, prior to the signing of the agreement.

''7. We desire to state that our proposition is definitely as stated in our first proposals with the following modification in Clause 4 to be changed: 'An advance of 12½ per cent. on the present day wage scale, after existing inequalities in the district are adjusted.' Clause 7 to be changed. The date of expiration of the agreement to be March 31, 1913.' ''

As this was not satisfactory to the operators, the miners then moved to adjourn sine die, and up to the present no efforts have been made looking to a renewal of negotiations.

BRITISH COLUMBIA.

The construction of railways now in progress in districts of the Province in which economic minerals are known to occur gives promise of facilitating the further development of the large mineral resources of British Columbia. The extension by the Great Northern Railway Company of what is known locally as the V. V. & E. line from Keremeos, through Hedley, and thence to Princeton, is resulting in the opening of several coal mines near or beyond Princeton, notably those of the Princeton Coal & Land Company, which last year commenced production on a commercial scale, with an output of nearly 12,000 short tons of coal; and of the Columbia Coal & Coke Company, which is developing a valuable coal property situated between Granite Creek and Tulameen (Otter Flat). The Princeton Collieries, Osoyoos Coal Company, and two or three others have also been encouraged by the construction of this railway to proceed with prospecting work and development of their respective properties. A cement manufacturing enterprise has been started in this district, while the opening of a number of copper claims is also looked forward to.

In Nicola district, the construction of the Kettle Valley Railway is in progress; this is intended to connect this district, in which are productive coal mines, with the Boundary district, regarded as sure to prove a profitable market for coal and coke from Nicola collieries. There is expectation, too, that copper mines will be opened in parts of the country this railway will traverse. Toward the eastern end of the Kettle Valley Railway there is the West Fork of Kettle River district, in which, as well as in the Nicola country, much prospecting has disclosed the occurrence of metal-bearing ores, though the West Fork claims that have as yet had most attention contain value in gold or silver rather than copper.

In East Kootenay, the construction of what has heretofore been known as the Kootenay Central Railway, southwards from the Canadian Pacific transcontinental at Golden, B.C., up Columbia River to the lakes at its source and thence down the valley of Kootenay River to a junction with the same company's Crow's Nest railway, is being proceeded with. Work on the most southerly section of this line has been in progress for some time; recently a contract was let for about 40 miles of the northern end, work on which in past years consisted of grading about 10 miles south out from Golden. In Windermere mining division, approximately half way between Golden and the Crow's Nest line, there are a number of mining properties, chiefly silver and lead, several of which were worked years ago, and from which ore was shipped but at too high cost to admit of production being continued under such unfavourable conditions. Here, too, the provision of railway transportation, though intended primarily for the development of an agricultural industry in a comparatively large area of fertile country, will serve to promote the utilization of mineral resources believed to be extensive and capable of being worked to advantage.

It is yet early to estimate the effect on mining the construction of the Canadian Northern Pacific Railway, from Alberta through the Yellowhead Pass and thence down the North Thompson River to Kamloops, on its coastwards route, will have, but at least two beneficial results to this industry are expected, namely, the making more accessible the mica claims in the country about Tete Jaune Cache, and giving transportation to the North Thompson district, in which coal is stated to occur. As the country between Kamloops and the Coast has long had the benefit of the C.P.R. passing through it, no particular additional advantage is likely to accrue to the mining interests by the construction of a second railway.

On Vancouver Island, both the C.P.R. and Canadian Northern Pacific Companies are busily engaged in railway building. The work of the former is well advanced; that of the latter has lately been commenced. In both cases, country in which mineral occurs will be opened to prospectors to an extent that will encourage much more exploration work being done than in the past. Much of the country is mountainous and heavily forested, but this notwithstanding, prospecting will be rendered less difficult and costly after construction of the new railways, and the eventual opening of valuable deposits of mineral may be expected. Fortunately, the more important of the known coal fields of the Island are within easy reach of tidewater, so that with only the construction of short lines necessary, they have already been provided with transportation from the mines to shipping ports. It is in connection with the discovery and development of metalliferous minerals more particularly that the mining industry of the Island is likely to be benefitted.

The great extent of country in northern Cariboo, Omineca, and Skeena mining divisions that will be opened for mining development by the construction of the Grand Trunk Pacific Railway, now well on towards completion, contains immense and varied mineral resources from which in the course of a few years there will probably be a considerable addition to the value of the annual mineral production of the province. Placer gold, lode metals, and coal, are all to be found in that central part of British Columbia, and the provision of transportation facilities will doubtless be followed by much mining on commercial basis.

In smaller measure, the McKenzie & Mann Railway fro Stewart, at the head of Portland Canal, inland, will assist the development of mining further northwards. A beginni has been made by giving the mining properties near Stewa railway connection with the sea, and if the suggested extensi of the line into the Nass River country, and thence eastwar to the Peace River district be carried out, another large ar of practically virgin territory will be opened to prospecto and miners, with reasonable ground for expectation of su stantial results in the direction of mineral production.

There are other railway construction projects that, if und taken, may be expected to add to the volume and value of t mineral production of British Columbia (among them one th has been commenced and intended to connect the Lillooet d trict with Howe Sound, thereby opening another mining d trict.) Those mentioned above will, however, of themselv be sufficient to indicate that considerable expansion may looked for in connection with mining in British Columbia, well as with its other large and valuable natural resources.

Ore Production to March 31.

In a general way, the ore production of the Kootenay a Boundary districts is shown by the figures that follow. these notes are being written before the returns for the l week of the quarter have been received, the figures are exact, but, though approximate, exhibit fairly closely the qu tities of ore produced in the several parts mentioned.

As the Boundary district is, in regard to ore tonnage, far the most productive in the province, its proportion of whole having of late years been nearly three-quarters, it ne sarily is a long way in the lead for the short period under view. Roughly, the output for the three expired months of year has been 450,000 tons of ore, of which quantity the Gr by Company's mines have produced 293,000 tons, those of British Columbia Copper Company 127,000 tons, and of Consolidated Mining & Smelting Company 30,000 tons. Sev small shipments were made by other mines, but in compari with the foregoing they are unimportant. The Granby C pany's production has been all from its group of big mi at Phoenix; the British Columbia Copper Company mined at 82,000 tons at its Mother Lode mine, 9,000 tons came from Wellington camp property, and 36,000 tons from the Rawl mine of the Dominion Copper Company's group, now contro by the B. C. Copper Company. The quantity from the Denoro mine was small, while that from the Napoleon is taken into account, this mine being situated in the adjoi State of Washington. The Consolidated Mining & Smel Company sent to its smeltery at Trail about 27,000 tons f its Snowshoe mine, 2,400 tons from the Phoenix Amalgam group, and 700 tons from the No. 7 mine. The Phoenix A gamated had not previously shipped ore; the group is situ immediately south of the southern claims of the Granby C pany's group. Late in March the Fife mine, in the extr eastern part of Grand Forks mining division, made its shipment in bulk, of copper gold ore, but it was only a s beginning.

Rossland mines made a total production of approxima 58,000 tons during the quarter. Of this quantity, 44,000 of gold-copper ore was from the Consolidated Company's tre Star group, about 10,200 tons from the Le Roi No. 2 cluding 3,600 tons of second class ore concentrated at the mi and 3,600 from the Le Roi. From four or five small mines t was a total of about 220 tons, of which quantity 174 tons from the Nickle Plate mine now worked in a small way leasers, but years ago one of the important mines of Ross camp. The expected production from two or three silver properties in this camp has not yet been realized, excep very small measure.

East Kootenay mines have a total shipped of between 10,000 and 11,000 tons sent to the smeltery, and perhaps a rather larger quantity concentrated at the St. Eugene mill. The former total includes 1,600 tons of silver-lead concentrate from the mine. The quantity appearing in provincial newspapers as having been milled at the St. Eugene is far in excess of that actually put through the concentrator. The output of the Sullivan mine, which together with the St. Eugene is operated by the Consolidated Company, was about 9,000 tons. The Society Girl sent between 200 and 300 tons to Trail before the melting snow made the waggon road too soft for hauling ore to the railway. This mine commenced shipping on a small scale late last year; some years ago ore was taken from its surface workings, but recent production has been from underground.

The tonnage for Nelson mining division includes so much ore treated at local stamp mills that figures published are not reliable as a rule. The actual quantity shipped to the smeltery, including concentrates from the stamp mills, was between 3,700 and 4,000 tons. Mines near Nelson city contributed more than 400 tons, those at Ymir (chiefly from the Yanke Girl group), 1,300 tons, the Emerald at Salmo about 900 tons of lead ore, Erie mines, 200 to 300 tons (figures not available), and Sheep Creek 850 to 900 tons. The last-mentioned in no way represents the quantity of ore milled at the Queen and Nugget stamp mills; only the product sent to the smeltery from the several shipping mines of the camp.

Ainsworth and Slocan together have a total of nearly 4,500 tons, which does not at all fairly represent the producing capabilities of these districts, for there were no concentrating mills at work, consequently the figures show only the first-class ore shipped. Several small mines in Ainsworth camp made a combined output of nearly 200 tons. Slocan mines inland from the lake sent out 1,700 tons, chiefly from the Rambler-Cariboo and Richmond-Eureka properties. Slocan Lake mines shipped 700 tons, mostly from the Standard, with about 180 tons from Slocan City division. The Lardeau district shipped 190 tons in all.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax, March 31st.—With the election of officers the 19th annual meeting of the Mining Society of Nova Scotia was brought to a close yesterday afternoon. The new president is G. J. Partington, who is identified with the gold mining industry.

At the morning session Professor E. A. Holbrook read a paper on "Modern Gold Mining Practice and its Application in Nova Scotia." Another paper was read by W. F. Jennison, whose subject was "Gypsum." This is the first paper relating to gypsum read before the Mining Society.

The only other paper read was one on "Coal Mining," by M. Dowling, of the Dominion Geological Survey.

During the afternoon a number of interesting papers were read. Dr. Ora W. Knight spoke on research work on certain Nova Scotia gold mines. C. J. McKenzie told how to handle the coal dust problem. W. H. Prest read a paper on "Prospecting in Nova Scotia," and John Preston described a "Light Weight Motor Driven Reciprocating Pump."

The officers elected were:

President, G. J. Partington.

First Vice-President—Prof. Sexton.

Second Vice-President—Thos. Cantley.

Council—C. E. Starr, Hiram Donkin, R. H. Brown, H. E. Cl, A. L. McCallum, A. A. Hayward, Hon. R. Drummond, G. W. Stuart, John Johnston.

Halifax, April 4—Major Thompson, Provincial Police Commissioner, left yesterday for Springhill, with his force of 33 Provincial police. The Commissioner and his men will replace the R. C. R. detachment, which will return the first of this week. They will be housed in "barracks" and will do, in the capacity of civil police, what the military force has been doing for the past year. The party left on the C.P.R. express.

Springhill Mines, April 2.—It now looks as if the strike in Springhill was drawing to a close. Five of the leading miners returned work yesterday. Thomas Piggott and Duncan Blue were among the number. These men have been for many years residents of Springhill and have always stood with their fellow workmen. It is stated that a large number of others have applied for work, and have accepted the terms of the company.

During the coming week a big break in the ranks of the strikers is predicted. The town was exceptionally quiet on Saturday, there was no picketing nor any disturbance of any kind. The officials of the company are confident that the beginning of the end is rapidly approaching.

As a result of the judgment of the Full Bench of the Supreme Court on Saturday, the Springhill miners who were found guilty of violating an injunction against picketing, will now have to come before the court for sentence. Seven or eight men are involved.

The case was that of the Cumberland Coal & Railway Company vs. McDougall, an appeal from the decision of one of the judges. The court dismissed the appeal with costs.

W. B. A. Ritchie moved for an order not to enforce the judgment pending an appeal to the Privy Council. The motion was refused.

New Glasgow, April 4—New record outputs in nearly every department were made by the Nova Scotia Steel & Coal Company for the first quarter of 1911.

At all the Scotia plants the outputs since the New Year have been excellent, and increases of from 20 to 40 per cent. over the production for the same period of 1910 have been shown, due to the extensive improvements recently installed.

The most marked increases have been made at New Glasgow. The Cogging mill rolled 19,540 tons of billets during this period, an increase of 25 per cent., while the finishing mills produced 15,232 tons of bars and plates, nearly four thousand tons more than in the corresponding quarter of 1910, while the production of pig iron was 20,546 tons, six thousand tons better than last year.

A number of new records were made during March. The Cogging mills which made a record of 6,600 tons in February, exceeded this by six hundred tons, while the finishing mills, which in February established a record of 5,000 tons, exceeded this by 500 tons. Further improvements are now in progress at the various plants which should increase the outputs even more proportionately, and if the present record is maintained the outputs for 1911 will far exceed the records made in 1910.

ONTARIO.

Cobalt—The Beaver mine is now a dividend-payer. The first dividend of 2½ per cent. is payable May 15.

Copper Cliff.—Captain John Lawson has quite recovered from his illness and is back at his post of duty with the Canadian Copper Company.

BRITISH COLUMBIA.

Trail.—At the Trail smelter during March, 6,000 tons o lead ore were smelted, yielding 1,500 tons of lead. For th Kootenay district bounty will be paid upon 17,000 tons for th fiscal year ending March 31st.

STATISTICS AND RETURNS

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending March 25, and those from Jan. 1, 1911, to date:

	Mar. 25. Ore in lbs.	Since Jan.1. Ore in lbs.
Beaver	43,730	595,243
Buffalo	129,170	623,670
City of Cobalt	44,000	296,280
Coniagas	120,910	1,055,090
Crown Reserve	40,060	548,730
Hudson Bay	63,600	185,950
La Rose	59,780	1,165,500
Kerr Lake	120,106	841,698
McKinley-Darragh-Savage	100,110	1,420,150
Nipissing	132,720	1,738,960

The shipments for the week were 863,186 pounds, or 431 tons.

Following are the shipments from the Cobalt camp for the week ending Mar. 31, and those from Jan. 1, 1911, to date:

	Mar. 31. Ore in lbs.	Since Jan.1. Ore in lbs.
Barber	.....	6,000
Beaver	.....	595,243
Buffalo	61,190	684,860
Chambers-Ferland	64,000	320,900
City of Cobalt	.....	296,280
Cobalt Lake	58,900	1,205,800
Cobalt Townsite	.....	289,740
Coniagas	111,300	1,166,390
Crown Reserve	.....	548,730
Hargraves	.....	41,100
Hudson Bay	.....	185,950
La Rose	.....	1,165,500
Kerr Lake	.....	841,698
King Edward	.....	40,000
McKinley-Darragh-Savage	.....	1,420,150
Millerett	44,000	44,000
Nipissing	81,800	1,820,760
O'Brien	64,120	335,440
Peterson Lake (Little Nip.)	.....	58,430
Right-of-Way	.....	318,260
Silver Cliff	.....	98,180
Standard Cobalt	.....	44,813
Temiskaming	140,193	503,612
Trethewey	45,500	275,200
Wettlaufer	.....	60,022

The shipments for the week were 671,003 pounds, or 335 to

The shipments from Jan. 1 to March 31, were 12,469,0 pounds, or 6,234 tons.

BRITISH COLUMBIA ORE SHIPMENTS.

The following are the returns of the ore production a movement for the past week, ended March 25, and for t year to date:

BOUNDARY SHIPMENTS.

Granby	27,817	265,(
Mother Lode	7,056	74,(
Snowshoe	2,424	24,(
Rawhide	1,443	34,(
Jack Pot	805	7,(
Number Seven	27	(
Phoenix Amalgamated	102	2,(
Fife	32	
Other mines	.....	
Total	39,706	410,

ROSSLAND SHIPMENTS.

Centre Star	3,346	40,
Le Roi No. 2	726	5,
Le Roi No. 2, milled	300	3,
Le Roi	241	3,
Other mines	.....	
Total	4,613	53,

SLOCAN-KOOTENAY SHIPMENTS.

Sullivan	806	8
St. Eugene, milled	2,775	33
Richmond-Eureka	30	
Rambler-Cariboo	39	
Hewitt	21	
Queen, milled	420	4
Granite Poorman, milled	250	

Nugget, milled	110	1,320
Wilcox, milled	75	900
Emerald	35	876
Eastmont	32	90
Summit	15	50
Yankee Girl	96	1,200
Knob Hill	133	312
Highland	22	22
Other mines		2,127
Total	4,859	57,680

The total shipments for the week, including the estimated lling, were 49,178 tons, and for the year to date, 521,119 tons.

B. C. COPPER CO.'S RECEIPTS.
Greenwood, B. C.

Mother Lode	7,056	74,655
Rawhide	1,443	34,495
Jack Pot	805	7,631
Other mines		240
Total	9,304	117,021

GRANBY SMELTER RECEIPTS.
Grand Forks, B.C.

Granby	27,817	265,685

CONSOLIDATED COMPANY'S RECEIPTS.
Trail, B.C.

Centre Star	3,346	40,293
Snowshoe	2,424	24,762
Sullivan	806	8,149
Le Roi No. 2	726	5,832
Le Roi	241	3,119
Number Seven	27	639
Richmond-Eureka	30	644
St. Eugene	62	1,585
Rambler-Cariboo	39	685
Hewitt	21	175
Emerald	35	876
Eastmont	32	90
Summit	15	50
Granite-Poorman	25	96
Nugget	34	95
Yankee Girl	96	1,200
Knob Hill	133	312
Phoenix Amalgamated	102	2,239
Fife	32	32
Highland	22	22
Other mines		2,872
Total	8,248	93,767

The total receipts for the week, at the smelters, including concentrates, were 45,369 tons, and for the year to date, 476,473 tons.

SHARE MARKET.
(Courtesy of Warren, Gzowski & Co.)

Miscellaneous.

	April 7th, 1911. Bid.	Ask.
Amalgamated Asbestos	....	....
Black Lake	....	14
Dominion Coal	....	....
Dominion Steel	....	....
Dominion Steel Corp.	58	60
Granby	30½	30⅞
Consolidated Mining	40	50
Nova Scotia Steel	....	....
Crow's Nest	....	74

Cobalt Stocks.

Amalgamated	...	...
Bailey	.04	.04¼
Beaver Consolidated	.38	.38½
Buffalo	2.10	2.40
Chambers-Ferland	.11¼	.12
City of Cobalt	.15	.18
Cobalt Central	.05	.07
Cobalt Lake	.17	.18½
Coniagas	6.95	7.10
Crown Reserve	3.06	3.15
Foster	.04	.07
Gifford	.02	.03
Great Northern	.19½	.20
Green Meehan	.03	.04
Hargraves	.17	.18½
Hudson Bay	96.00	106.00
John Black	...	...
Kerr Lake	6.20	6.30
La Rose	4.40	4.55
Little Nipissing	.03⅞	.04½
McKinley	1.67	1.69
Nancy Helen	.02	.03
Nipissing	10.60	10.75
Nova Scotia	.11	.12
Ophir	.12	.18
Otisse	.01½	.02
Peterson Lake	.09¼	.09¾

Right of Way	.09½	.10
Rochester	.03	.03¾
Silver Leaf	.03¾	.04¼
Silver Queen	.02	.05
Temiskaming	.68¼	.69
Trethewey	.87	.89
Watts	...	...
Wettlaufer	.99	1.00

Porcupine Stocks.

Apex	.15	.20
Porc. Can.	1.05	1.10
Porc. Central	.58	.62
Dobie	3.20	3.45
Dome Extension	.50	.54
Hollinger	8.25	8.34
Monitor	.21	.22
Preston	.35	.36
Pearl Lake	50	.56
Porc. Tisdale	.07	.10
Swastika	.50	.51
United Porc.	.06	.11
Porc. Gold	.56	.57
Standard	.28	.35
West Dome	2.65	2.75
Coronation	.33	.35
Crown Chartered	.58	.59

New York Curb.

	Bid.	Ask.
Brit. Col. Copper	.05½	.05¾
Butte Coalition	.11	.11½
Chino Copper	.21⅝	.21⅞
Davis-Daly Copper	.04½	.04⅝
Ely Consolidated	....	....
Giroux Mining	.06	.06 1/16
Goldfield Consolidated	.06 1/16	.06 3/16
Greene-Canadian	.06 7/16	.06½
Harcuvar Copper	...	...
Inspiration Copper	.07⅛	.07¼
Miami Copper	.18⅜	.18⅝
New Baltic Copper	.02½	.03
Nevada Con. Copper	.18	.18¼
Ohio Copper	.01 7/16	.01 9/16
Rawhide Coalition	....	....
Ray Central	.01½	.01⅝
Ray Consolidated	.15¾	.16¼
Union Mines	....	....
Yukon Gold	.03⅞	.04

TORONTO MARKETS.

April 10.—Pig Iron (Quotations from Drummond, McCa Co., Toronto):

Summerlee No. 1, $23.00 (f.o.b. Toronto).
Summerlee No. 2, $22.50 (f.o.b. Toronto).
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Hamilton No. 2, $17.50 (f.o.b. Hamilton).
Clarence, $19.00 (f.o.b. Toronto).
Cleveland, $19.00 (f.o.b. Toronto).

GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.

Coke.

April 6—Connellsville coke (f.o.b. ovens):
Foundry Coke, prompt, $2.00 to $2.15 per ton.
Furnace Coke, prompt, $1.60 to $1.65 per ton.
April 6—Tin, Straits, 41.50 cents.
Copper, Prime Lake, 12.50 cents.
Electrolytic copper, 12.25 cents.
Copper wire, 13.50 cents.
Lead, 4.47½ cents.
Spelter, 5.50 cents.
Sheet zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 9.50 cents.
Aluminium, 21.00 to 21.50 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, 41.50 per ounce.
Platinum, hard, $43.50 per ounce.
Bismuth, $2.00 to $2.10 per lb.
Quicksilver, $52 per 75-lb. flask.

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	New York. cents.	Londo pence.
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" 23	52⅝	24 5/16
" 24	52⅝	24 5/16
" 25	52½	24¼
" 27	52¾	24 5/16
" 28	52¾	24 5/16
" 29	52¾	24 5/16
" 30	52⅝	24 5/16
" 31	52½	24¼
April 1	52⅝	24 5/16
" 3	52⅝	24 5/16
" 4	53⅛	24½
" 5	52⅞	24⅜
" 6	53	24 7/16

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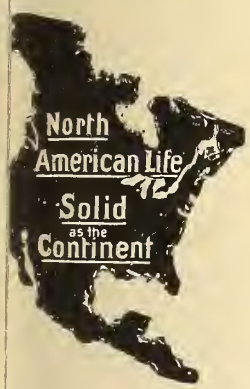

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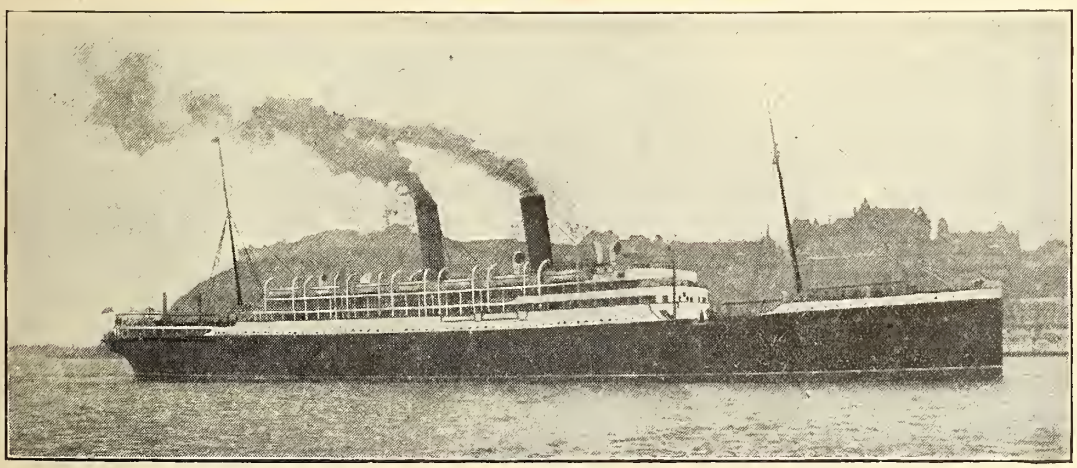

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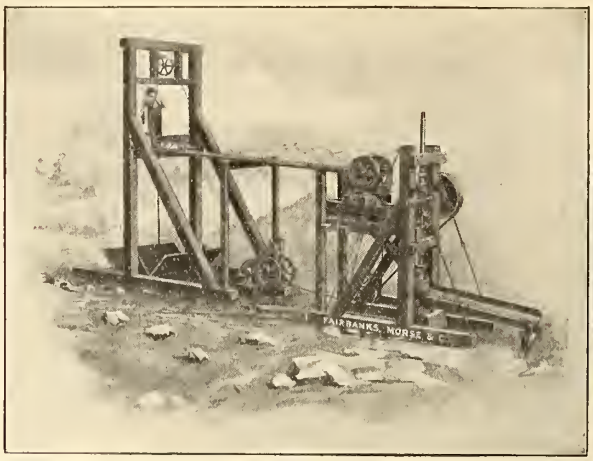

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Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

REPORTS RECENTLY ISSUED:

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1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map of Canada, by G. A. Young and R. W. Brock.

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ONTARIO

1059. A Geological Reconnaissance of the region traversed by the National Transcontinental railway between Lake Nipigon and Clay Lake, Ontario. Accompanied by two maps covering the region, by W. H. Collins.

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1091. Memoir No. 1, Geology of the Nipigon Basin, Ontario, by A. W. G. Wilson.

NORTH WEST PROVINCES

1035. Coal Fields of Manitoba, Saskatchewan, Alberta and Eastern British Columbia accompanied by a map, by D. B. Dowling.

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1134. Map 14 A. Hall Harbour Sheet. Scale 1 mile to 1 inch.

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1132. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.

1117. Map 5A. Topographical map of Edmonton, scale 2,640 feet to 1 inch.

1118. Map 6A. Edmonton. Isobathic lines showing cover over "Clover Bar" coal seam, scale 2640 feet to 1 inch.

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1068. Geological Map (sketch) of the Sheep Creek Mining Camp, West Kootenay, B.C. Scale 1 mile to 1 inch.

1095. Map 1A. Topographical map of Hedley Mining District, Scale 1000 feet to 1 inch.

1096. Map 2A. Geological Map of Hedley Mining District. Scale 1000 feet to 1 inch.

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1089. Map 9A. Explored Routes on Parts of the Albany, Severn and Winisk Rivers. Scale 8 miles to 1 inch.

1103. Map 10A. Tantalus Coal Area, Yukon Territory. Scale 2 miles to 1 inch.

1104. Map 11A. Braeburn-Kynocks Coal Area, Yukon Territory. Scale 2 miles to 1 inch.

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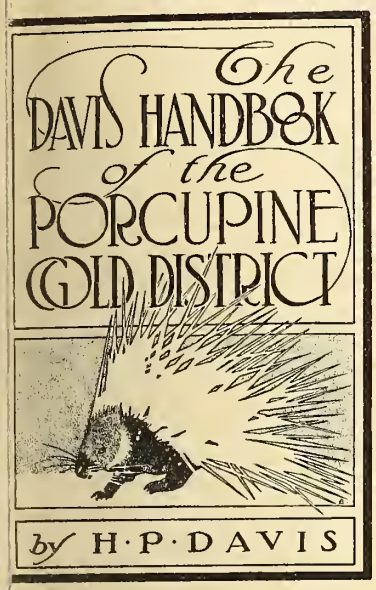

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PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Government of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unsurveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minimum being 40 acres in unsurveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

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Ontario's Mining Lands

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Iron in large bodies of magnetite and hematite; copper in sulphide and native orm; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

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The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

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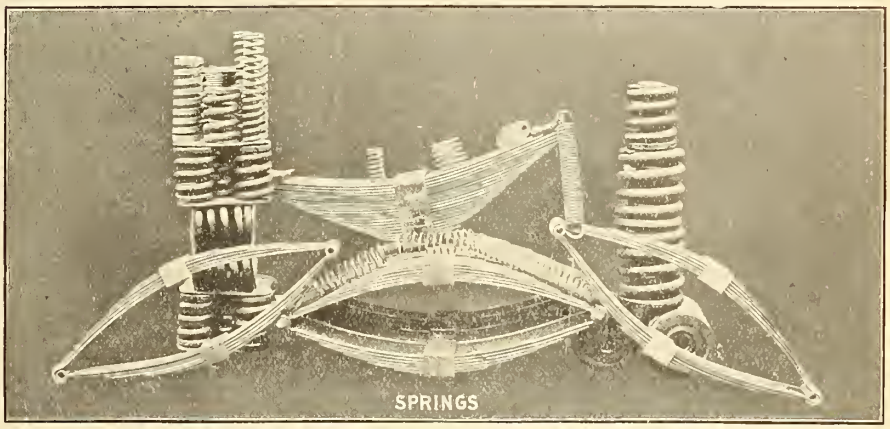

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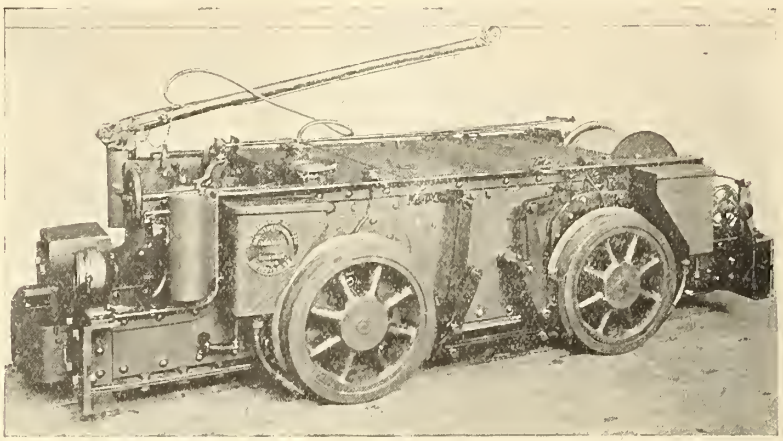

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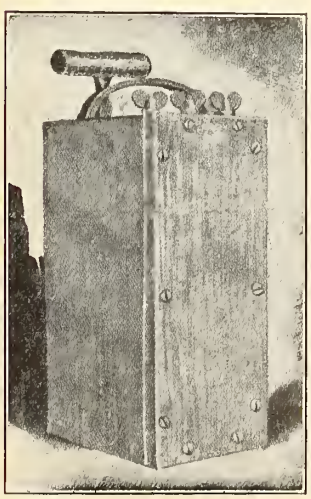

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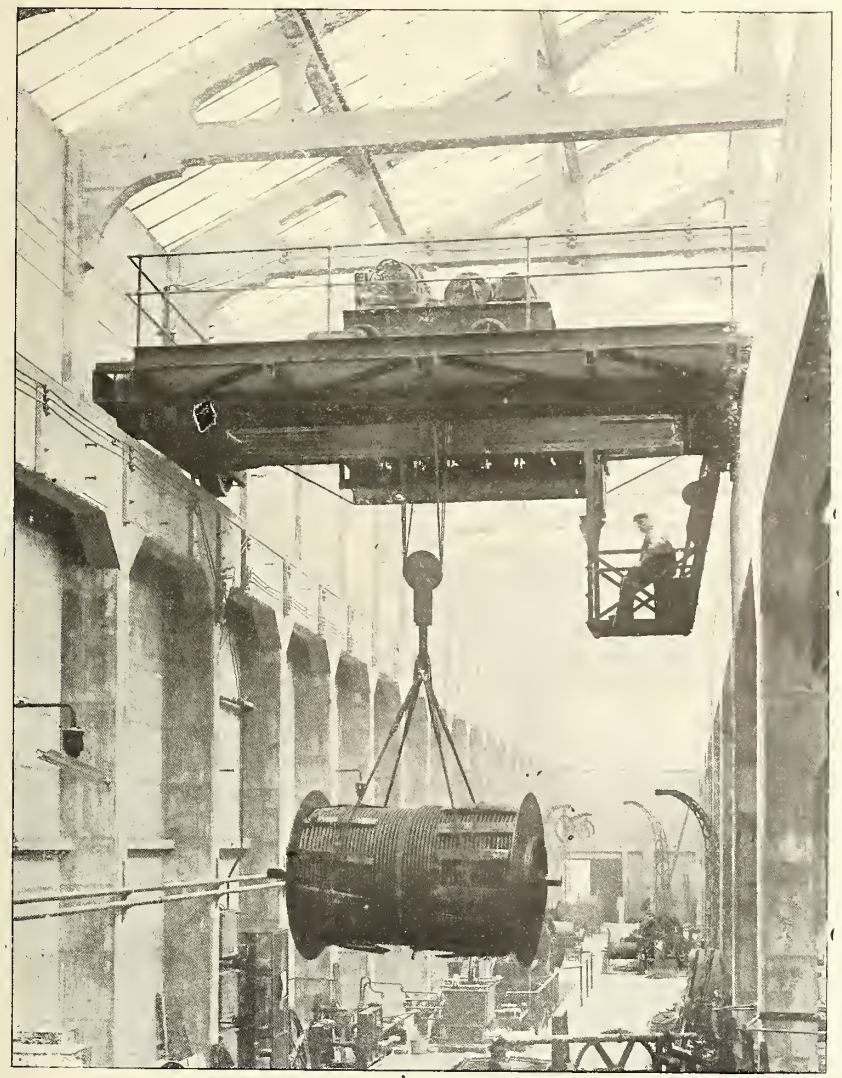

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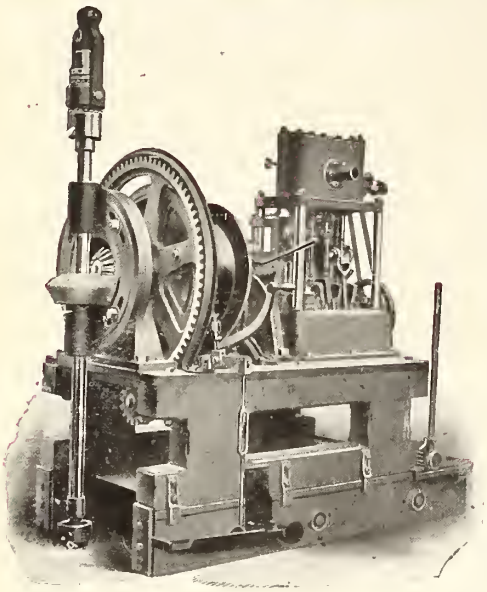

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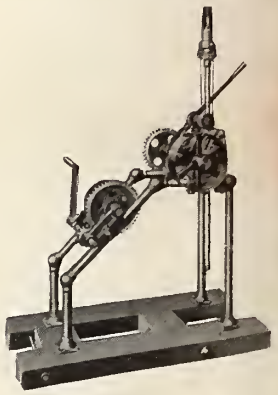

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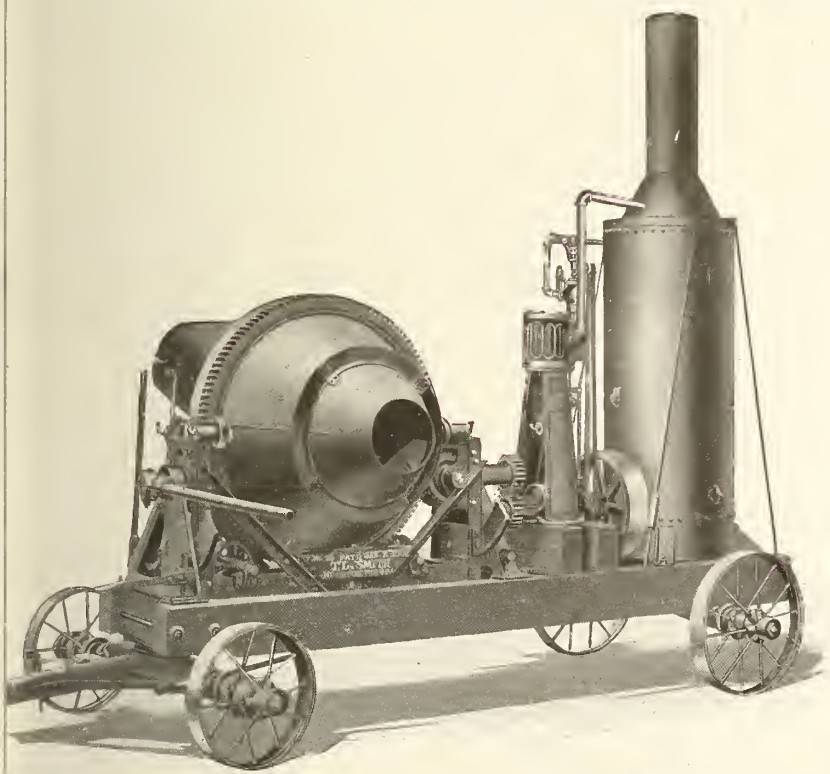

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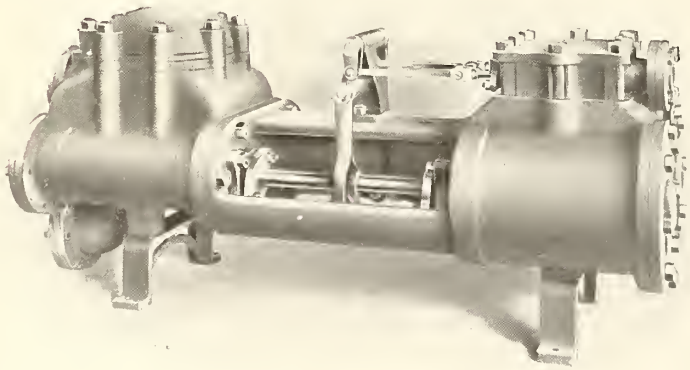

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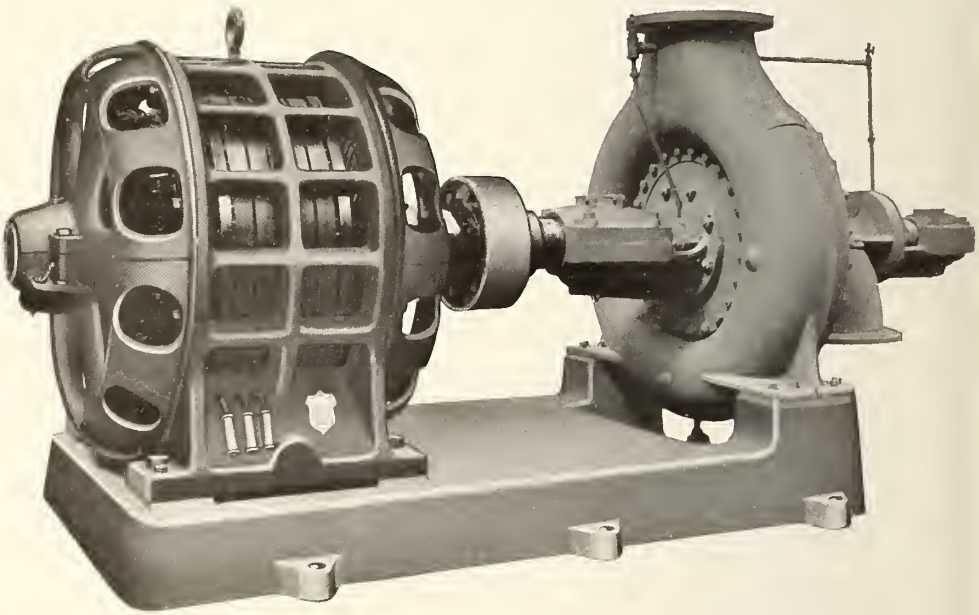

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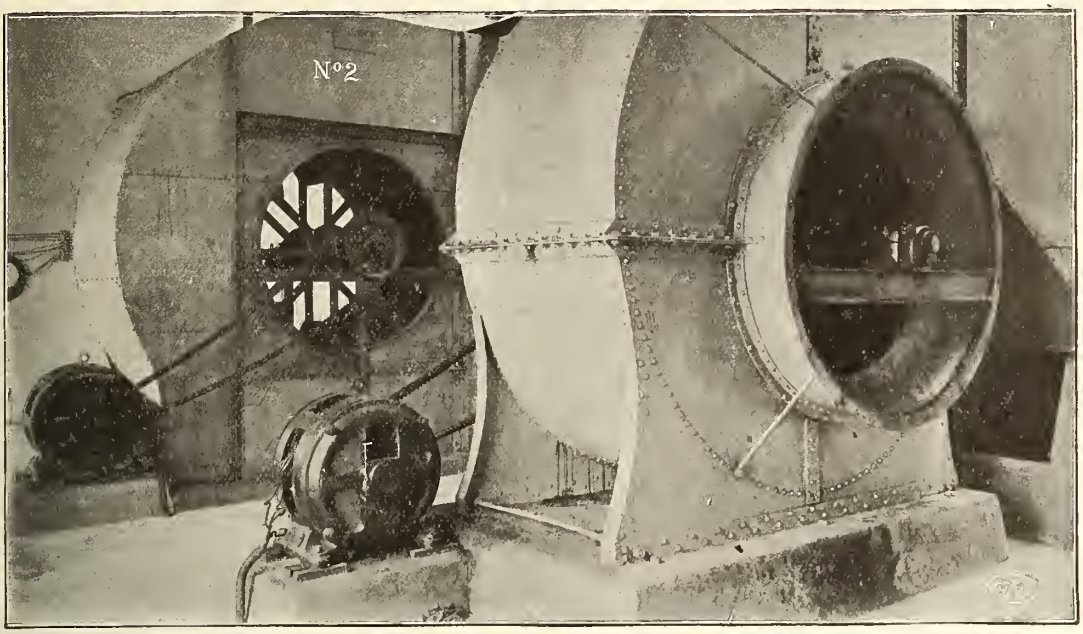

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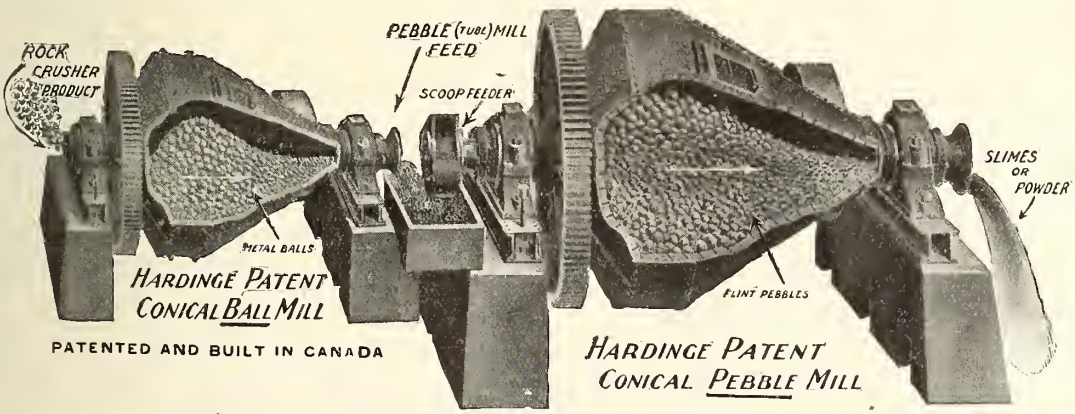

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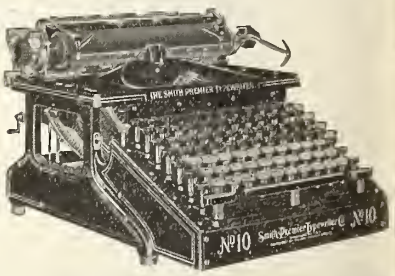

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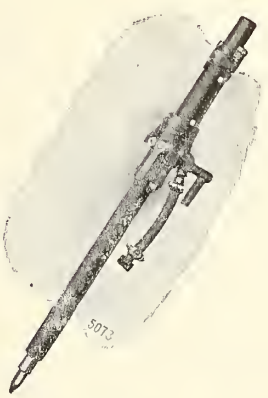

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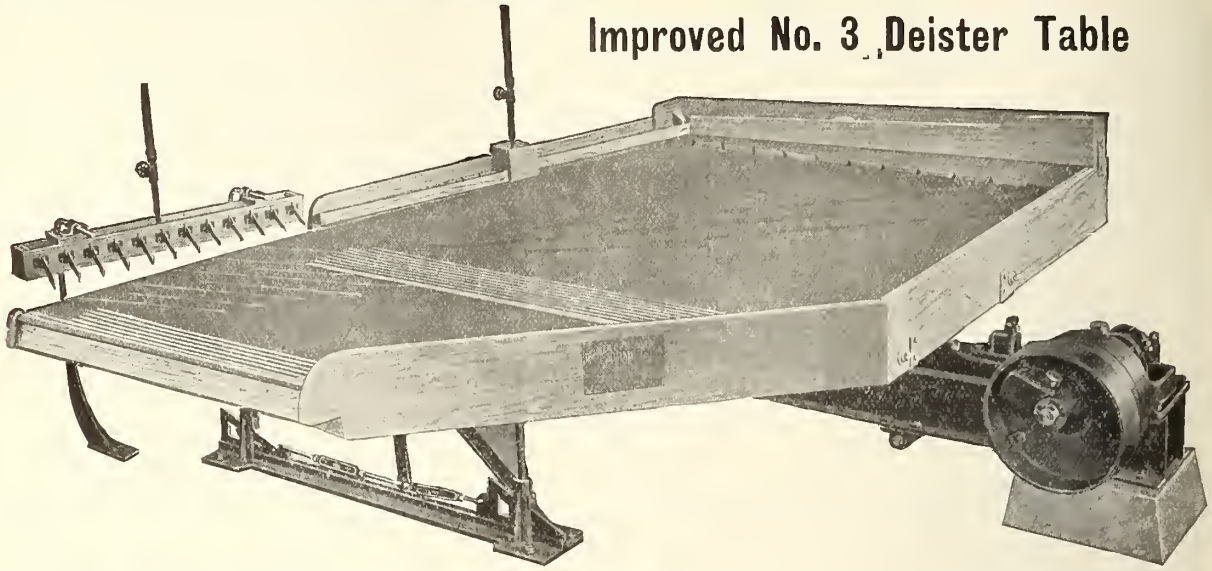

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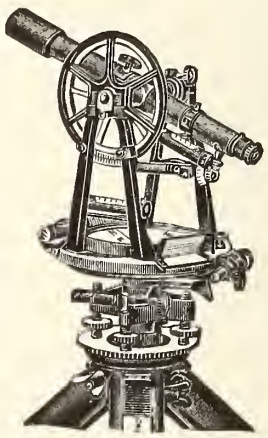

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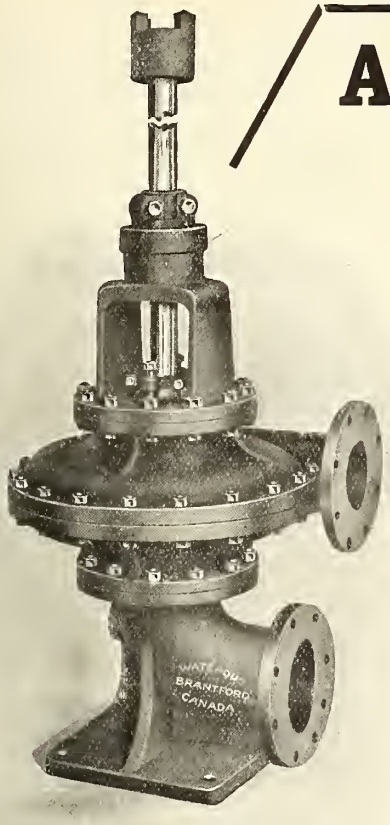

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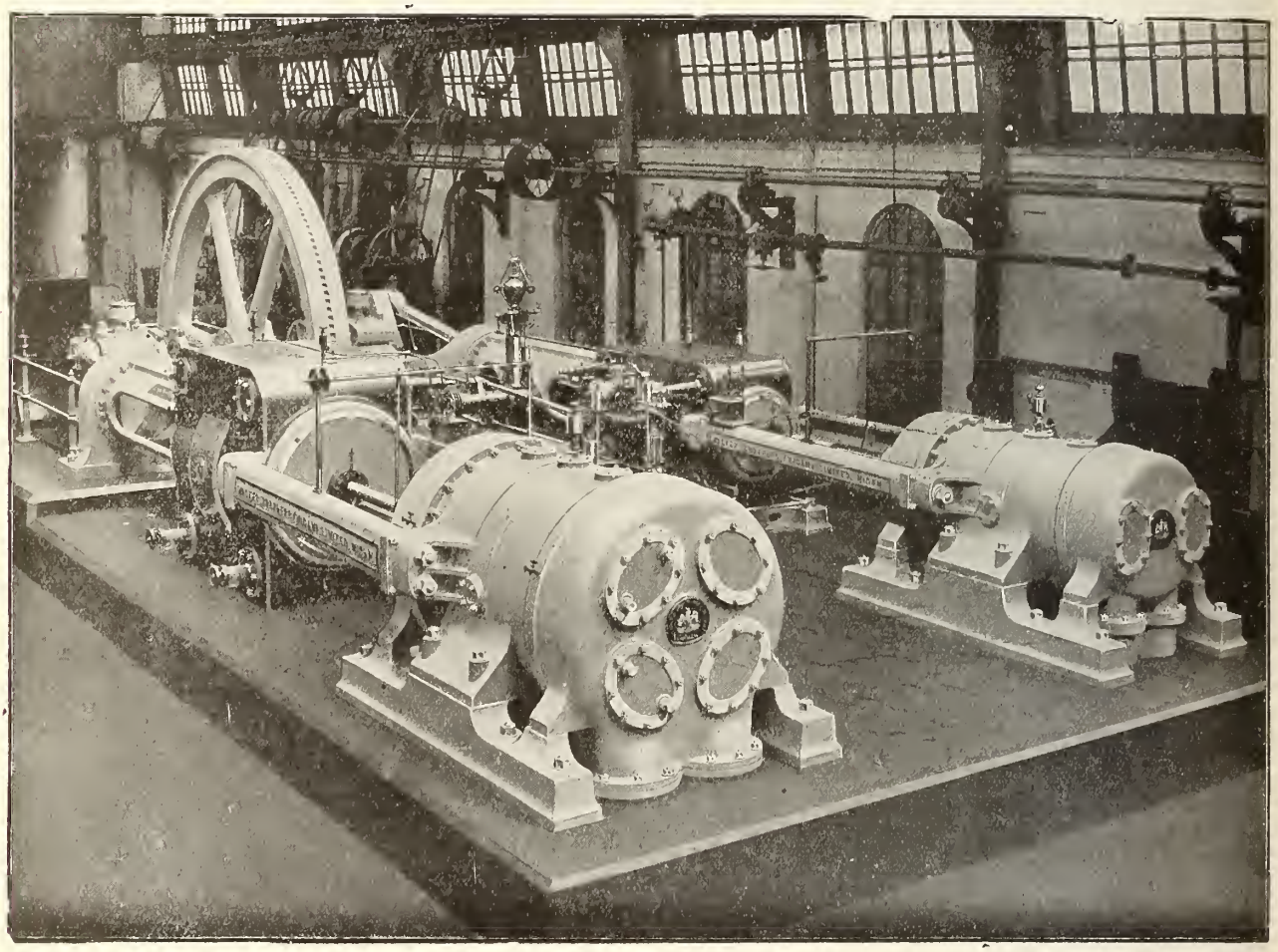

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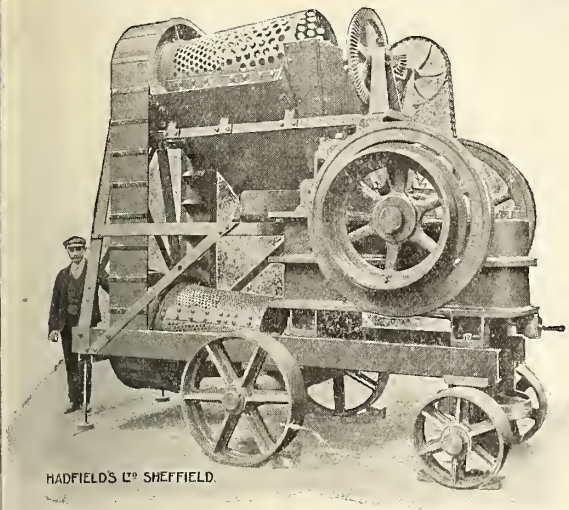

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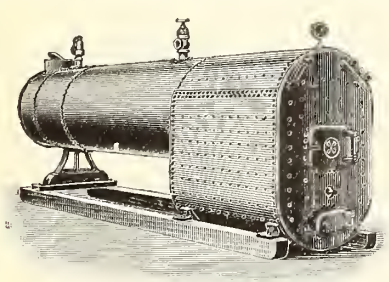

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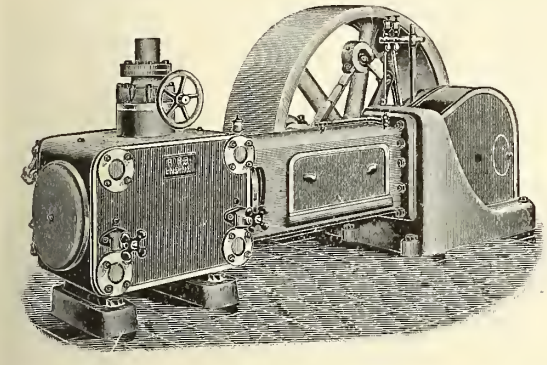

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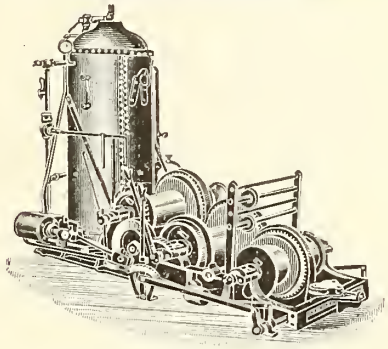

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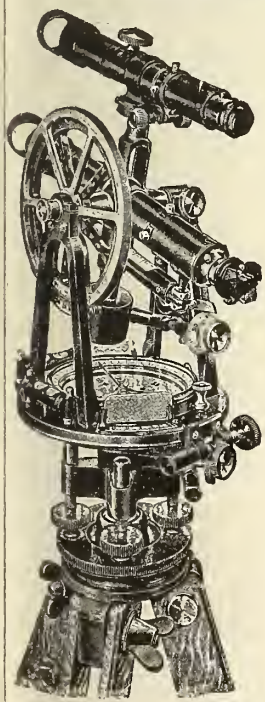

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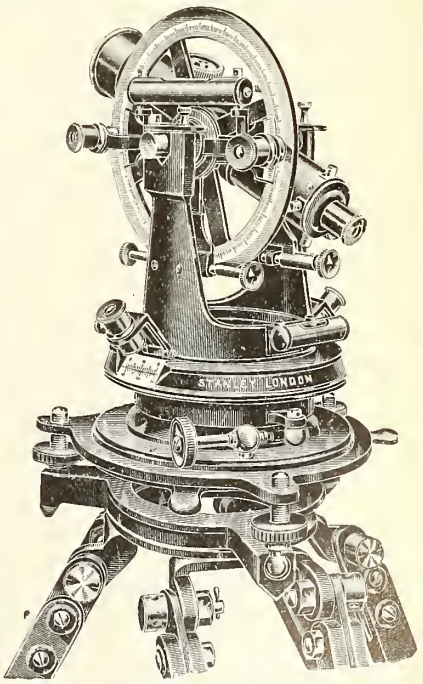

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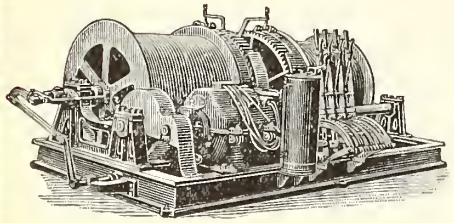

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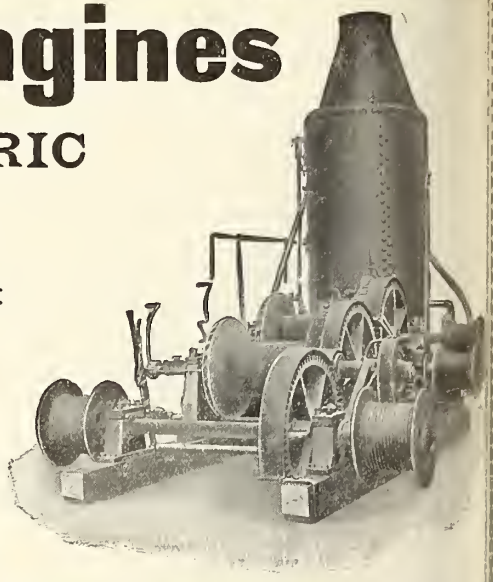

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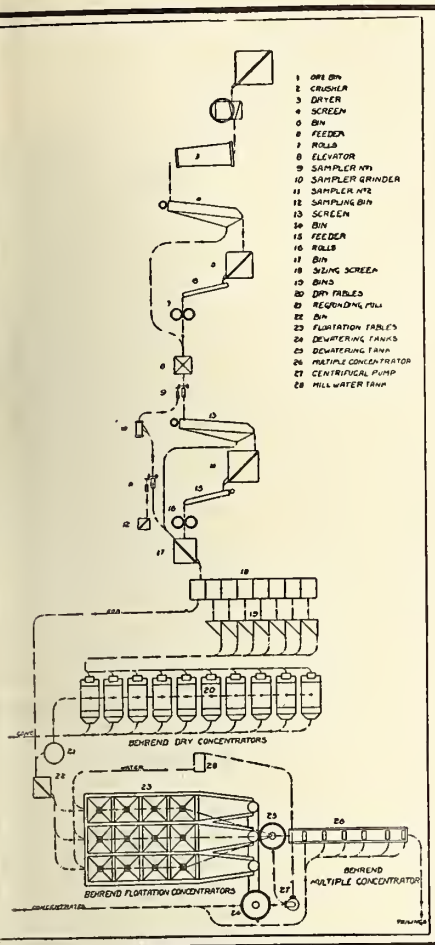

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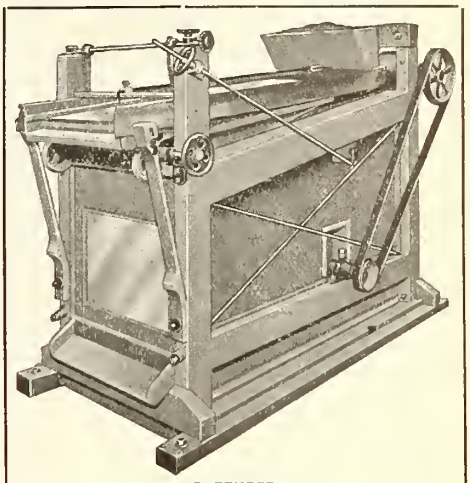

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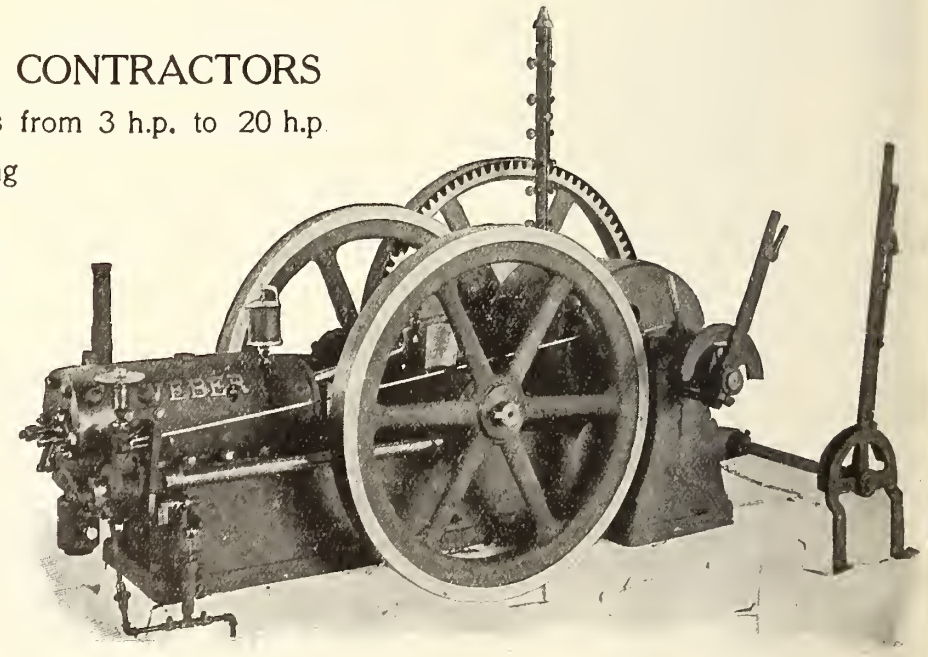

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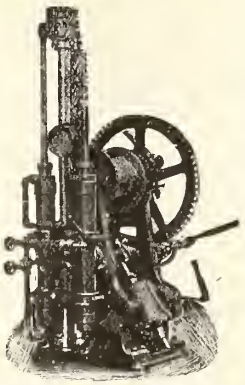

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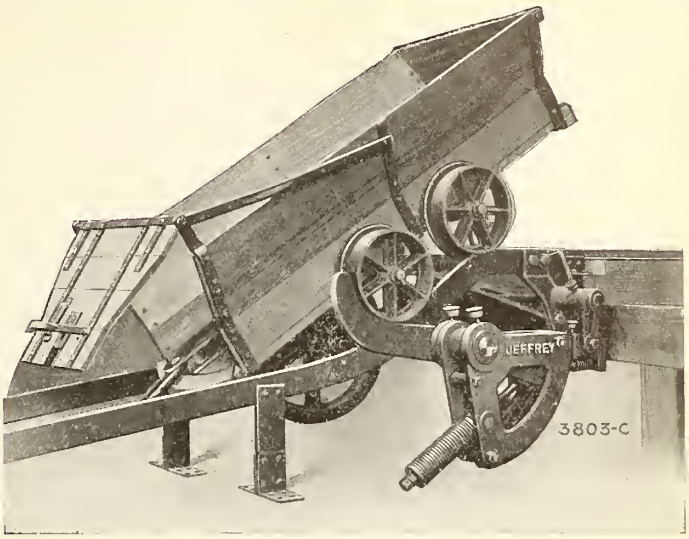

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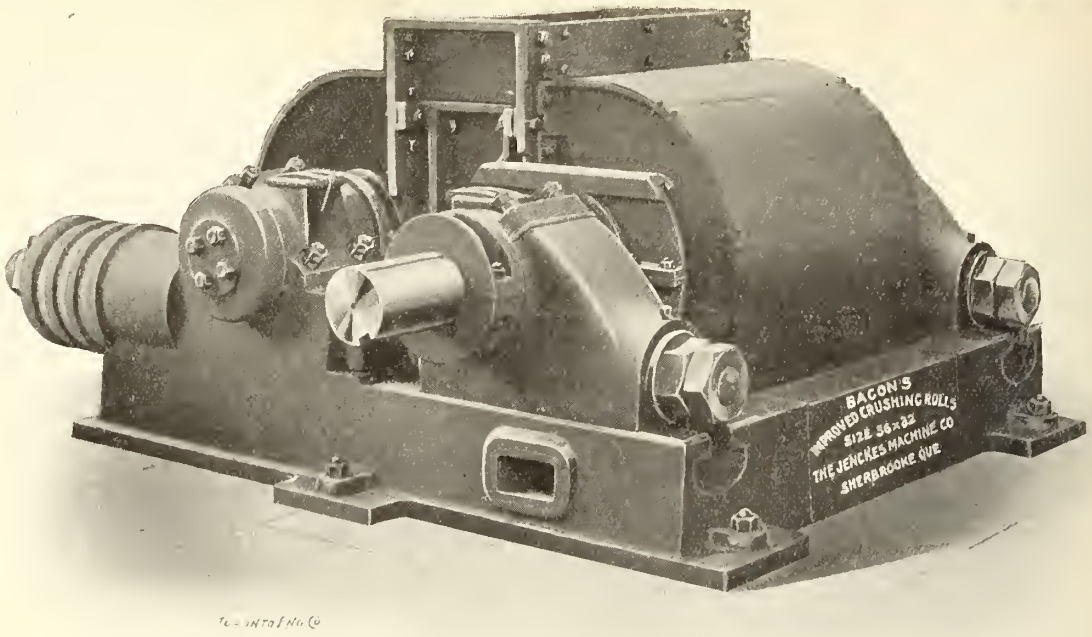

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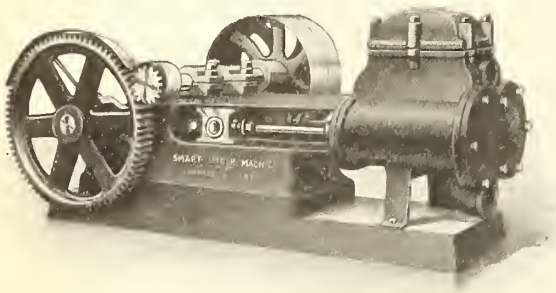

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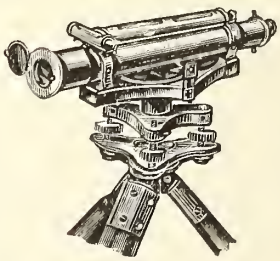

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THE CANADIAN MINING JOURNAL

VOL. XXXII. TORONTO, May 1, 1911 No. 9

The Canadian Mining Journal

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CIRCULATION.

Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3rd, 18[illegible]."

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CANADA'S ASBESTOS INDUSTRY.

There has just been issued by the Mines Branch of the Department of Mines, Ottawa, a 300-page illustrated monograph on the asbestos industry. This is a second and much more complete edition of a former volume issued in 1905. Mr. Fritz Cirkel is the author of both.

Under title, "Chrysotile-Asbestos—Its Occurrence, Exploitation, Milling, and Uses," Mr. Cirkel has endeavoured to review the whole Canadian industry in all its economic aspects, and to touch upon the production of the mineral in other countries.

In the first two chapters the reader is told of the general historical, physical, and geological facts relating to the Canadian mineral. The third chapter discusses the quarrying of asbestos. Here we note with approval the substitution of the word "quarrying," in place of "mining." Only one MINE of asbestos is worked. That is the well-known Bell mine at Thetford. All other workings are quarries. Mr. Cirkel predicts the continued use of both quarrying and mining, and expresses the belief that only the richer properties will employ mining methods. He asserts further, that mining will be conducted on approved rich ground. The chapter presents an interesting resume of general ore winning practice.

A very useful synopsis of milling practice is contained in the fourth chapter. Probably some of the illustrations could have been omitted with advantage. However, there is much important information given. The costs of construction, labour, and operation are set forth. Particularly noticeable is the marked diversity in the flow sheets of various mills. Standardization has not yet been nearly attained.

A conspectus of mining, milling, and marketing costs follows. Certain advantageous features of the Quebec asbestos regions are touched upon. The remarkable fact that there is no working quarry situated farther than 1½ miles from the railway line, is mentioned. As to the future of the industry, Mr. Cirkel believes that, although geographically the field is strictly limited, yet there are such enormous indicated reserves that there is little need of worrying. He quotes one instance to which we must take exception. In one Black Lake quarry, he asserts, there are 44,377,500 tons of asbestos rock in sight. Deducting 50 per cent. from this as waste rock, we have roughly 22,000,000 tons of mill rock left, or a supply sufficient to keep a plant of 4,000 tons daily capacity running for

more than twenty years. The exception that we would take to this statement relates rather to the form than to the matter. That there may be 44,000,000 tons of asbestos rock indicated between several present workings we do not doubt. But that this ore is literally, in an engineering sense, in sight cannot be the case. It is, of course, quite justifiable for men who know the region to spend money upon the assumption that large intervening blocks of ore are homogeneous to the depth attained by the present workings. In fact, the probability of this being the case may be higher than in many instances where metalliferous veins are blocked out on three, or even four, sides. But it is quite incorrect to term such assumed reserves "ore in sight." This is, after all, a matter of terminology. It is, nevertheless, highly important to avoid even the suspicion of exaggeration.

A comprehensive descriptive directory of mines and prospects occupies the next forty pages. Then come chapters on foreign asbestos and commercial uses, and an appendix by Mr. Frederic Bacon on the testing of heat-insulating materials.

* * * * *

We have sketched very meagrely the ground covered in this monograph. The book includes facts and data not otherwise obtainable. It is comprehensive and complete. The author has gone to no small pains to walk circumspectly. He has had an especially complex subject to attack. We believe that he has done his work creditably. The new monograph is a distinct improvement upon the first edition. More careful editing would have been well. But, all in all, the publication is to be warmly commended.

A MIDWINTER JAUNT.

Several weeks ago there appeared an item in the newspapers announcing that Mr. R. J. Flaherty had returned from Hudson Bay, and that he had brought with him the diaries, field-notes, etc., etc., lost during the previous summer by Prof. C. K. Leith. No further mention of the matter has been made.

As Mr. Flaherty's journey was remarkable in many respects, we shall present here a few details. A more complete description will appear later. Even the bare outline, however, is most interesting.

Mr. Flaherty, who is a very young man indeed, left Cochrane, a station on the Temiscaming and Northern Ontario Railway, on August 28, 1910, with one white companion. Moose Factory was reached by the Mattagami route on September 5. Here a boat was engaged and on September 7th Mr. Flaherty landed on Charlton Island. Not until the 25th, however, did he succeed in making arrangements to sail to Fort George. Eight days of sailing brought him there.

Further progress was now impossible. A long wa was necessary until travelling by dog-team becam practicable. Finally, on December 16th, Mr. Flahert set out for Cape Jones with no white companion. A Cape Jones he engaged two Esquimaux and a tea of nine dogs. Despite bad ice conditions, he mad Great Whale, the most northerly Company post o the east coast of Hudson Bay, on Christmas night. Tw days were spent here in arranging with the half-bree in charge for another relay of Esquimaux and dog On New Years Day, Little Whale, an abandoned pos was sighted. It had taken five days to travel 70 mile On January 4th Nastapoka Sound was reached.

After making a seven days' examination of certa of the Nastapoka Islands, Mr. Flaherty started on h return journey. While travelling with an Esquimau family, a short stop was made at Little Cape Jone In the igloo of an Esquimau entitled Husky Bill, label much more pronounceable than the gentleman native patronymic, Mr. Flaherty was astonish to see a very modern cross-section book. H curiosity was aroused. Upon inquiry he found o that the book belonged to Dr. C. K. Leith. Furthe he discovered that Dr. Leith's dunnage bag had be picked up on the shore by Husky Bill's son, near Litt Cape Jones, after being exposed to the weather f some months. He found the notes, etc., in perfe condition. The contents comprised diaries, geologic notes and sketches, six fifty-dollar drafts, and $53 cash. The Esquimaux gave up the bag witho demur.

Mr. Flaherty now proceeded south; getting to Fo George on January 23rd. Since leaving that post had covered about 600 miles under desperately adver conditions. The actual time occupied was five weel which period included all stops and delays.

The return route to Moose Factory was made mu longer than necessary as the Esquimaux refused travel directly to Moose on account of the deep sno So it was possible only to strike out for Rupert House. An Indian dog-team was engaged here. Lea ing Moose Factory on March 2nd, Mr. Flaherty a rived at Cochrane on March 14th. Thus between I cember 16th, 1910, and March 14th, 1911, he had co ered 900 miles on ice and 200 miles on land.

The recovery of Dr. Leith's manuscripts and no books is an incident that reads like highly colour fiction. No doubt that distinguished geologist h given up all hope of seeing his precious bag aga Incidentally, the story affords a pleasant illustrati of the honesty of the unsophisticated Esquimau Apart, however, from this accidental piece of luck, M Flaherty's performance as a sub-Arctic traveller is u usually noteworthy.

Leading authorities, especially on the other side the Atlantic, predict continued low prices for copp

E RESIGNATION OF DR. R. W. RAYMOND.

personality stands out more prominently in all merican mining world than that of Dr. Rossiter aymond. For forty arduous years he has been tstanding figure in the affairs of the American ute of Mining Engineers. After filling the offices ce-president and president during several suce years, Dr. Raymond was elected secretary in His annual re-election has been taken as a matcourse.

secretary of one of the most important technical ations in the world, Dr. Raymond has perd his duties without fear or favour. In his ity as editor of the transactions, he has been the g spirit in collecting and preparing for publia vast bulk of professional literature. All the lical excursions of the Institute have been sucl largely because of the zeal, courage, and ine of Dr. Raymond.

announcement that Dr. Raymond has resigned sition will be read with sincerest regret by his rous Canadian friends. However, it is distinctly ling to learn that Dr. Joseph Struthers is to be ccessor. Dr. Struthers has long occupied the on of assistant-secretary. He is fitted in every t to carry on the work of the Institute.

hing could be more fitting than that the Can- Mining Institute should seek the opportunity of g in any steps that may be taken to honour the ng secretary.

"VALUES."

irrepressible contemporary, The Mining Magais at it again. In the current issue of that inble periodical is a strong editorial objection to n uses of the word "values" in mining engineers' s. Academically, The Mining Magazine is right. ically, it is partly right and partly wrong. And, dly, this kind of thing may be defined as "placritating emphasis on non-essentials."

rity of speech, of thought, and of writing is alto be desired. If the word "values" conveys to ader a more distinct idea than does another word, et us forget our feelings. If some other word is , let us use it. Meanwhile we may note that no ent substitute has been suggested. Not even The g Magazine can offer a practicable synonym.

s dangerous to carry very far the law of analoThe Mining Magazine objects incidentally to the phenated "footwall,' and takes as the ground of gument the antithetical term "hanging wall," is always hyphenless. What, then, can be said word "football"? Not even the hypercritical g Magazine would care to spell the word with an hyphen. Yet "foot-wall" and "football" are as closely analogous as words can be.

An end to this hair-splitting! It is well to be precise, exact, and accurate. It is not well to mistake the shadow for the substance.

FEDERAL MINING LAW.

Only a few mining men are aware of the debt of gratitude that the mining industry owes to the officers of the Canadian Mining Institute and to the committee, ably presided over by Mr. G. G. S. Lindsey, which is now urging the codifying by statute of the Dominion Mining Laws and Regulations.

Considerable progress has been made, and it is still hoped that a statute may be passed during the present session of the Dominion Parliament. If a statute is not passed, there will be compensation in the fact that the clauses of the Act will receive maturer consideration before becoming law.

The argument in favour of immediate action is extremely cogent. It is to be hoped that, before this session ends, the rights of mining men may be governed by laws enacted by Parliament, and no longer by Order in Council, or Regulations, or the arbitrary whims of the Minister of the Interior.

PLATINUM PRICES.

The prices of platinum are soaring. Recently, hard platinum reached the record price per ounce of $43, whilst the soft metal touched $41. Six years ago the pure metal was selling at $18.50 per ounce. Through the year 1906 the price of hard went up to $40. The market now declined until in August, 1908, prices had fallen to $20. Soon after this the rise commenced and has continued until the present. Within the last six months the advance has been most pronounced, amounting to practically $10.

One incidental cause of enhanced prices is the growing use of platinum in manufacturing jewelry. Another is the demand for the metal in making tips for the sparking plugs of automobiles. But probably the main factor is the closer control of the principal Russian sources of supply.

EDITORIAL NOTES.

In the course of a paper read by Mr. W. H. Prest, before the Mining Society of Nova Scotia, is given a list of 35 gold veins that have been opened in the province but on which little or no work has been done. In thickness these veins range from one inch to 2½ feet. Some of the smallest veins have been found to

be enormously rich. All of the veins mentioned have yielded assays exceeding one ounce of gold per ton.

Rarely has the weather of April been so excessively cold. In the northern mining camps travel over the ice was possible until well on in April. In eastern Canada the weather has been more severe than it has been for many years.

The appointment of Mr. R. B. Watson to the directorial board of La Rose Consolidated will meet with warm approval. The more voice given to technical men of Mr. Watson's type on the governance of large mining corporations, the better it will be for all concerned.

The U. M. W. A. leaders have taken a strategic advantage of the western coal operators by applying to the Department of Labour for a conciliation board. The two representatives appointed by the Department could not agree upon a chairman. The Department, therefore, has taken matters in its own hands and has requested the Rev. C. W. Gordon, otherwise known to fame as Ralph Connor, to act as chairman. May we express the hope that Providence is giving Mr. Gordon an excellent chance to make amends for some of his recent novels.

PYRITE PRODUCTION IN THE UNITED STATES.

Mr. W. C. Phalen, in his remarks about pyrite mining in an advance chapter of the annual report of the U. S. Geological Survey, alludes to the fact that the tremendous production of sulphuric acid at Ducktown, Tennessee, has not injured the pyrite business.

The United States production of pyrite in 1909 was 247,070 long tons, valued at $1,028,184. Whilst this is an increase over the output of 1908, it is just about equal to that of 1907. It is worth noting that thirty years ago the quantity mined annually in the United States was less than 30,000 tons. The State of Virginia produces almost 50 per cent. of the total annual tonnage. California comes next with 50,000 tons. The balance is distributed between Alabama, Georgia, Massachusetts, New York, and from a few other states. The average reported price was higher in 1909 than before. It was $4.16 per ton.

PYRITE MINING IN VIRGINIA.

For 22 years the Cabin Branch pyrite mine, near Dumfries, Prince William County, Virginia, has been in operation. The ore is iron pyrite carrying rich streaks of chalcopyrite. The ore body ranges from 6 to 14 feet in thickness and dips 45 deg. to 60 deg., striking northeast and southwest. A single compartment shaft is sunk in the ore. This shaft is down 1,500 feet.

In mining, drifts are run from the shaft in either direction to the end of the ore body at intervals of 100 feet or less. A raise is then driven from the end of each drift to the level above, if it has not caved. If the ground about is treacherous, from 2 to 6 feet of ore is left as a pillar. The pillar is kept as slight as possible. The raise is run about 20 feet wide. After opening up the raise a modified system of retreat longwall mining is carried on. Beginning at the end of the drift the ore is mined back to within about 30 feet of the shaft in successive strips across the end of the stope from the drift below to the pillar above. One 4-foot to 5-foot hole loaded lightly with 40 per cent. dynamite breaks the ore from foot to hanging. The ore is mined by contract. Drill-runners, working two men to the drill, using light tripod machines and furnishing their own powder, caps, and light, can make good living wages breaking the ore at 20 cents per ton. About nine-tenths of the ore is recovered.

There are now no less than five branch banks in Porcupine. That should be enough to accommodate even a boom camp.

Electrical power is to be generated at certain oil-fields in California and transmitted long distances for industrial purposes.

Had the birth of such gold-mining districts as those on the Lake of the Woods, Ont., been postponed ten or fifteen years, it is highly probable that they would now be figuring prominently on our stock exchanges.

For packing and transporting ore samples carefully made leather bags, construeted like large flour-sacks, and fitted with strong locking devices, are by far the safest. While these bags are costly, they last for a long time.

The British producers of aluminium no longer attempt to maintain high prices on a limited output. The combine went to pieces in 1908. Since then the policy has been to produce large quantities and to sell at moderate prices.

Within certain limits the freezing process is useful in sinking shafts in wet ground. But at great depths freezing is impracticable. Various other causes may militate against freezing. The process of injecting cement into the crevices that make the water is often the best means of checking the water.

Cable reports have it that the new Bewick-Moreing flotation in London will be called the Ontario Porcupine Goldfields Development Company. The capitalization is to be £600,000. The chief purpose of the flotation is to acquire 50 claims in Porcupine. It is the scheme is primarily to sell an option on undeveloped prospects.

The failure to produce peat commercially in the United States is officially attributed to overenthusiasm, lack of technical knowledge, too little capital and too much confidence in poorly designed and untried machinery. Both the peat in itself and the market are known to be alright. The total production of peat fuel is about 1,200 tons, valued at between $3.50 and $5 per ton. Unreported quantities of peat are used for such purposes as stable-litter, absorbents and fertilizers. Much of this material was imported

CORRESPONDENCE.

Editor, CANADIAN MINING JOURNAL:—

Sir,—Your Nova Scotia correspondent has, on several occasions, made mention of the services rendered by Draeger apparatus in connection with the fire in the Albion mines of the Acadia Coal Company, March-April, 1910.

In your last issue, he quotes the report of Mr. Thomas Blackwood, Deputy Mine Inspector, as taken from the 1910 Report of the Department of Mines of Nova Scotia, wherein it would appear that all credit for saving this mine was due to the men and apparatus from Cape Breton. The facts do not warrant any such credit being given or claimed from the standpoint of services rendered either by these men or the apparatus. To all those who know the conditions and circumstances in connection with the fire, such claims are ridiculously absurd. The use of rescue apparatus (whether Draeger or other types) so far meets with approval that a station is now being equipped by the Acadia Coal Company; but after our experience with them at this fire we are fully assured that their uses are strictly limited. This fact was made manifest to every one who had anything to do with them at this fire.

The location of this fire and the conditions of ventilation, water supply, relation of pillar workings to seat of fire, mode of attack, provision for safety of men at seat of fire and total absence of fire damp in the district affected, if fully described, would refute these erect-claiming reports in the minds of all practical mining men. But the writer has neither the time nor the inclination to give an extended description of the above.

Briefly, the facts are as follows:—On the morning of the 5th of March, 1910, it appeared that the fire might pass a certain point where every effort was being made to hold it in check; and as men engaged at the fire were working in noxious gases, or were obliged to pass through fumes in order to reach this point, it was decided to request the Dominion Coal Company and the Nova Scotia Steel & Coal Company to send men and apparatus, and every credit is given to both companies and men for their prompt response. In the meantime a way was cleared over a heavy roof fall for the men engaged at the fire to reach same without having to go through the return air from the fire. From 2 p.m. to 5 p.m., March 15th, was the crucial time if there was any danger of losing the mine, which none of those having years of experience in like cases either admitted then or will now. A shift of men from the Allan shaft, headed by Mr. Simon Lott, came on duty at 2 p.m. and if credit is to be given to any one or to any number of men, the full credit belongs to this shift. Either of the other two shifts would have done precisely the same had they been on duty during this time. At 5 p.m. the fire was so far under control that changes in water supply were started to increase efficiency and insure a steady supply when needed, so that nothing was done in actual fire fighting from this time until after the arrival of men and apparatus from Cape Breton. On their arrival at the scene of the fire between 1 and 2 a.m. on the 16th, the connection over the roof fall had been completed and water supply was ready to be turned on. All hands approached the actual fire *without* apparatus, and, in fact, the first stream was turned on the fire by Mr. John W. Johnson, Mine Manager of the Nova Scotia Steel & Coal Company, who had kindly come on from Halifax to render any assistance in his power. As a matter of fact, the fire was considered so far under control, and the means of fighting were so complete, that the services of Cape Breton men were not required. This pertains to all but two—one from the Dominion Coal Company, the other from the Nova Scotia Steel & Coal Company, who were retained for some time. These men admitted to the writer, not once but several times, that the Draeger apparatus was of practically no use in the existing conditions other than to make the briefest examination a short distance ahead of the men (without apparatus) working at the fire. As we *actually loaded all the material out of the seat of the fire*, wetting with water as we proceeded, it can readily be understood by mining men that, unless it is for advertising purposes, there has been neither warrant nor occasion for the "full meed of credit" given and so unctuously taken. As stated above, the full credit belongs to our own employees. The writer's opinion, from long and varied experience in mine fires, is confirmed by officials and workmen in the Stellarton field, who, from boyhood up, have had to contend with mine fires—that too much may not be expected from rescue equipment.

Yours, etc.,
CHARLES J. COLL,
General Manager.

BOOK REVIEWS

TABLES FOR THE DETERMINATION OF MINERALS BY MEANS OF THEIR PHYSICAL PROPERTIES, OCCURRENCES, AND ASSOCIATES — BY EDWARD HENRY KRAUS, PH.D., AND WALTER FRED HUNT, A.M.—254 PAGES — PRICE, $2 NET—MCGRAW-HILL BOOK COMPANY, 239 WEST 39TH STREET, NEW YORK, 1911.

The mineralogical tables that make up the bulk of this book are based mainly upon lustre and colour, streak and hardness being subsidiary. Two hundred and fifty of the most common minerals are classified into three groups—those that are very common, those that are common, and those that are not common but are important. The very common names appear in black capitals; the common, in light capitals; and the third group in lower case type.

In the introduction, the physical properties of minerals are very briefly outlined. Then follows an adequate glossary. Then come nearly 240 pages of tables. tables.

Minerals with metallic lustre are dealt with in the first 67 pages. The colour sequence is thus arranged: dark gray or black; metallic white or light metallic gray; yellow; brass, bronze, or copper red; red, brown, or blue. To each colour several successive double pages are devoted. The horizontal headings are so devised that one sees at a glance the name, composition, crystallization, structure, lustre, colour, hardness, streak, cleavage, fracture, tenacity, specific gravity, characteristics, and associates of any given mineral. In the first column are included page references to the textbooks of Kraus, Dana, and Moses and Parsons. The remaining 179 pages are tables of minerals with non-metallic lustre, done in the same style as indicated.

We are decidedly impressed with the simplicity of the plan followed in designing these tables. The book is so clear and places so much proper stress upon the most immediately available means of distinguishing the different species, that it is bound to prove acceptable.

THE QUARRYING OF ASBESTOS

Notes from Chapter three of the monograph "Chrysotile-Asbestos."*

The work of extracting the asbestos from the rock in which it occurs, and converting it into a saleable article, will be described under the following heads:

(1) The quarrying proper, that is, the blasting, separating the dead from the useful material, hoisting the same from the pits, and transporting it to the cobbing sheds or mills.

(2) The cobbing or dressing of the better qualities, that is, the separation of the fibre by hand from the adhering rock particles; together with the mechanical treatment, in mills, of all rock or fine material containing fibre; grading of products; and subsequent transportation of product over railways, and by shipping to the markets of the world.

It is important that all the different stages through which asbestos has to pass until it is a finished product, be treated separately; since these involve the entire expenditure from the winning of the crude material in the rock, up to final delivery to the consumer.

ADVANTAGES AND DISADVANTAGES OF OPEN-CAST WORK.

Nearly all the companies employ the method of open-cast work as the means for exploitation of asbestos deposits; for in spite of all its disadvantages—especially in severe winter weather—it has proved itself to be the most convenient and the cheapest method hitherto employed. Its advantages over underground work may be summarized thus:—

(1) Easier supervision.

(2) No trouble as regards ventilation the men are always working in the open air.

(3) Easier lay out of works in larger steps and stopes than is usually possible in underground works.

(4) No timbering is necessary.

(5) Complete extraction of all the asbestos encountered in the rock; no loss in the form of pillars.

The principal disadvantages of open-cast work are:

(1) The removal of all the waste rock resulting from dikes and barren zones of serpentine.

(2) Exposure of men to the inclemency of the weather: work is interfered with; amount of work done reduced considerably; or even stopped by bad weather.

(3) Curtailment of dumping ground on properties of limited extent.

However, recent experience in a prominent quarry at Thetford seems to demonstrate that open-cast work, under certain conditions, may be replaced by regular underground methods; and although all the difficulties in connection with their general application—such as we are accustomed to find in lode mining—are not wholly overcome, it seems reasonable to assume, that before long, the larger and richer mines, at least, may follow suit.

The question of underground mining has been taken up spasmodically by different companies in the district. At the "Union" quarry, some twenty years ago, a somewhat extensive tunnel was run during the winter from the foot of a hill and a shaft sunk in connection with it; but the results are not definitely known. In the old Broughton (Fraser) mine a shaft was sunk to a depth of 100 feet along an excellent bestos vein near the contact with the slate format and it is reported that the results were satisfact for the first 75 feet; but owing to the irregular cl acter of the vein below that depth, work had to abandoned. Seven years ago, the Bell Asbestos C pany, sunk at Thetford, a roomy shaft in the west part of the property close to the King quarry; this experiment was not successful, since the sl went through an apparently barren zone, and li hope was entertained as to finding better conditi in the immediate environment.

For a long time after this experience, undergro work was looked upon in the district as an im sibility It was affirmed in support of this conten that the asbestos pay shoots were distributed i very irregular fashion; indeed so irregularly that economic system could be brought into operation; moreover, that due to this cause also, valuable gro or perhaps pillars composed entirely of valuable posits, would have to be sacrificed for the sake safety. It was further maintained, that on accoun the highly slippery condition of the serpentine, narrow drifts could be run; otherwise a great amo of timber would be necessitated in order to sup the ground so penetrated, and that, in consequenc this, the cost of extraction per ton of ore would excessive. The underground work, however, i gurated and successfully carried on by Mr. Geo Smith, M.E., at the Bell quarries, seems to demonst that not all of the contentions hitherto brought ward can be substantiated; indeed it has been sho that after all not so much timber is used, in spit the fact that all the drifts are very large, much l er than in any other class of underground min Further, the question of valuable pillars for the pose of safety may be regulated to satisfaction, s the running of a system of approximately par drifts in different levels, admits of a thorough stud the ground preparatory to the winning of the min proper. As to the employment of timber in the dr it may here be stated, that the total length of un ground work in the mines of the Bell Asbestos C pany, is now 1½ miles, and the writer, who inspe these drifts twice, noticed very little in any of t No accidents caused by a falling roof have occu so far, for a rigid inspection is made almost dail the workings. With increasing depth, however, ditions in that direction will probably materi change; the rock pressure will increase, necessitat perhaps, heavy timbering, where to-day nothing the kind is required.

The great advantage of this mining method quarry work is the convenience with which the w can be carried on during the winter. In open wo to win the asbestos through ice and snow, and s times very cold weather, reduces enormously the w ing results; the drying of the ore, which is m most of the time with snow and ice, requires al three times the amount of fuel needed at ordi times; while the transmission of compressed air, more especially steam, to the pit bottom, has its g difficulties. For this reason it is questionable whe

*Chrysotile-Asbestos, its occurrence, milling and uses; by Fritz Cirkel; issued by the Mines Branch, Ottawa.

days at all to work some of the quarries in severe winter season. As a matter of fact, if prices are not specially tempting, a number of them close down altogether.

One of the greatest hindrances in the way of economic open quarry work is the selection of a suitable dumping ground. Many mines which have little ground at their disposal, find considerable difficulty in solving this problem. In the early days of asbestos quarrying, when very little engineering skill was displayed, and little thought was given to projected efficiency, most of the dumps were placed quite close to the quarry, as was the case in most instances. This accumulated waste rock had to be removed, when it was found that the ground so covered contained large asbestos-bearing zones. To-day — in some of the quarries on ground specially bought for that purpose — long, horizontal, gravity tramways are built to remove the dumps as far away as possible.

The question of the disposition of the dumps is daily becoming of increasing importance; in fact some of the companies that formerly treated this subject as a secondary matter are beginning to give it earnest attention.

In underground mining excellent facilities for the placing of dead rock are afforded; since a system similar to the methods employed in wide lode mining may be introduced, whereby stopes can be filled conveniently with the debris. This would also secure safety against unexpected cave-ins, and would, in addition, greatly increase the general working economy of the mine.

However, taking into consideration all the advantages of both methods, together with their disadvantages, it must be said that the open quarry method remains the favourite of the miner, and will, doubtless, be retained as long as circumstances permit. Moreover, there seems to be no doubt that the application of the underground method — as introduced by Mr. Geo. Smith — will be confined only to such mines as work on approved rich ground, and the practical working sphere of which permits of gradual expansion. It will thus be seen, that in future the probability is, that the richer mines may employ the combined quarry and underground method: the one preferably for the summer season, and the other for the winter.

Removal of Overburden.

The first operation in opening a quarry is the removal of the soil which covers most of the asbestos-bearing areas, which varies in thickness from a few feet up to 25 feet. In Black Lake, the crest and slope of the large serpentine ridge is for the greater part covered with a thin layer of humus, thus rendering prospecting work comparatively easy; the lower ground of this locality, however—the area between Black Lake and Thetford—is covered to considerable depth with soil, while at Thetford, the thickness of the overlying soil is, in some places, 15 to 20 feet. The removal of this soil for open quarry work is performed only in the summer time; the winter, on account of frost and snow, being too severe for this class of work.

The soil is generally cleared off with pick and shovel, and loaded into large dumping cars on trucks which are laid for this special purpose close to the work, and lifted when required.

Several of the larger Thetford companies employ steam shovels for this purpose.

Quarry Work.

As a rule the quarries in the smaller mines have a very irregular shape: most of them following the trend of the asbestos-bearing zones; while the lean serpentine, or intrusive dikes, are left as pillars. In the larger mines, however, where the locations of the asbestos-bearing and lean rock, and the location and extent of intrusive dikes have for years been more fully studied, the quarries have, generally, a more regular outline: as at the King and Bell pits, Thetford; also at the large quarry in Danville.

At these quarries, no discrimination has been made between dikes, lean or rich portions of the serpentine; no pillars of any rock have been left, for the reason that these would only prevent mining with advantage towards depth. The shape of the quarries is rectangular: and while the outlines of the walls are not strictly in conformity with that shape, nevertheless the execution and the progress of the work in the pits indicates that a definite system has been followed in late years. The principal advantage of the system employed in these mines lies in the fact that, generally, a number of different zones—both lean and asbestos-bearing—are thus laid open, hence the work, also the supply of ore, can be regulated to better advantage according to requirements.

As a general rule, in all the larger pits the rock is taken down in a series of benches, stopes, and terraces, which vary in dimensions according to the size of each pit. A good illustration of systematic progress in quarry work is the long pit of the King quarry of the "Amalgamated Asbestos Corporation," at Thetford. This pit has a length of 1,350 feet, and an approximate average width of 350 feet. The height of the benches and stopes varies from 5 to 30 and 40 feet in the deepest part; while the length of the terraces varies between 50 and 250 feet.

Explosives.

The great bulk of the dynamite used in the asbestos quarries contains 40 per cent. of nitroglycerine; the cartridges being, as a rule, 8 inches long, by 1¼ inches diameter, and are packed in boxes of 50 pounds, containing from 85 to 95 cartridges. The price is from 14 to 15 cents per pound.

Effect and Cost of Hand-drilling.

Hand-drilling is still in use in the smaller quarries and prospects, also for block-holing.

As a rule, three men are employed with 1-inch octagonal steel, and six or seven pound hammers. The average capacity in hard serpentine or granite is from 15 to 18 feet per shift; and the cost per foot—including explosives—from 24 to 28 cents. In some of the mines block-holing is done by one man only; using ¾-inch steel, and three to four pound, short handled hammers. The capacity is from 7 to 9 feet per day, and the cost — including explosives — about 20 cents per foot.

Effect and Cost of Machine-drilling.

In nearly all the quarries, machine-drilling is in vogue for the breaking of the rock in situ. The proper placing of the holes is a very important factor in obtaining the best results from blasting in asbestos rock. It is necessary that the operator have a thorough knowledge of the position of the strata, and the position and trend of cracks and fissures. To obtain

this knowledge, the intelligent miner examines the rock attentively, and carefully ascertains for each blast the position of any joints and fissures in the rock; to enable him to form a judgment as to the proper direction to be given to the hole, and the free sides available for the best results; but it happens, too often, that two miners will have different opinions as to the proper charge for a certain shot. The result is, very frequently, a waste of explosives, which sometimes assumes considerable proportions. Where the rock is massive, and the walls of the benches to be taken down vertical, the direction of the holes is vertical, or nearly so; and when the rock is much fissured, the holes have, generally, an inclined position according to the largest fissures and the bulk of the rock to be taken down.

When blasting benches having several free sides, the holes are arranged in rows, and they are as nearly as possible parallel with the largest free side, so as to obtain the deepest hole, and thus be able to use, relatively, the smallest quantity of explosives. In order that the charge may be as fully utilized as possible, due regard is given to the contour of the free sides and the longest line of resistance. The holes in this case are generally made vertical, so that the explosion will not have to lift the rock it breaks down, but will allow it to fall by itself, and thus gives less work afterwards in removing.

The depth of holes ranges between 8 and 10 feet, and in the case of exceptionally large faces, 12 and 15 feet. The charges of the drill holes vary, of course, according to the position of the latter, quality and quantity of rock as outlined above; but, as a general rule, in the course of ordinary work—where the faces are free on one side—from 0.45 to 0.5 pound of dynamite is used for every foot drilled.

The rock drills in use are mostly of the Ingersoll and Rand types, with 3⅛-inch cylinder, and a stroke of 6¾ inches.

Electric Drills.

Lately, electric percussion drills have come into use; but many improvements will have to be made on the present design before their use will become general. Most of the manufacturers have adopted the following method: power is conveyed from an electric motor—which is placed either on the drill carriage, or in a box lying on the floor—to the drill by a flexible shaft. Compression springs are placed in the rear of the carriage; the drill carriage being released when the springs have been compressed to a certain pressure, and the drill is thrown forward by the force of the expanding springs. There are springs in front of the carriage also, which force the drill back after the blow has been struck; and there is the usual shifting arrangement, which comes into operation as the drill returns; by means of which, rotation is effected. In another form of drill—known as the box drill—air is compressed inside a cylinder forming the drill carriage; the drill being held in front and working in guides as usual, while the compression of the air is accomplished by an electric motor attached to the back of the drill.

In another percussion drill the following principle has been introduced: motion is communicated to the drill by means of a solid plunger, around which two coils of wire are fixed; electric currents passing into one coil, which, in receding, compresses a strong spiral spring in the rear. It is forced forward by the current in the other coil, aided by the force of the expanding spiral spring.

Electric drills in the asbestos quarries have several advantages over those actuated by steam or compressed air, especially in the winter time; since there is no loss through transmission, and the working effects are generally much higher.

For block-holing, little giant drills are used: the diameter of the piston is only 1⅞-inch, length of stroke 3⅝-inch, and depth of holes drilled from 1 to 2 feet.

The steel usually employed is octagonal in shape 1⅛-inch in diameter for the larger, and ⅝-inch for the smaller drills.

The motive power for actuating rock drills is usually compressed air, or steam; but in utilizing the latter, there is a large loss from condensation in transmitting steam from boilers to the drills: especially in the usually severe winter seasons, when all the main pipes require to be covered with insulating material which entails extra cost.

Compressed air has a great advantage over steam the loss in transmission is small, hence the amount of drilling done is comparatively high. The operating results with steam drills are from 40 to 45 feet, per shift of ten hours. The total cost per foot—including power, labour, and explosives, at present prices of fuel—is from 15 to 18 cents; not including, however, wear and tear of machinery and interest on capital involved.

In nearly all the quarries the firing of shots is performed by means of electric batteries. There are few instances where one-hole blasting is still in vogue. In support of this practice it is urged that not alone is a saving of explosives effected, but that the expense of picking them up is less; because the asbestos veins are less liable to be smashed to small fragments, and widely scattered.

The expenditure for explosives per ton of rock broken, in mines where the rock is of a solid, massive character, is 3 4/5 cents per ton; in mines where the rock is much fissured and shattered, as in the East Broughton mines, the cost is a little less.

Each pound of dynamite brings down, on the average, 4.25 to 5 tons of rock.

Separation and Removal of Rock and Ore.

After the firing of shots, the broken material undergoes a hand-sorting process; which is different in every quarry, according to the grades to be produced and the ground worked. Where no crude or hand cobbed fibre is produced, all the rock containing fibre together with the fines scattered all over the pit, is sent to the mill; but in quarries where the different qualities of crude are produced, the material to be treated comprises:

(1) The long asbestos fibre, and pieces of rock containing the same.

(2) The milling material, or rock, containing the shorter fibre.

(3) Fine material, and the scrapings of the pit resulting from blasting and breaking up the rock by means of sledge hammers.

(4) Dead rock.

The material specified in No. 1 is sent to the cobbing sheds, and the material indicated in Nos. 2 and 3 is sent to the mill: the fines going first, however, to the dryer.

If the bottom of the quarry is on the same level as the top of the dump, the removal of the debris is simple: the latter is loaded directly into dumping cars or on a platform, and subsequently placed, by means

small derrick, on trucks, and then delivered to destination; but in most cases where deep mining going on heavy boom and cable derricks are employed.

Construction of Boom Derricks.

Boom derricks are employed in only a few of the smaller mines, or where dumps have to be worked over again. Quarries of large dimensions do not, generally admit of the successful application of boom derricks; on account of their very limited working radius.

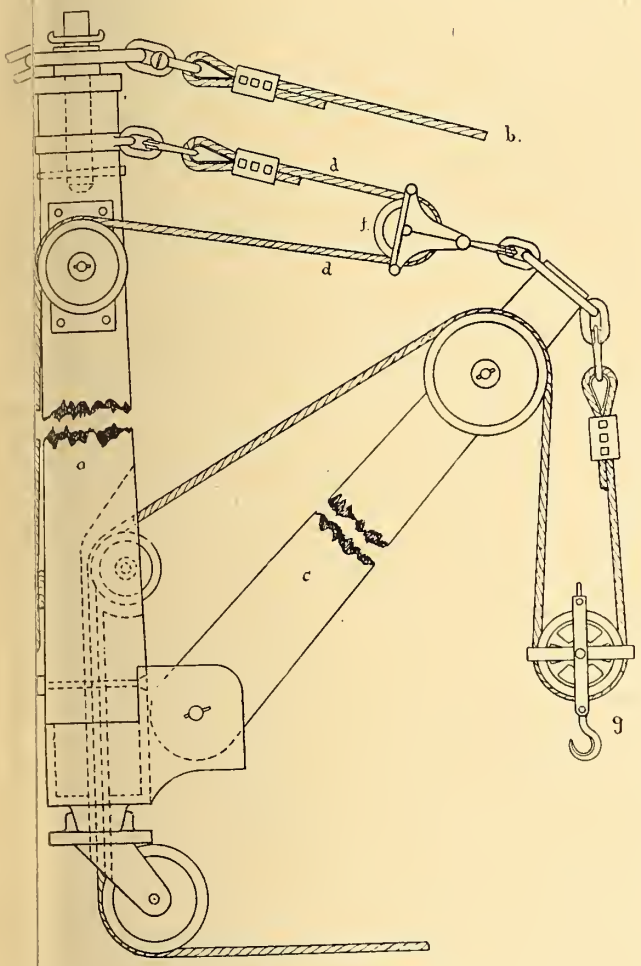

Fig. 19—Boom derrick.

A boom derrick (fig. 19) consists of a mast held in a vertical position by means of guy ropes or legs. To provide for the rotation of the mast about its vertical axis the lower end of it is pivoted into a socket of the fixed bed-plate. A boom or arm is hinged to the foot of the mast immediately above the pivot. The farther end of the boom, which carries the load, is suspended from the top of the mast by ropes, which pass over pulleys to permit the variation of the inclination of the boom to the mast. The length of the boom is from 30 to 50 feet; its working radius is naturally limited and can hardly be extended more than 50 feet.

Construction of Cable Derricks.

A cable stretched from the top of a well guyed frame or mast to some point across the working pit, along which the load is to be transferred, constitutes the main feature upon which the cable-derrick is constructed. A carrier suspended from the cable by a system of pulleys travels along the cable, and may be arrested, lowered to pick up the load, and rehoisted at any point between the limits of the cable.

The cables may span a distance of 400 feet, are made of crucible steel, and are from 1½-inch to 2-inch diameter: depending on the length of the span and load to be carried. The ropes for hoisting are from ⅝-inch to ¾-inch diameter.

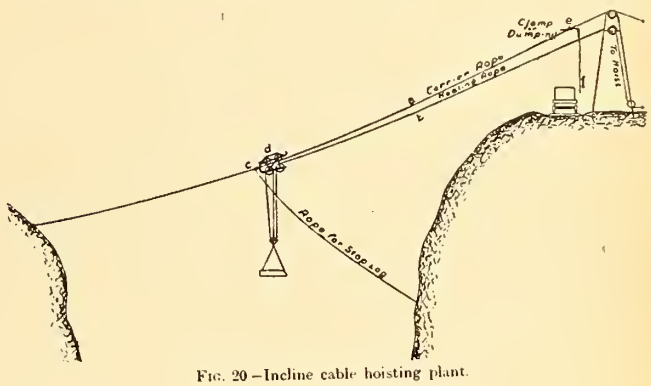

Fig. 20—Incline cable hoisting plant.

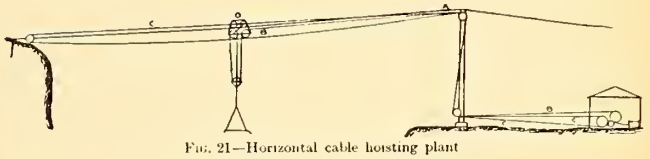

Fig. 21—Horizontal cable hoisting plant

The cable ways may be either inclined (Fig. 20) or horizontal (Fig. 21).

The cable ways may be either inclined (fig. 20) or horizontal (fig. 21). In the case of the inclined cable way the carrier is provided usually with one rope: the fall rope, which is also used as a hauling rope. To prevent the carrier moving along the cable when the load is raised, it is necessary that the angle of inclination of the cable be at least 30 degrees, to render the component of the force of gravity of the load acting down the cable of sufficient intensity to retain the carriage in position until the load arrives at the stop on the cable.

On stopping the carriage at any point on its upward journey, the load may be lowered and dumped, after which the carriage returns down the incline to the stop. It is generally necessary, however, to provide a bridle or link (e), pivoted to a wooden clamp on the carrier rope over the dumping point, which link is raised by a cord, (f), and dropped over the hook on the end of the carriage before dumping, and afterwards released to allow the carriage to return.

To obtain control of the carriage so that a load may be picked up or lowered at any point on the line, without shifting the stops on the carrier rope, a third rope or extra hauling or tail rope, ⅜-inch diameter, is required; which is attached to the carriage and wound in at the same speed as the fall rope after the load has been lifted, and by means of which the carriage may be restrained in its movement down the incline on the return trip, or made to stop over any point in its range of travel for loading or unloading purposes.

By making the hauling rope endless · that is, by passing it from the carriage around the separate winding drum on the hoist and around a sheave on the farthest end of the cable way, the latter may be used in a horizontal, instead of inclined position. In some quarries the inclined, and in others, horizontal cable-

ways, with tail rope are utilized. Miners generally prefer the horizontal to the inclined cable-ways, on account of the ease with which the carriage may be stopped at any desired point from the hoist; while with the inclined cable-way a constant shifting of the stopping log on the cable rope is necessary.

The support for the cable consists either of a pyramid, constructed of four legs fitted and bolted seeurely; or of two legs held in vertical position by 7/8-inch guy ropes arranged in the manner illustrated in

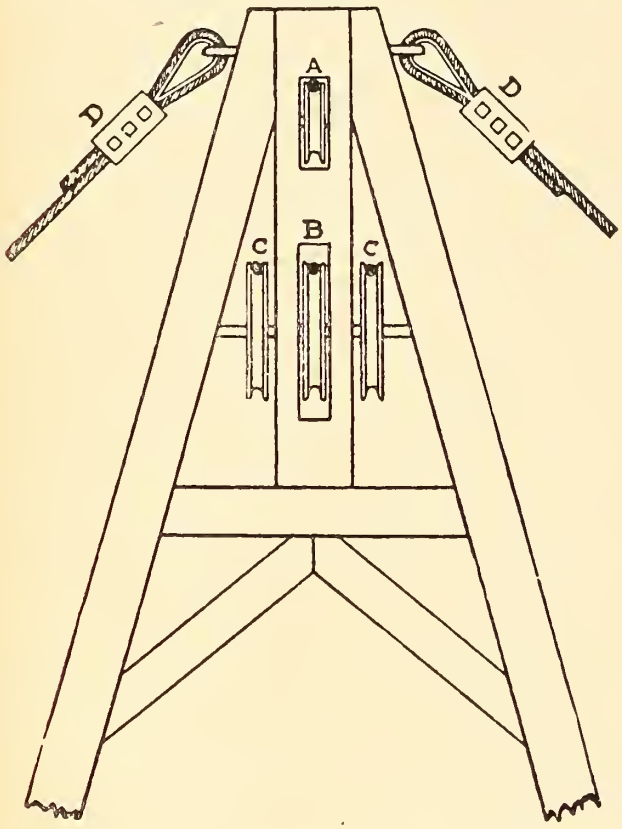

FIG. 22.—Two-leg support for cable derrick.

(A) Carrier rope. (C) Hauling ropes.
(B) Lifting rope. (D) Guy ropes.

fig. 22. On the top of these supports are placed the sheaves for the carrier and haul rope. It is claimed for the pyramid-shaped supports that they are very rigid, and strong, and do not require any guy ropes; while the two leg supports are of simpler construetion and can be more easily removed.

Single mast supports were perceived in one mine; but they are exceptions to the general rule.

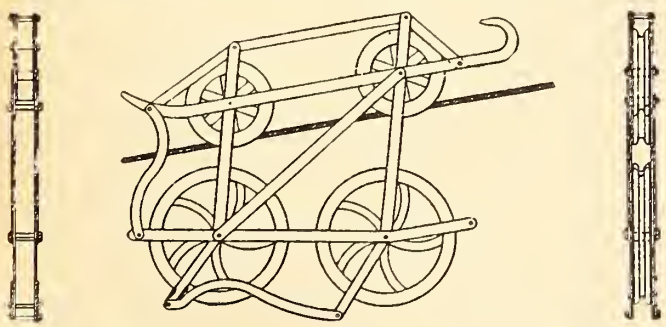

FIG. 23.—Carrier for cable hoisting.

The eable carriage (fig. 23) is substantially con structed of wrought iron, and is yet comparatively light. The running wheels are of cast iron, hav flanges, and, as a rule, are provided with anti-friction bearings. The hoisting wheels are of cast iron, 1 inch to 24-inch diameter, in order to reduce the wea on the hoisting rope, and to enable the gin block t lower as freely as possible.

The boxes for hoisting are made of 2-inch hardwood and hold, generally, from 16 to 20 cubic feet o rock, weighing from 2,200 to 2,500 pounds. The bo tom is covered with 1/4-inch steel plate; while in som quarries the outside corners are covered and protec

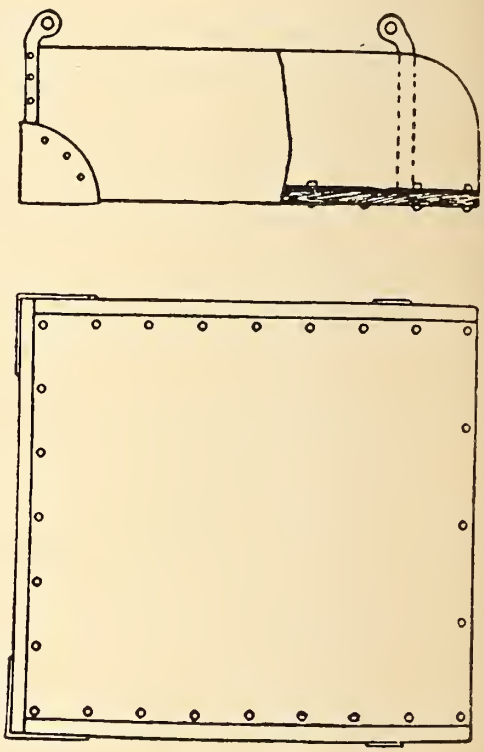

FIG. 24.—Construction of transport boxes

ed by heavy flanges (fig. 24). It is claimed that a bo of the above construction in ordinary work does n last longer than from six to eight months. One com pany has attempted to use boxes made of iron; but appears that the experiment was not successful.

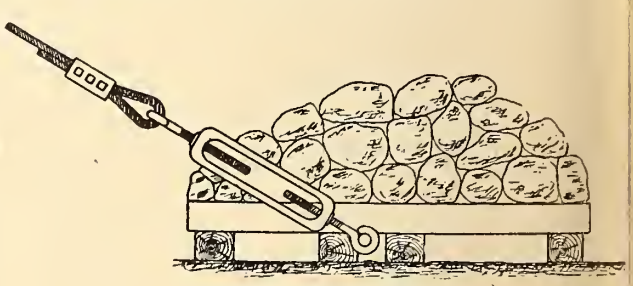

FIG. 25.—Anchorage of carrier rope.

The heavy cable is fastened at both ends, either a system of heavy wooden legs loaded with ston (fig. 25), or to a large iron bar securely fastened in drill hole in the solid rock.

For the purpose of stretching the cable from tim to time, a turnbuckle is inserted at one end of t cable, in the manner illustrated in fig. 25

Hoisting Engines.

All hoists used in the district are of the double cylinder type, with reversible friction drums.

Efficiency of Hoisting Plants.

The number of tons of rock which can be raised from a quarry by means of a cable derrick depends upon the depth of the pit, the distance to be hauled, and the capacity of the machinery. As a rule, however, the distance in nearly all the quarries does not exceed 400 feet; while the greatest depth so far attained is 185 feet. Taking these figures as a basis, and assuming the load to be one ton, and the capacity of the hoist 40 horse-power, an average of from 240 to 300 tons can be raised in a ten-hour shift. It must be understood though, that a cable derrick is used also for other purposes: for instance, the lifting and shifting of heavy pieces of rock in the quarry in order to clear the working face after blasting. On account of the work entailed through the separation of the useful from the dead material in the bottom of the pit, a cable derrick is very seldom used to its full capacity. In order, therefore, to provide for a steady supply of ore in all the quarries, a larger number of such mechanism as will permit the tilting of the box to both sides of the track.

The gauge of the latter is 42 inches. In all the larger quarries haulage is being done by small 10 and 12-ton locomotives; and it is claimed that not only is the cost of transport per ton considerably reduced, but that accidents are very few. The first introduction of these small locomotives was made by Mr. Geo. Smith, in 1895, who used in their construction two cylinders from an old hoisting engine, in connection with gearing motion.

The steel rails employed are of either 19 pounds to the yard, for light dumping cars; or 45 pounds, for mechanical haulage.

General Hoisting and Hauling Arrangement and Position of Cable Derricks.

The position of the cable derricks is determined by the location and number of working points in the pit, and changes with the shifting of operations. Where the quarry is of rectangular shape, all the supports and hoisting engines are, as a rule, placed on one side of the pit; the former usually all on one row near the border of the pit, leaving, however, enough space for the passage of dumping cars. A good illustration of

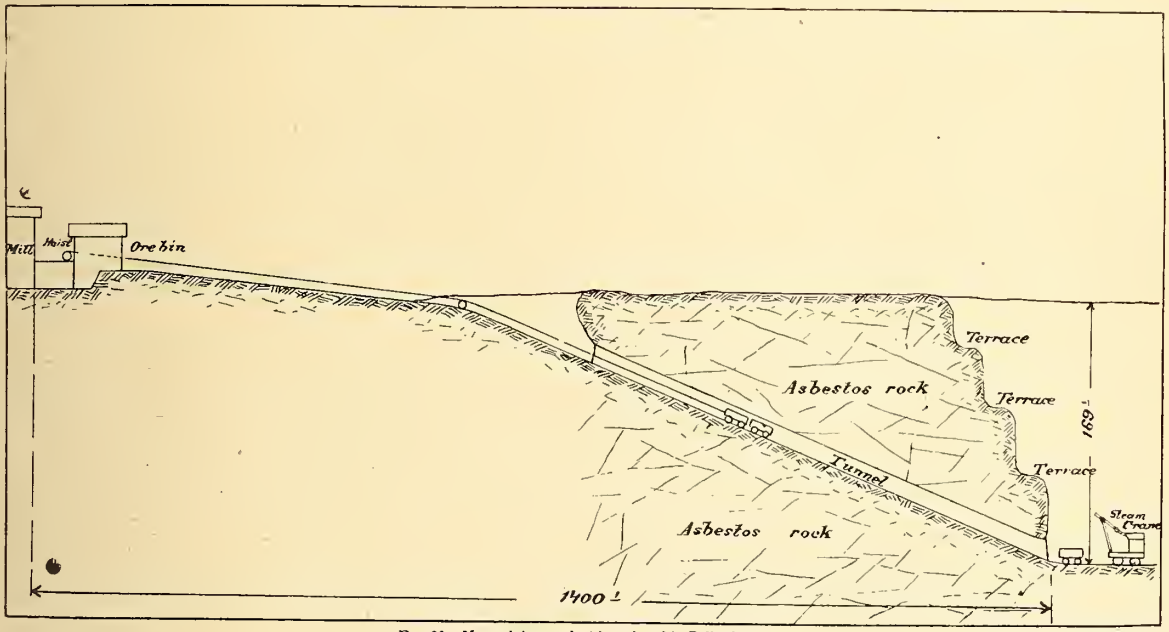

Fig. 26.—New mining method introduced in Bell mines.

cable derricks than the regular output capacity indicates, are employed and stationed along the quarries. In illustration of this, it may be cited that one company treating about 300 tons of asbestos rock in the mill and raising for this purpose as an average 500 tons, has employed eight cable derricks.

Haulage and Dumping.

The dumping cars in use are of two classes: (1) those hauled by men or by horses, and (2) those hauled by power. Dumping cars of the first class consist of a truck and a movable box, constructed for a 26-inch gauge, and holding from one-half to one ton.

The box cars for power haulage hold from three to six tons of rock. They are furnished with brakes and

this arrangement is the large "King" pit of the Amalgamated Asbestos Corporation at Thetford. The derricks employed here are all of the tail-rope type; the cables being stretched nearly parallel at fixed intervals over the pit; while all the hoists — some of them are grouped together in one building — are stationed back of the supports.

In cases where the pits have an irregular shape, and curved outline, an effort is generally made to place the hoists and supports on one central spot, from whence all the cable-ways can be operated.

The tracks for the haulage of dumping cars are generally laid alongside, and close to the borders of the quarries. Generally, two tracks are close to each other; one for the loaded and the other for the empty cars.

In some of the mines the tracks are of an ascending grade towards the pit; allowing the loaded cars to descend by gravity for some distance to a shunting yard, where they are sorted and delivered to their destination.

An ingenious device for the disposal of the mill rock from the pits, the only one of its kind in the district, has been installed at the quarries of the "Jacobs Asbestos Mining Company," of Thetford Here the boxes coming from the pits by way of cable derricks are dumped in a system of ore pockets which empty into a pan conveyor below. The latter transports the ore directly to the ore bin of the mill. There are altogether installed 7 cable derricks with as many ore pockets. The conveyor has a total length of 325 feet, and consists of heavy steel pans 30 inches wide, each pan being reinforced by angle iron. Its velocity is 40 feet per minute.

The signalling from the pits to the hoists in shallow workings is effected by shouting; but where the pits are deep, and where the operations cannot be noticed by the engineer, boys are stationed at points of vantage on the border of the pit, who convey the signals either by electric bells or by means of a galvanized wire to a hammer which strikes a bell, the number of strokes indicating what is required.

Each engineer stationed at a hoisting engine marks the number of box loads he has hoisted during the shift, and the summary report of all the hoisting engineers' records must tally with the number of cars delivered at the different stations; i.e., at the cobbing shed, the dryer, the mill, and the dumping ground.

Recent Improvements in Hoisting Appliances.

The suspended cable—which replaces the boom derrick in all cases where a wider range of operations is required—with its travelling, hoisting, and propelling lines, possesses many advantages. First of all, the main cable, suspended high over the quarry from the terminal towers, provides a roadway entirely independent of obstructions and of the condition of the surface. Having no other supports than those provided at the terminals, it has one clear span, hence there is no interference with the passage of trains, waggons, or other work carried on within the range. With a suitable equipment in the way of engine, sheaves, carriers, and skips, almost any kind of hoisting may be carried on with a certain amount of speed, and over a comparatively large range. It comes here in direct and successful competition with the boom derrick; for it does the same work with a substantial saving in operating expenses. Upon watching closely the operations of these cable derricks, however, we find that they also have their serious drawbacks; and this is more apparent the greater the quantity of low grade material handled. In order to work simultaneously at many points in a big quarry it is necessary to install quite a number of these cable-ways In one pit, measuring over 1,000 feet in length, twelve cableways are being operated, and this necessitates twelve different hoisting units; each consisting of cableway hoist, cable tower, two or three heavy cables, and other accessories. Moreover, the operating expenses; the permanent watch necessary to keep these units in good order to prevent any accident; the time lost by the men in the quarry—as is generally the case—in watching the arrival or departure of the hoisting skips; are all factors which, when considered in the proper light, tend to offset, to some extent, the apparent advantages that at first sight appear.

These negative facts are now recognized by engineers, hence efforts have already been made to do away, to a very large extent, with the cableways in cases where larger quantities of rock are to be handled and to substitute a tramway service instead — where the location of the quarry permits of such a course The "Bell" people, at Thetford, are the first to be credited with this innovation. When the present proprietors — Messrs. Keasbey & Mattison — took over the property several years ago, their manager, Mr. Geo. Smith, made a proposal to connect their great quarry with the mill: which was located at a distance of 1,100 feet, by rail through a tunnel, allowing at the same time a thorough exploration of a long stretch of virgin serpentine. This plan was at once accepted and executed, with the result that to-day all the rock instead of being hoisted by cable derricks, is hauled in large 5 ton cars over a tramway through a tunnel to the mill. The advantages of this hoisting system are manifest, and need no further comment. There are a number of quarries in the district, the location of which permits the introduction of a similar tramway service; and although the initial expenditure of making a tunnel or open-cut in connection with the tramway may be high, yet the operating expenses are so low, compared with that of ordinary cable derricks, that the money invested may be considered well spent.

Compressed Air.

In some of the larger mines the motive power for actuating rock drills and hoists is compressed air generally supplied by straight-line air compressors.

In order to secure uniformity of pressure, and to get rid of the water, and impurities, the air is led from the compressor into a receiver, which is generally supplied with a safety valve, and pressure gauge also a cock for letting off the water which gradually collects.

Where the distance of the pit from the air compressor is long—over 500 feet, a second receiver is installed about half way, for the purpose above indicated. The capacity of an air compressor is generally estimated by the number of rock drills it can supply There are 3, 7, 14, and 20 drill, air compressors, all which are employed in the asbestos region. The pressure usually produced for air drills is 80 pounds.

The straight-line air compressors which are extensively used in the district, have the great disadvantage of consuming too much steam. They are now being superseded by the duplex, compound steam-air compressors, which are constructed on more economic lines.

The annual analysis book of the Lake Superior Iron Ore Association has just been issued. The list of analyses includes 283 ores. Michipicoten and Sudbury Canadian ores are listed. The former are classified for the trade as "Algoma," "Helen No. 1," and "Helen No. 2." Of the various groups of the Steel Corporation's ores only two show increases in iron content. These increases are partly or wholly due to reduction of moisture content. The remaining ores fall off slightly in iron percentages.

In the oil fields of Galicia, Austria, there are now 135 producing wells, and 204 new wells are being drilled. The Austrian State Railways use oil exclusively. This provides a steady market.

A PERSONAL NARRATIVE OF THE BELLEVUE, ALBERTA, RESCUE PARTY.

The following narrative has been submitted to us by an official who took an active part in the efforts made to rescue the miners entombed in the Bellevue colliery after the explosion last December. The narrative and covering letter were written for the purpose of correcting a statement that appeared in the CANADIAN MINING JOURNAL, February 1st, 1911, to the effect that the Draeger apparatus installed at Hosmer, B.C., were of the 30-minute type.

Our correspondent shows that this statement was only partly correct.

The lessons learned by the Bellevue experience are numerous. Not least important is the demonstration of the mischievousness of official interference. The narrative should be read with close attention.

THE NARRATIVE.

On the 9th December, I was informed that there had been an explosion in the Bellevue mine of the West Canadian Collieries Company, Bellevue, Alberta, and that assistance had been requested. I was informed that there was a special train on the way from Fernie, to take the rescue party up to Bellevue, which is situated about 42 miles east of Hosmer.

After assembling a few men, we had three "Two-hour Type" Draeger apparatus, two "One-half-hour type," pulmotor, pump, spare cylinder of oxygen, and a supply of spare small cylinders for the "two-hour" type, with the necessary potash cartridges, packed up and put aboard the train. Accompanied by Mr. D. G. Wilson, manager Hosmer Mines; F. Alderson, fire-boss, Hosmer; and Mr. Fuller, secretary, we proceeded to Michel, where we picked up Messrs. Ashworth and Fraser, of the Crow's Nest Pass Coal Company. We arrived at Bellevue about 1.30 a.m., after having to change all our apparatus from one car into another at Coleman, causing a delay of about 20 minutes.

It was about 11.30 p.m. when we received word in Hosmer of the explosion. I decided to take only the three apparatus ("two-hour type") owing to Mr. Ashworth having informed me that we would not require them. As Mr. Ashworth had investigated an explosion in this mine about six weeks previously, he informed me that he was almost sure we would not require the rescue apparatus. We had the apparatus taken to the lamp room, where I left it in charge of Alderson while I proceeded to the office to see if any of the mine officials were there. Not finding any of the officials, I decided to go into the mine, and, taking the apparatus, we proceeded in a car for some distance. Then, owing to some coal having blocked the way, we had to walk. At about one mile and a half we found the rescue party bringing out the bodies of twenty-one miners who were found near a leak in the high pressure line. At this point I found Mr. Powell, the manager, and, after introducing myself to him, I suggested that he send out to the lamp-room for the doctor in whose charge I had left the pulmotor, as it might be useful to try it on these men. I might mention that I left the pulmotor in the charge of the doctor as he had been instructed to stay outside. I also showed him the way to use the pulmotor.

Mr. Powell then asked if we could explore the level, so Alderson and myself put on the Draeger apparatus and started in. We had only gone about 500 feet when Alderson complained of something being wrong with his apparatus and I had to assist him back to the starting point. On examination I found that the nipple connecting the oxygen cylinder and the apparatus was loose and all the oxygen had escaped. Here I may state that I had been away from Hosmer for three weeks taking in the Mine Rescue course at Seattle, and had only returned that night; therefore, to make sure, every part of the apparatus was examined in the presence of Alderson and Wilson on the road coming to Bellevue. After a short rest, Alderson requested to be allowed to put on the other apparatus, and as he appeared to be all right, I acceded. We proceeded in the level about 2,000 feet, where we found eight miners alive around the high pressure charging station. I explained to these men that we would return and get the two "half-hour" apparatus and take them out.

Starting out we had only gone twenty feet when Alderson stopped and informed me that he would give one of the men his apparatus so as to allow the miner to go out. This I protested against, and informed him that it was not right. Still Alderson insisted on going back, and took his apparatus off, giving it to one of the miners, who accompanied me out. On arriving at the starting point, I informed Mr. Powell of how things stood, and asked that men be sent out to bring in the two "half-hour" set, also a further supply of potash and the spare oxygen cylinders for the "two-hour" apparatus. I then returned inside, carrying Alderson's apparatus,. This he put on and I gave mine to another of the miners, who accompanied Alderson out. On Alderson returning inside, he was completely exhausted and had the chin valve of his apparatus open, but was able to inform me that he had dropped my apparatus on the road in; also he thought that in the one he had on the potash cartridge was done. Assisted by the miners, I took the apparatus off and put it on to try it, and found that it was all right. I started for the outside and you can judge that the entombed men were in good condition when two of them accompanied me out for 15 or 20 feet to see if I was all right. I arrived at our starting point, and urged that some person go out and hurry up the apparatus I had sent for, and Mr. D. G. Wilson started out to hurry them up.

About this time A. McTuskey arrived, and requested to be allowed to go in. He having taken the course at Seattle, I consented, and he put on the "two-hour" apparatus and carrying also one of the "one-half hour" type which had now arrived, he started inside. About twenty minutes later McTuskey returned and informed me that the men were all down except the fire-boss. In reply to my question why he did not insist on the fire-boss taking the apparatus and bring him out, he informed me that none of the men could stand, much less walk. I suggested to Mr. Powell that a rope be sent for so that a man could go in and tie the men on and we could pull them out, and this was sent for. Realizing that through some cause the gas was being forced onto the men (these men had been inside for about eight hours) I then suggested that we extend a sort of life line of men and follow up as near as possible to try and grasp any chance of saving their lives. We started in, and Mr. T. Spruston, overman, Michel,

taking the lead, testing the air as he went, we succeeded in reaching the entombed miners. Only in the inside did Spruston detect any sign of CH_4, and then only a small cap. Having reached the entombed miners we started to haul them out (we had no stretchers). Spruston and myself pulled one man a considerable distance when Spruston got knocked out and left me. T. Mather, Michel, then gave me a pull with the same man and also left me, then, feeling pretty sick, I gave up and tried to make my way outside; but must have succumbed to the afterdamp. I was found afterwards and revived.

When this forlorn hope started in there were seven men inside including Alderson. I am glad to say that the conditions altered so that five of these men were rescued alive. What caused this sudden change in condition I am not certain. It may have been a cave. On the other hand, Mr. Wilson on going out to hurry up the supplies, found the trap-doors without any person in charge. One of these was propped open. Mr. Wilson requested the Inspector of Mines, Mr. Heatheote, to put some person in charge.

Reviewing the situation I might mention that the station at Hosmer has only been open since November 1st. There are practically no trained men as yet,* the intention of the British Columbia Government being that the inspectors would take the course in the Seattle Mine Rescue Station and that, with a suitable training station, corps of men could be trained. I had just returned from taking the course as I previously mentioned. A. McTuskey, previously mentioned, had taken about six lessons, while Spruston had taken two lessons. These two did not come up with the special train, but followed in another train. Alderson had been doing some training in Hosmer mines with the apparatus, therefore my preference for him. The incident of th first apparatus leaking I can only explain by the fa that when we arrived in the lamp-room at Bellevue was crowded with men, and the appearance of th Draeger apparatus created quite a sensation, it beir almost impossible to keep the men from inspecting ar generally handling the apparatus. The pulmot which I had left with the doctor was brought in, b was not tried on any of the twenty-one men, the re son being, so far as I can see, that the doctor did n realize the importance of the pulmotor. Afterwar Messrs. Wilson and Ashworth tried it on some me but informed me later that it would not work. O the Monday following I was able to satisfy Mr. As worth that the trouble was that they failed to mak an air-tight connection between the mouthpiece an the man's face. The pulmotor, I think, would hav given a good account of itself, had there been trained man there to handle it.

I might also mention that we have four "two-hour type apparatus at Hosmer. One of these had bee leaking, therefore I did not take it

I have not the least doubt but that if the chang had not occurred in the ventilation we could hav brought out the eight men successfully; and more, ha there been a trained corps of men on the spot with a reasonable time, I believe a great many of the twe ty-one men found dead at the leak on the high pressu line would have been saved, as these men all died CO poisoning, and practically all had time to put o their clothes and take their buckets with them whe they tried to get out.

It must be remembered that we were out of ou own district, as Bellevue is in Alberta, and we coul not assume the direction of affairs as we would hav liked, and as is necessary for the successful issue rescue work. As it was, we were only rendering vo unteer assistance. We have, however, this advantag that we learned some very valuable lessons. The are, not to depend on advice as to whether the appa atus is wanted or not, to treat every accident as th worst until we find different, and to make a mo thorough inspection of the apparatus before it is take into actual work. The necessity of having traine

*Editors Note.—This account was written early in February of this year.

n and attendants, with an appointed leader whose ers are to be obeyed, was proved. Sentiment uld have no place in the work, as this leads to the of life, probably endangering the life of the whole ty. Portable stretchers are absolutely necessary. portable station in a railroad car is also a neces-. The pulmotor ought to be in the charge of ned men, able to determine how far it can be taken de, so that the men have not to be carried long ances for treatment.

nother point,—on making my second trip out I felt hed and heavy. This I ascribed to putting the ap-atus on inside, as, although there may be sufficient to keep men alive, I question if there was sufficient d air for a person to take when putting on the eger apparatus. In other words, I objected to Alderson giving up his apparatus as I considered there might be some CO in it. My reason for doing the same thing after was that it looked selfish to keep Alderson inside taking all the risk.

Referring to the incident when Alderson returned inside, having dropped the spare apparatus and claiming that the potash cartridge was done, I think that the exertion of carrying the apparatus, probably in a great hurry, had exhausted his respiration bag and he had dropped the apparatus when he should have taken a rest.

I have tried to give you an account of our experience, and if there is any point that I have overlooked or is not clear, I shall be glad to explain the same.

The apparatus we have is the 1910 type.

CANADIAN MINING LAW

By J. M. Clark, LL.B., K.C., Toronto, Canada.*

rom the Transactions of the American Institute of ing Engineers.

(Wilkes-Barre Meeting, June, 1911.)

or some years past, those interested in the devel-ent of the increasingly important mining industry anada, have urged the adoption by the Dominion liament of a federal mining law, which would e the force and stability of statutory enactment. present, placer mining in the Yukon Territory is erned by the Yukon Placer Mining Act. All other ing under federal jurisdiction is governed by Or--in-Council and Ministerial Regulations.

the earlier stages of development, it is perhaps atter of neccssity that these important matters ld be so dealt with; but it is now felt that the has come when mining rights in the extensive ons under federal control should be put on a per-ent basis, and that any changes required from to time should be made only after full and open ussion in Parliament.

short sketch will suffice to indicate how vast and ed the interests affected really are.

hen the Dominion of Canada was instituted by Imperial Statute known as the British North rica Act of 1867 (which came into force by pro-ation on July 1 of that year), it comprised only present Provinces of Ontario, Quebec, Nova Scotia, New Brunswick; but provision was made for the sion of Newfoundland, Prince Edward Island, sh Columbia, Rupert's Land, and the North-West itories. Subsequently Rupert's Land and the h-West Territories were acquired, the Crown Col-s of British Columbia and Prince Edward Island admitted, and all the other British territories possessions in North America, with the islands ad-nt thereto, except Newfoundland and its depend-s, were annexed to Canada by Great Britain.

Canada, consequently, now comprises the whole of the northern half of North America, except Alaska, Newfoundland, and that portion of Labrador which constitutes a dependency of Newfoundland. All lands, mines, minerals, and royalties belonging at the time of the union to the several provinces of Canada (now Ontario and Quebec), Nova Scotia, and New Brunswick, are declared to belong to that one of the said several provinces of Ontario, Quebec, Nova Scotia, and New Brunswick, in which the same are situated or have their legal origin—subject, however, to any trusts existing in respect thereof, or any interest therein, other than that of the Province.

Each of the Provinces named has jurisdiction to make laws for the management and sale of its public lands, and of the timber wood thereon, and also as to property and civil rights in the Province.

With some exceptions, not necessary to be here specified, the same rules were made applicable to Prince Edward Island and British Columbia. But very different conditions and regulations obtain in the remaining parts of Canada.

Under the sanction of an Imperial Statute, the Dominion of Canada obtained a surrender of the lands and territories granted by Charles II. in 1670 to the Governor and Company of Adventurers Trading into Hudson Bay, known as the Hudson Bay Company; and Rupert's Land and the North-West Territory were consequently admitted into the Dominion as of July 15, 1870.

When the Provinces of Manitoba, Saskatchewan, and Alberta were formed, the lands, mines, and minerals, with slight exceptions, were not transferred to the Provinces, but remained the property of the Dominion of Canada, and subject to federal jurisdiction and control.

The proposed federal mining law must deal with the mines and minerals of these three Provinces, of all the Territories (including the Yukon Territory), and of certain areas of the older Provinces, principally the Indian lands and the railway belts of British Columbia. It must, therefore, deal with placer mining, coal, natural gas, oil, petroleum, gold, silver, copper, and the other minerals. The whole field must be covered and every problem of mining law solved.

*ecretary's Note—Mr. Clark, an eminent Canadian er, and joint author of the treatise on "The Law ines in Canada," has been requested by the Do-on Government to prepare a Federal mining law, presents this paper, by invitation of the Council, der to obtain, if possible, useful suggestions from bers of the Institute.—R.W.R.

The framing of this general law is regarded by mining men as supremely important, not only on account of the great interests actually and potentially involved, but also because it is looked upon as the first step towards the unification of the mining laws of Canada. The vital importance of such completeness, wisdom, and practical convenience being presented by the federal statute as will recommend it to the several Provinces for voluntary adoption is therefore self-evident.

While the Dominion has no jurisdiction over the mining laws of the Provinces which own mining lands, it is hoped that the provisions of the federal law, by reason of their excellence and efficiency, will gradually be adopted by the various Provinces.

To paraphrase a famous saying, this must take place, not by reason of imperial power, but by the imperial power of reason.

In this connection, a striking instance of concerted action by independent jurisdictions may be mentioned. Some years ago, an exceedingly well-drawn Act, dealing with bills of exchange and promissory notes, was passed by the Imperial Parliament. The same Act, with slight changes, was passed by the Canadian Parliament, and by a majority of the State legislatures of the United States; so that it may now be said that this statute governs the greater part of the English-speaking world!

There is no reason why the members of this Institute should not take a useful and active part in obtaining for the mining world advantages similar to those which have been thus secured by the mercantile communities of Great Britain, the United States, and Canada.

At the present time, a discussion of the fundamental principles upon which such a mining law as is proposed should be based, and of the merits and deficiencies of such codes as that of Mexico, would be interesting and instructive, as bringing together, in useful form, the results of close observation and varied experience of the mining laws of the world.

There is no danger that any form of the so-called "apex-law" will be again introduced into Canada. That law was once copied, under the influence of miners from the Pacific States, by British Columbia, but was finally abolished April 23, 1892, since which date the rights of the holder of a mineral claim are confined, in British Columbia, as in all other parts of Canada, to the ground bounded by vertical planes drawn through its surface boundary lines. The vested rights of claim owners who had located their claims under former acts were protected; and the "apex-law," in British Columbia, as elsewhere, has given rise to costly litigation, which seems inherent in the system of extra-lateral rights.

There are, however, other important questions to be discussed; such as how adequately to protect the prospector, without at the same time introducing the danger of "blanketing"; the function of discovery in the acquisition of mining title; the most useful forms of working conditions, and the most efficient methods of enforcing such regulations. Last, but not least, the ever-present and ever-troublesome questions of taxation and royalties must be considered.

Discussion.

Rossiter W. Raymond, New York, N.Y.:—It is satisfactory, but not surprising, to learn that there is no danger of the adoption in Canada of the apex-law w its extralateral right. I do not think that any co munity which has once experienced the evils of th system, and has escaped from them by abandoni it, would ever dream of returning to it. And Briti Columbia having had that experience, has doubtl furnished a sufficient object lesson for the wh Dominion.

Mr. Clark's hope that a federal law may be fram which will ultimately be adopted by the Provinc is not chimerical. Not only the commercial instar which he cites, but the history of our United Sta law, encourages such a hope. That law prescribes few conditions, leaving to local legislation freedom ordain others, not inconsistent therewith. For instan the form and the maximum dimensions of a mini claim and the minimum amount of annual "asse ment work," are prescribed, together with a f forms of procedure; but smaller dimensions, larg amounts of annual work by possessory owners, a additional forms of procedure, may be imposed local legislation or regulation. In many cases, es cially during the earlier period following the adopti of the Federal law (1870), this freedom was abu antly used, and locators of lodes or placers were oft obliged to do, for the maintenance of their possess titles, a good deal more than the United States st utes required; but gradually the convenience of u form conditions, working quietly, but continuous like the pressure of gravity, had its effect; and, at t present time, the local regulations of mining distri have been largely superseded by State or Territor statutes, which are, in the main, not only consiste but identical with those of the federal law. Anotl illustration is the manner of making and recordin mining location upon the public domain. It may se strange that the United States law prescribes nothi at all in this respect. It required the location to h certain essential features of shape, maximum dim sions, and relations to the discovery of a mineral posit within its boundaries; but it does not requ any particular form of record or proof of these f damental requirements. Indeed, the United Sta Government does not to-day possess either records maps showing what portions of its public mine lands have been appropriated by valid mining lo tions, and, being held under possessory title, do now belong to that domain. The explanation of t anomaly is historical. At the time when our gove ment had to do something in order to define its re tions with miners who were technical trespassers u the public lands, those lands constituted, in the ma a vast unsurveyed wilderness. A theoretically perf and properly guarded system for the record of min titles would have been impracticable of execution; Congress, therefore, did the best it could under circumstances. The punishment of trespassers be neither desirable nor practicable, it legalized the t pass, and left the parties concerned to settle their lations to one another according to the local r which they had themselves adopted in the several m ing districts, or which might be established for th by local legislatures, subject to a few more or l elastic requirements established by the United Sta as the real owner of the land. Meanwhile, the fa concerned were left to be proved by any kind of dence, documentary or oral.

In my judgment, this action of Congress, thou warranted under the circumstances so far as reco of location, etc., were concerned, might and could h been remedied, when these circumstances had gre

ed, by requiring records of location, etc., to be in or officially transmitted to the United States or general land office. But it is worthy of note without any such requirement, the effect of considerations of the certainty and safety of such ls has brought about a general uniformity of legislation, requiring them to be filed with the s of courts or counties, who will be responsible eir preservation from mutilation or destruction. not yet the duty of such officials to give notice e United States of such entries, affecting the f the United States to its public lands; but that nay easily be taken. Meanwhile, this narrative newhat chaotic progress may encourage the belief hat obviously wise and useful features of administration will, in the end, be adopted by communities pon which, when first promulgated, they are not y binding. In other words, it is worth while for eral government, like that of the United States e Dominion of Canada, to frame a system of mining law for its own lands, which will commend ceptance of its constituent States or Provinces n th administration of their own lands.

To his end, I think the first requisite is a survey of ands. Apart from the mischievous extra-lateral the greatest cause of confusion and waste in mining districts of this country which have been d by our mineral land law, has been the lack of ublic surveys as would permit the accurate definiof a mining location by reference to established arks. I do not know how far the Dominion has ded in the discharge of this public duty—one of ry first, in my opinion, which is incumbent upon vernment worthy of the name. At all events, that Mr. Clark's draft of a code will include on for immediate performance of this work. grants may have to be made in territory not rveyed; but this should be done under conditions which will secure their subsequent re-definition rence to the lines of such a survey, and will permit the readjustment of their boundaries so as to conform, if possible, to those lines. This will be comparatively easy, if the boundaries of the original location are required to follow the direction of the future surveys—e.g., to run N-S. and E-W. The purchaser or possessory tenant of a tract of mining land would never object to paying for a little more area here, or little less there, in order to conform to this obviously convenient rule — provided, of course, he were not haunted by the fear of losing problematical "apex-rights" by any variation in his lines. Under our present United States system, the locator determines, as well as he can, the course of the "apex," which he ondly hopes he has truly discovered, and is bound to claim a rectangle covering that course—under penalty of losing some or all rights, both extralateral and interalateral, if later developments should prove him mistaken. It might be a hardship to him to be required to draw his boundary lines in particular directions; although I am inclined to think that, in the long run and in the majority of cases, the result would be advantageous to our mining operators, by reason of their greater security of title. I have had to do with a large number of mining litigations, and I can recall few lode claims involved in such cases from which the lode did not depart, at some point, across side line; so that I am inclined to believe that, even under the "apex-law," the boundaries of locations might have been required (with some modification or conditions as to length and width), to run N-S. and E-W., with real advantage to locator. Be this as it may, I see nothing to prevent the adoption by the Dominion of Canada of a provision so well established and so universally approved in the sale of public agricultural lands.

Next in importance to public surveys is the official classification of the public lands to be leased, sold, or opened to prospectors. This classification should be, in my opinion, final and conclusive. If the land in question has been sold outright, say, at the price of agricultural land, and the grant or patent of the government, conveying the full common-law fee simple to its contents, usque ad astra, usque ad inferos, has been issued to the purchaser, then the original official classification of it, as agricultural, should not be disturbed by proceedings attacking the purchaser's title, on the ground that it was or is, in fact, more valuable for mining than for agricultural purposes. The government should occupy, in this respect, precisely the position of a private seller. (Of course, actual fraud, to which the purchaser was a party, might be pleaded against his title, but to no further extent and under no other conditions by the government than by any private party wronged by such fraud. That is to say, the government should itself bring suit for the abrogation of its grant or deed; and the latter should not be open to collateral attack in any private suit.) In short, the purchaser of anything from the government is entitled, in justice as well as policy, to know just what he gets, and to be assured that he really gets it. The danger that, through an incorrect official classification, mineral land may be sold at a lower price as agricultural land, is entirely insignificant compared with the importance of giving a clear and secure title to purchasers.

On the other hand, lands may be granted for agricultural purposes, with a reservation by the government of the mineral rights. In this case, a previous official classification is less important. Yet I think it might well be required to protect the government against unnecessary administrative complications. Any land which is officially classed as "mineral," had better not be sold as "agricultural"; and, in any case it is best that in such transactions, as in private bargains, both parties should clearly know what they are doing. In leases of mineral rights, it might be urged that the government should be able to increase its requirements upon proof of unexpected value of the property. One obvious answer is, that such a change should be practicable, if at all, only after a term of years. But a more conclusive answer is, that the mining industry should be taxed upon its annual product or profits; and such a tax will take care of all unexpected prosperity, without disturbing the conditions of mining title. I feel bound to say, however, that nearly 50 years of observation and experience have inclined me to believe that the acquisition by private parties or corporations of the full fee simple of public lands, including the mineral right, is better in the long run, than any system of leasing by the government. If such a system should be deemed advisable, then the condition of the retention of title should be, not a given amount of annual "work," but an annual payment of money. The requirements of "assessment work," under our United States law, is delusive and useless. The required annual payment of a sum of money would be much more effective in preventing the retention of possessory titles (which are

practieally, under our law, goverument leases) for speculative purposes.

The policy of requiring continued work as a condition of eontinued possessory tenure is not partieularly harmful with regard to metal mines, espeeially when, as with us, the amount of such work is trivial; but the governmental leasing of coal lands for limited periods, and upon eonditions of eontinual operation under penalty of forfeiture, is thoroughly bad. This idea has been suggested, I believe, by President Taft himself, whose sane and wise views of the general subject of conservation'' have won the approval of intelligent people. But I think he is wrong on this point. The operation of a colliery by a lessee is certain to eause the saerifiee of future to present interests; and the requirement that sueh a lessee shall keep going or lose his lease simply aggravates the situation. No governmental inspector could fairly require of a lessee the expenditure of a large sum of money whieh he might never reeover, under an arrangement subjeet at any time to executive eaneellation, espeeially if such expenditure were required, not for the safety of workmen, but only for the advantage of some future lessee; and the requirement of eontinuous operation as a eondition of tenancy, would operate to favour that over-produetion which is the greatest enemy of ''eonservation.'' At a recent meeting of the Institute, an eminent authority on this subject* read a paper advoeating the shutting down by the gov ment of coal mines that did not pay, in order to vent the injurious over-production and consequ waste of coal. My proposition is, that sueh mines be shut down by their proprietors without gov mental interferenee, provided they are not force eontinue operations for some other reason, such as danger of thereby losing their property altoget In short, I think that, in all sueh questions, pri ownership and liberty are likely to produce better sults than governmental supervision; and that best thing any government can do is to preserve der, enforce contracts, give to lessees or purchaser its lands clear and valid titles, and then allow t the largest praeticable liberty of enterprise and dustry—reaping its own advantages, not from the tortion of a pereentage of the anticipated result speculative adventures, but from the eonsequent creased wealth of all its people and the fair taxa of that wealth.

I could say many other things upon the text w Mr. Clark has presented, but I trust the foregoing incite other members of the Institute to offer sug tions whieh may be useful in his undertaking.

*Edward W. Parker, The Conservation of Coa the United States, Trans. xl., 601 (1910).

EQUIPMENT AT PORCUPINE

The following list of equipment already installed, or about to be installed, was furnished to the CANADIAN MINING JOURNAL by Mr. Alexander H. Smith, mining engineer, now resident in Porcupine. The list is not entirely eomplete, but it is nearly enough right to indicate the eondition of affairs early in April. Hardly any more additions will be made until after the railway is complete. Any omissions that may be noted have, of course, been made unintentionally.

List of power plants, etc., Poreupine Gold District, April, 1911—erected or under construction:

1. Armstrong-Booth—Boiler, hoist, and drills.

2. Armstrong-MeGibbon—3-drill Rand eompressor, boiler, hoist, and drills.

3. Bewick-Moreing No. 1—5-drill Rand eompressor, 6 drills, boilers, hoists. etc.

4. Bewick-Moreing No. 2—5-drill Rand compressor, 6 drills, boilers, hoists, ete.

5. Burns (Shaw)—10-stamp mill ordered with neeessary equipment.

6. Crown Chartered No. 1—3-drill Rand, boiler, hoist, drills, one MeKiernan-Terry shot drill.

7. Crown Chartered No. 2—Boiler and hoist.

8. Duncan Chisholm—One McK.-T. shot drill.

9. Dome—40-stamp mill, 1 Nissen stamp, eyanide plant, power plant, eompressor, ete.—largest plant in camp.

10. Dome Extension—3-drill Rand, boilers, hoist, drills, one McK.-T. shot drill.

11. ''Foster'' West Dome—Compressor, boi hoist, drills, and 4 MeK.-T. shot drills.

12. Foley-O'Brien—3-drill compressor, boilers McK.-T. shot drills, hoist, and drills.

13. Feldon—Reported 2 shot drills.

14. Hollinger—30-stamp mill, concentrating mi Tremaine steam stamp. boilers, compressor, h ete.

15. Imperial—Boiler and hoist.

16. MeEniney—Boiler, hoists, and drills.

17. Philadelphia—Boiler, hoists, and drill

18. Preston-East Dome—5-drill Sullivan compre boilers, hoists, drills, 2 Nissen stamps.

19. Pearl Lake—2 boilers, 2 hoists, 2 drills. McK.-T. shot drill.

20. Goldfields Consolidated (''Rea'')—5-drill pressor, boilers, hoists, drills, one McK.-T. shot d

21. Standard—Boiler, hoist, 1 drill.

22. Scottish-Ontario—Boiler and hoist.

23. James Whalen—Boiler and hoist.

24. Vipond—Compressor, boilers, hoist, and Nissen stamp.

In addition to the above, we have ascertained four additional McKiernan-Terry shot drills have installed on properties not mentioned in the list. T properties belong to Thor Warner, B. Babayan, balt Townsite Mining Company, and Catlin P Company.

First Train on Porcupine Railway.

Mill and Power Plant at Vipond

Excavating for Mill at the Dome.

Boiler for Dome crossing Porcupine Lake

Excavating for Mill on Hollinger

ONE VIEW OF PORCUPINE

From our valued contemporary, the Mining Journal of London, we reprint the following remarks concerning Porcupine. The tone of the letter, which was written by the Journal's New York correspondent, is sound and the criticisms appear not unduly harsh.

THE PORCUPINE BOOM—For the past twelve months romantic stories of fabulously rich quartz veins have been issuing from the wilds of Northern Ontario, and, unless all signs fail, the campaign of educating the public through the press will be sufficiently advanced in the course of the next two or three months to permit of the launching of the Porcupine boom.

When the Cobalt field was first opened up, engineers for the most part reported adversely on the camp, and many of those who reaped the advantage of the richness of these unique deposits were people who had little or no previous experience in mining, and who, by the fortunate investment of a few hundred or a few thousand dollars, became rich within a short period of time. The great richness of the ore veins at Cobalt, and the proximity of the camp to the populous cities of the eastern part of the United States and Canada, caused the wildest sort of excitement, and set up a standard of prices never before witnessed, except in the early days of the Comstock lode

Following the discoveries of gold-bearing quartz in Porcupine less than two years ago. it was quite natural that the first people to interest themselves in the camp should be the mine operators of Cobalt, only a short distance away. These immediately applied the Cobalt scale of prices to undeveloped mining claims, thousands of dollars being asked for swamp land without even an indication of mineral. The readers of the Journal are already familiar with the geology and general character of the deposits at Porcupine.

The greatest secrecy has prevailed regarding the results of development work that has been carried on in the Timmins and Dome properties. The enormous quartz outcrop at the Dome property, with its spectacular showings of free gold, stimulated the imagination of many people, and the vague statements — and contradictory ones, too—that have from time to time been published, have only served to enhance the mystery surrounding this supposed to be fabulously rich property. A few people, perhaps, are in possession of the actual facts regarding the value of the ore proved by the development work in the Dome. The high standing of the group of financiers who control this property lends colour to all the stories published, despite the fact that the owners have never made a public statement about the values disclosed by the development.

The Hollinger mines. belonging to Timmins et al, share equally with the Dome in the romance of Porcupine.

The publicity agents of the district have assiduously informed the interested world every time an engineer of note has come into the district in the past six months. William Frecheville's name was published far and wide as indicating the interest London financiers were taking in the camp. When the Consolidated Gold Fields of South Africa entered the field there was a blare of trumpets, and daily the press is filled with announcements of transactions which are supposed to indicate the great richness of the field.

Aside from the recently published statement by M Timmins, as president of the Hollinger mines, the has been no definite statement made by anyone in a thority as to the assay value of any of the ore opene up. The general character of the statements regar ing the ore is that there are spectacular showings an rich development. As a matter of fact, the Porcupi deposits are by no means peculiar to that section the world, but have been exploited with indifferer success elsewhere, and absolutely reliable informatio based on results of sampling, indicate that most the engineers who have visited Porcupine have turne the camp down.

According to the statement of Mr. Timmins abo mentioned, on the Hollinger mine there have bee some 1,400 feet of development work. Based on th meagre amount of development, it is stated that t average assay value of the ore is $49 per ton. A cording to the "Boston News Bureau," the Hollinge has $3,000,000 in sight in a high grade vein of quar averaging 8 feet in width, which has been develope for 1,300 feet in length on the 100-foot level. A estimate of ore reserves on the Hollinger must taken with caution. There are only three shafts the property on the main ore zone, one of which h not been sunk to the 100-foot level. Before any a curate estimate of ore reserves can be made, a gre deal of additional work must be done.

Recently 100,000 shares of this company were o fered at $3.50 per share, and the price has since ris to about $8, giving a market value to the property $4,800,000. It is safe to say that the amount of d velopment work done does not warrant any such val ation of the property, and in view of the meag amount of information regarding the character the ore deposits at Porcupine, $8 for these shares unwarranted.

The people interested in the Dome property have record of success behind them in the mining worl which should go a long way in reassuring one th the property has merit. If the statements regardi the developments of the Dome property are to be b lieved, according to the "Boston News Bureau," a orebody 600 feet long by 350 feet wide, having a average assay value of $10 per ton, has been opene up at the 40-foot level. An orebody of these dime sions would contain 600,000 tons for every 40 fe vertical in depth. At the present time a 40-stamp m is being erected on the property, which may be e pected to crush about 75,000 tons per annum. In oth words, the 600,000 tons stated to exist above the 4 foot level will take about eight years to mine. Di mond drill holes are stated to have proved the co tinuation of values at considerable depth. An anal sis of this situation leads to the inevitable conclusi that an orebody of such dimensions and value wou be attacked in an entirely different manner, conside ing the experience and financial ability of the owne

We have yet to learn that a mine valuer of stan ing had made a report giving values which may used by the public as a gauge of the merit of the pr perties reported on. It is likely that the astute peop ple who are interested in the Dome and Timmins pr perties are fairly well convinced that they have pr perties of merit, and they most certainly expect make either out of the share market or the min

But this is a long way from proving that everyone of any of the other extremely numerous outcrops of the camp will prove of value; and a warning signal should be hoisted as a guide to the investing public that they must be careful lest they be bitten by the numerous flotations which are sure to come, and which will be placed before them in an attractive form inviting them to participate in the enormous wealth supposed to exist in Porcupine.

The history of gold mining in Eastern Canada has been one of uniform financial failure; and if for no other reason caution should be exercised regarding the Porcupine field until developments have reached such a stage as to indicate with absolute certainty the possibilities of the district, not only superficially but in depth. Lenticular bodies of quartz showing gold do not necessarily make paying mines

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PRODUCTION OF LEAD IN 1910

(In tons of 2,000 lbs.)

By C. E. SIEBENTHAL.

Advance Statement of U. S. Geological Survey.

	1909	1910	P.c. increase
Production of primary refined lead	448,112	470,380	5.0
Primary lead available for consumption	370,013	376,021	1.6

SMELTER PRODUCTION.

The refined-lead product cannot be apportioned according to source of ore, owing to the fact that lead refiners treat smelted products whose origin may, as in custom refining, be unknown to them, the identity of the ore, and thus its original source, being preserved only as far as the smelter. Accordingly, the following table, showing source of lead smelted or refined in the United States, is based on smelter figures. It includes "pig lead" reported by all smelters using Mississippi Valley soft lead ores and "lead" produced at all other lead smelters in this country. The greater part of the product reported by smelters operated in conjunction with refineries is in terms of refined lead. A like part of the antimonial lead product is thus eliminated from the lead produced and appears only in the figures of production of antimonial lead. No lead ore from the United States was treated elsewhere during the period covered by the table.

Source of Primary Lead Smelted or Refined.

	1907	1908	1909	1910
Domestic ore—				
Alaska	.....	3	60	60
Arizona	2,340	1,464	1,465	858
Arkansas	15	.....	14	.....
California	854	515	937	1,160
Colorado	48,876	28,728	29,326	35,685
Georgia	2	.....	.....	.....
Idaho	112,569	98,464	97,183	99,924
Illinois	498	363	273	262
Iowa	225	110	15	.....
Kansas	1,798	2,293	2,764	1,308
Kentucky	75	.....	.....	50
Missouri	122,856	122,451	142,650	161,659
Montana	2,035	2,320	1,376	1,790
Nevada	3,380	3,796	4,698	2,195
New Hampshire	.....	.....	5	.....
New Mexico	1,927	586	1,275	1,731
Oklahoma	404	1,409	2,268	1,805
Oregon	.....	7	6	.....
South Dakota	.....	13	.....	7
Tennessee	16	.....	.....	.....
Texas	10	42	42	33
Utah	61,699	42,455	64,534	57,081
Virginia	82	13	.....	87
Washington	281	391	115	311
Wisconsin	3,551	4,013	3,238	3,884
Undistributed	355	36	303	288
Zinc residues	1,318	1,290	1,641	2,049
Total from domestic ore	365,166	310,762	354,188	372,227
Foreign ore—				
Africa	323	.....	3,227	3,499
Canada	5,793	341	71	44
Central America	.....	12	25	7
England	.....	.....	.....	28
Mexico	36,749	38,729	69,100	70,159
South America	911	1,186	1,574	3,168
Other foreign	149	4	38	.....
Foreign base bullion—				
Canada	.....	.....	1,816	.....
Mexico	32,924	57,489	27,006	31,648
Total from foreign ore and base bullion	76,849	97,761	102,857	108,553
Grand total, derived from all sources	442,015	408,523	457,045	480,780

REFINED PRIMARY LEAD.

The following statement of the production of refined primary lead embraces all desilverized lead produced at works in this country, and the pig lead recovered from Mississippi Valley soft lead ores. The pig lead derived from Mississippi Valley ores and desilverized is shown separately. The antimonial lead reported by refineries is also given below. The original source of the ore and bullion affording this refined product is shown in detail in the accompanying table under "Source."

Production of Refined Primary Lead.

	1907	1908	1909	1910
Desilverized lead	284,432	265,564	296,891	301,223
Soft lead	99,948	101,013	118,801	139,318
Desilverized soft lead	29,809	29,856	32,420	29,839
Total production of refined primary lead	414,189	396,433	448,112	470,380

Production of antimonial lead	9,910	13,629	12,896	14,069

PRODUCTION OF SECONDARY LEAD.

Pig lead	9,990	7,840	17,872	a27,354
Lead in alloys	15,508	10,443	33,040	a24,533
Total recovered lead ...	25,498	18,283	50,912	a51,887

CONSUMPTION.

In the following table "lead" includes all kinds—lead in ore, base bullion, pigs, bars, and old. The figures of domestic production are based upon returns by the smelters: all other figures are from the records of the Bureau of Statisties. Decrease by liquidation covers losses in smelting and refining in bond and other corrections. Warehouse stocks of bonded lead of foreign origin are given, but it has been found impossible to obtain at this time complete figures of domestic stocks. For this reason the result given below is "lead available for consumption." The "apparent consumption" of previous reports would be this quantity increased or diminished by the increase or decrease of domestic stocks during the year.

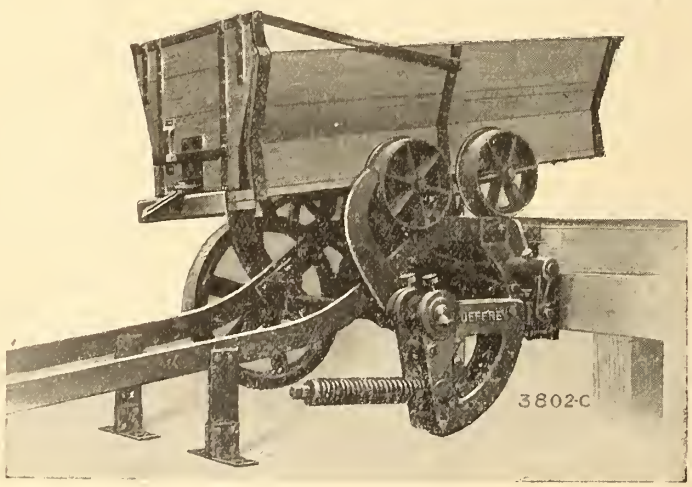
Consumption of Primary Lead.

Supply:	1907	1908	1909	1910
Stock in bonded warehouses, Jan. 1	5,756	12,944	18,565	17,405
Imports—				
For consumption	15,246	9,805	18,036	15,359
For warehouse	64,569	102,241	96,145	93,249
Production from domestic ores	365,166	510,762	354,188	372,227
Total supply	450,737	435,752	486,934	498,240
Withdrawn:				
Exports of foreign lead:				
From warehouse	51,447	76,857	86,077	69,786
In manufactures, with benefit of drawback.	8,268	9,254	4,796	8,800
Decrease by liquidation.	4,578	13,425	8,643	7,661
Stock in bonded warehouses, Dec. 31	12,944	18,565	17,405	35,979
Total withdrawn	77,237	118,101	116,921	122,219
Available for consumption	373,500	317,651	370,013	376,021

aSubject to revision.

JEFFREY-GRIFFITH DUMP

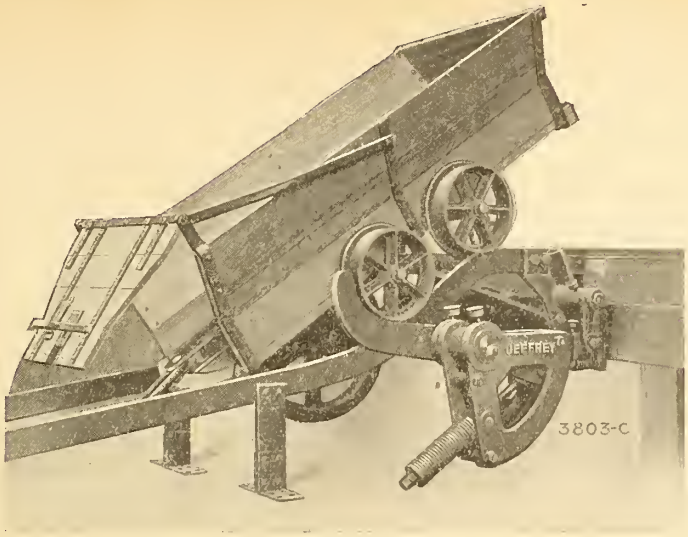
The Jeffrey-Griffith Patented Dump shown herewithillustrated in fig. 1, the jar being absorbed by th is one which has recently been developed As a cross-spring. over car dump, it possesses features which make the dumping or flow of the coal almost continuous in its Automatically the car assumes the dumping positio movement over the dump. No. 2, which is almost simultaneous with posi



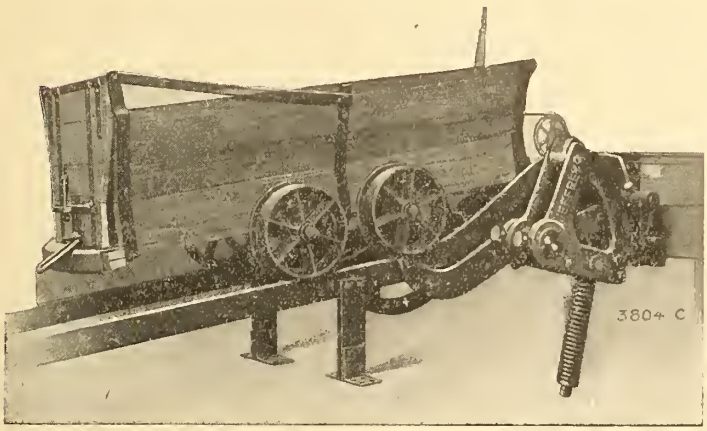
Entering.

This dump eonsists of two continuous rails to which are attached substantial horns, securely fastened to a heavy shaft; this shaft has a bell erank and quadrant with spring deviee seeurely attached to the one end, while at the other end is located a brake wheel and lever deviee for releasing the car after discharging its eoal. In operation, the cars pass over the knuckle as tion No. 1.

After the eoal is discharged, the ear is released b means of a lever (the only work of the operator) which allows it to pass over the track as in illustra tion No. 3 by depressing the horns whieh automaticall resume position for the next ear. This is done b means of the spring, whieh is of suffieient strength t



Dumping



Releasing.

the horns into the receiving position together with the rotating action of quadrant by gravity.

Te cars may be discharged over this dump per min- ute) that its capacity is only limited by the activity o" te man required in its operation. Its continuous rails make stoppage of operation due to derailment of cars n impossibility and also insure less breakage of coal nd less wear and tear on cars; its simplicity of desi n. operation and capacity, make it most desir- able or large as well as small mines. Its large dump- ing pacity is due to the quick and continuous action of the dump, shorter movement of the cars and the increased safety in bringing loaded cars close to the dumping position.

This is the only dump where the car maintains continuously its natural position throughout the operation. There is no break of hinge in the tracks to cause derailment of cars and blocking of the coal consequent thereto. As this dump occupies less space than other cross-dumps, the cost of the tipple building to house same is correspondingly reduced; less help is required because of simplicity and ease of control.

JAPANESE STEEL.

Th Government-supported steel industry of Japan, upon which $15,000,000 has already been expended, is calling for $6,000,000 additional to put it in a sound posi on. The works, situated at Wakamatsu, were take over by the Government in 1900. Large annual defic s have been recorded since then. In 1910 the de- fi it was $250,000. About 9,000 men are employed at the orks and collieries. Three blast-furnaces, each of 1 tons daily capacity; two 10-ton acid Bessemer conv rters, 11 basic Siemens-Martin furnaces, 25 tons each one crucible-steel plant; 13 rolling mills, etc., mak up the plant. The iron ore used is imported from Korea. It contains from 50 to 60 per cent. metal- he in n.

CARBORUNDUM.

Carborundum, the artificial abrasive, is manufactured by fusing a mixture of pure granulated coke, pure glass sand, and sawdust. Residnal coke from the distillation of petroleum is used. Sawdust is added to make the mixture porous and to prevent decrepitation due to the explosions of carbon monoxide produced during the reaction. The reaction between the sand and the coke produces carbide of silicon, or carborundum. The Carborundum Company, Niagara Falls, N.Y., uses 10,000 electric h.p. continuously. The carborundum crystals are crushed under manganese rollers and the crushed product is treated in a bath of sulphuric acid to dissolve the particles of steel that have been cut from the rolls. This treatment has been more effective than cleaning by magnetic separation.

SPECIAL CORRESPONDENCE

ONTARIO.

Porcupine.

Unless immediate steps are taken there will be a very serious epidemic of typhoid in Porcupine this summer. There is at present no water in any of the settlements except from wells, and, as analysis has shown, many of these have been contaminated. Golden City, the site that the Government sold, has good water in Bobbs Lake and arrangements should at once be made to pipe it over, the Government contributing. In the meantime, the sanitary inspectors are doing all they can to prevent the accumulation of refuse and are compelling the carting away and burning of all refuse, but without pure water these precautions are not likely to prove effective against an epidemic. Pipes are being laid from South Porcupine to Porcupine River for a temporary supply of water. With the promise that Porcupine now has of permanency, no time should be lost in obtaining water from the Matagami River. The Hollinger gold mine, a certain centre of mining activity, is within two miles, and there will be camps strewn all along the seven miles into South Porcupine.

West Dome Formerly Foster, Ferrodolomite

According to recent discoveries on the Hollinger, the other veins parallel to the one developed are likely to prove up well. Two crosscuts have been run from the 100-foot level of the main vein and in both places where a parallel vein has been cut the ore body has been found to be both large and quite as rich as on the developed lead. Good results are announced from the 200-foot level also.

Owing to the very late spring much machinery and supplies that would otherwise certainly not have reached Porcupine till after breakup have been taken over the winter road and will be installed and working before they c have been taken in under last year's conditions. There sh not be more than two months between the final breaku the winter trails and the running of the first train over T. & N. O. line.

The property of the Haileybury Silver Mining Compan the Township of Deloro has been sold to M. T. Rowland Arizona, for a company. Work will commence right away

It is stated that the option on the Ross veteran propert the east side of Porcupine Lake has been given up. A siderable amount of diamond drilling was done on this perty to test it up by an English company.

Work on the Imperial Gold Mining Company's propert Porcupine has been resumed after a month's cessation, w the plant was being installed. The main shaft has been 50 feet and the first work will be to crosscut to the vein. velopment work on the Apex Porcupine gold mines, near West Dome, has been commenced. Stripping will be conti and test pits sunk on the veins until machinery can be bro in.

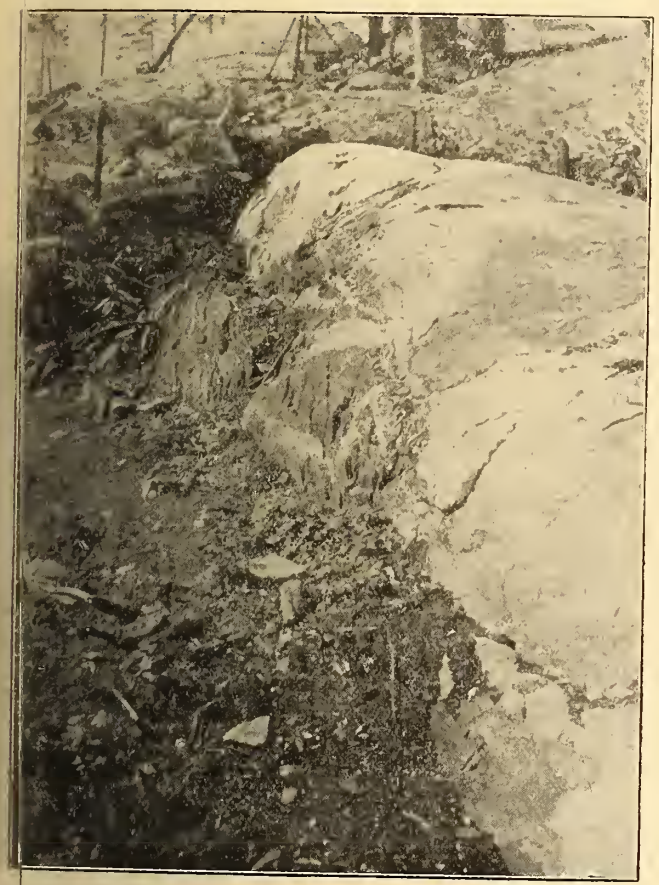
Several finds of free gold have been made recently in frey Township, near the west boundary. The latest what is known as the Futunda syndicate of Montreal, specks of gold have been found in the quartz at a dep six feet.

While there is not a single shaft sunk yet on any o hundreds of claims staked in the Keekeek country, 60 northeast of Haileybury, and little prospecting done, ther very considerable amount of interest. Several pioneer cluding Sam Le Roy, have good assays from wide vei

artz, and there is no question but that there will be much ivity between the Quinze and the Transcontinental during summer. The mining laws of Quebec have been so amended t it is much easier now for prospectors. The manager of the eat Lakes Dredging Company at Port Arthur is now work- the James claims with a good force of men. Last summer staker, Thomas James, opened up some very pretty free gold showings in a narrow vein.

Following a find of free gold to the west of Fort Matche- wn, on the Montreal River, a considerable amount of stak- has ensued. Isolated prospectors have been finding gold in this section for years, but it was not until Porcupine showed a endency to make good that much attention was paid to it.

With the Terry shot drill the veins on the Dobie and the Ea properties have been cut recently. The Rea ore taken fm 200 feet looks very promising, and the greater part of



Quartz Mass on the Dome.

th payments have now been made. On the Dobie, the drill na just entered the vein and the result is said to be satis- fa tory to the owners.

he West Dome, being developed under the direction of Mr. Wiss, has also found its vein at depth. The cores in this an ance are considered quite satisfactory.

Cobalt, Elk Lake, Gowganda, and Other Silver Fields.

he Nipissing is now operating a mill on its own property fo the reduction of its high grade ore. To date it has pro- du ed from the amalgamating and cyanide process specially ad pted to Cobalt ores by Mr. Chas. Butters and Professor Chenger, 307,690 ounces, and is getting an extraction of sc ething like 98 per cent. from 2,000-ounce ore and upwards. Experiment is now being made to see if the process cannot be ad pted to the treatment of low grade ores.

t Elk Lake, the Beacon Consolidated Mines is now install- in a plant. The company has the Cleaves claims and has a sh ft sunk 70 feet.

The March production of the Nipissing was of an estimated value of $185,332, while ore shipped amounted to $90,400. The Nipissing has produced to date $571,750, and has shipped $421,257 for the first quarter of 1911. This came from 1,260.50 tons, and ounces contained were 1,089,106.

The Crown Reserve has just declared the usual monthly dividend of 5 per cent., payable May 15. The statement shows an increase in the surplus, which now reads over $698,000. The Crown Reserve has now paid over $3,006,981, or 150 per cent., in dividends in May.

The Temiskaming Mining Company showed a surplus of $377,165 in its quarterly statement just before the 3 per cent. dividend was paid. This will amount to $70,000. Excellent ore is being raised at this date from the 575-foot level of the mine.

The Beaver has now entered the field of Cobalt dividend-payers, at the last meeting in Toronto declaring for a disbursement of 2½ per cent. on $2,000,000. The mill building project has been allowed to lapse until more ore has been blocked out.

At a meeting of the Temiskaming Mine Managers' Association, Mr. E. T. Corkill, Provincial Mines Inspector, was presented with a handsome chest of silver. Mr. Corkill has been identified with the camp ever since it was a camp, and has always been popular.

The Badger and the Bailey have entered the shipping list during the month. The Badger has not made a shipment previously; the Bailey not for some years in its own name.

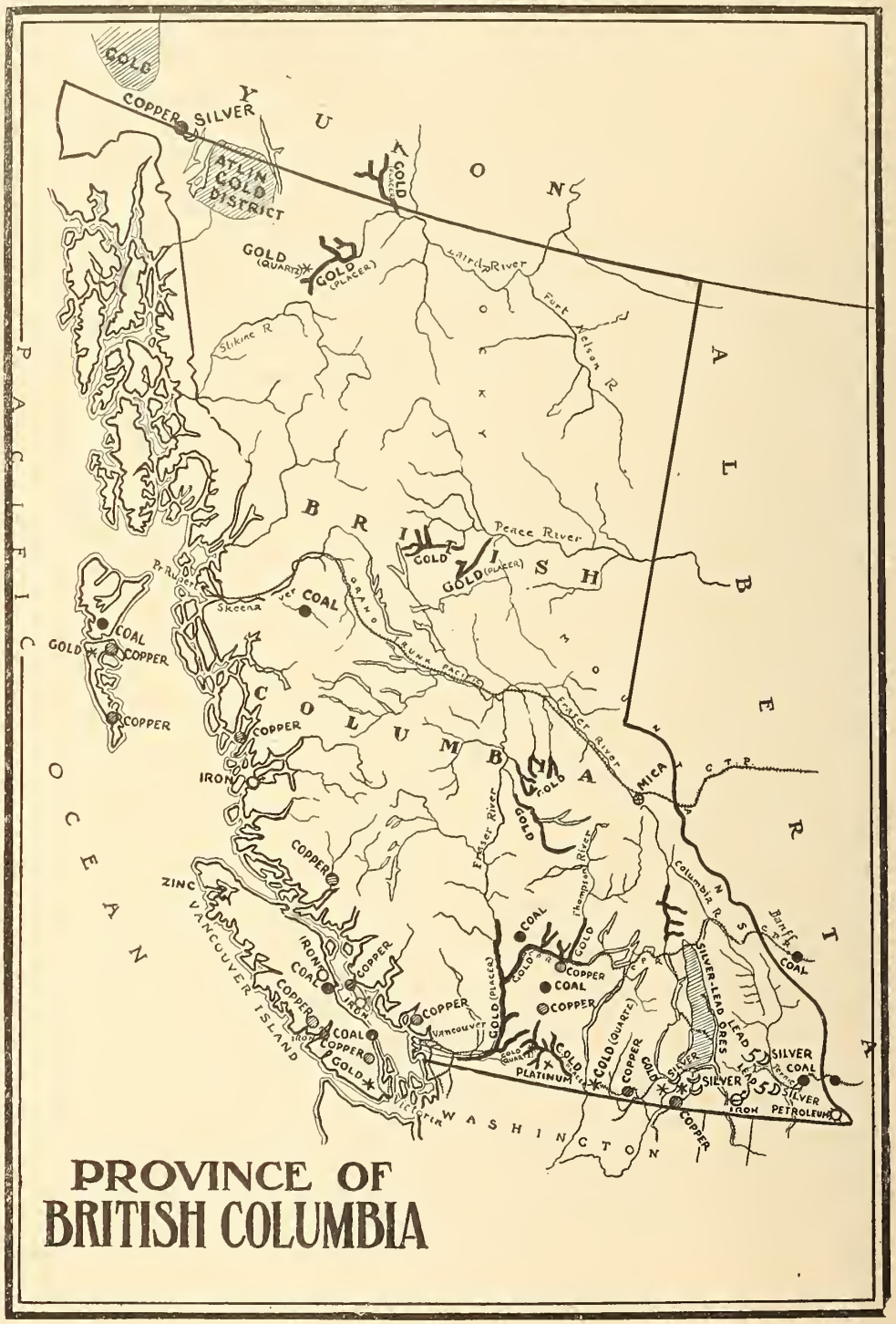
An overheated stove in the office of the Green Meehan mine set that building ablaze and it was burnt to the ground. It is isolated, and no damage was done to the rest of the property.

BRITISH COLUMBIA.

Reports from the placer gold mining districts of the province continue to show a general expectation of a larger recovery of gold this year than last, consequent upon there having been a heavier snowfall in the winter of 1910-1911 than in that of 1909-1910. In some of the placer mining districts much will depend upon the weather of late spring and early summer. If warm weather shall come early and cause a speedy melting of the snow, the gravel-washing season will not be nearly so long as under weather conditions favourable to a gradual exhaustion of the water supply extending well into the autumn. The hydraulic miners who operate on an extensive scale are prepared to move a considerably larger quantity of gravel than in recent years, besides which two or three hydraulic leases will be worked that have not been among those that have contributed to the production of the last few years if of any at all. There are several new mines in the Cariboo and East Kootenay, both of which districts may be expected to recover more placer gold during the ensuing season than for some time past.

The lode mining industry may also be expected to show a larger total of production this year, if there shall not be any serious interruption in mining and smelting as a result of labour difficulties in the Crow's Nest regions of southeastern British Columbia and southwestern Alberta. So far as lode gold, from stamp milling, is concerned, there should be a substantial increase in production, for the capacity of the Hedley Gold Mining Company's 40-stamp mill at Hedley, Similkameen, has been increased and auxiliary steam power, for use when the water power is not available, has been provided, so that it is likely the year's total tonnage of ore put through the mill will be larger by 5,000 to 10,000 tons, in which case the value of the production from this property will be greater by between 60,000 and $120,000. In Nelson mining division, too, an appreciably large increase may be looked for, both from mines within a few miles of the city of Nelson and those in Ymir and Sheep Creek camps. Much of the lode gold re-

covered each year in the provinces is from ores that are smelted, so the returns from these will materially affect the year's production of this metal. An early agreement between coal mine operators and their employees and a resumption of coal mining and coke-making without much delay will prevent a cessation of smelting at the copper reduction works. Most of the copper ores smelted in the province contain more or



less gold and silver in association with copper, so that the production of all three metals is smaller when the smelteries have to be closed for two or three months of the year. However, there is still room for hope that suspension of smelting operations will be avoided, so it is yet early to anticipate lessened production on this account. As a partial set-off to possible loss from the Kootenay and Boundary districts, there is reason to look for a larger production of copper ores in the Coast district this year than last, for the outlook for the Britannia mine, on Howe Sound, is reported to be brighter while an increased output from Texada gold-copper mines is expected, consequent on the Tyee Copper Company having leased the Van Anda group there and undertaken development work that will probably result in a return to old-time productiveness of the Cornell and Copper Queen mines, at Van Anda. Meanwhile the Marble Bay mine, in the same locality, continues to steadily produce a fair tonnage of ore of good grade, with promise of maintaining its output for a long while. Two or three mines higher up the British Columbia coast should be productive this year, and so add to the total tonnage of the Coast district as to make it higher than that for last year.

The quantity of ore mined in British Columbia for its silver

nt only is not considerable, that containing both lead ilver being far larger. Both these metals should be pro- in greater bulk this year from ores mined in Slocan t and, as compared with last year, from East Kootenay A small increase in silver and lead ores may be ex- l from Nelson mining division, and in less degree from nth belt of Rossland camp. Portland Canal will likely producing camp this year, and it is possible a little silver- ore may come from the Skeena district, occurrences there es containing silver and lead having been tested with raging results. Reverting to the Slocan district—the pects for at least half a dozen producing mines here are edly promising. The Rambler-Cariboo is prominent the mines of the district. The Kaslo "Kootenaian" published the following information: "Superintendent y, in his monthly report to the directors of the Rambler- bo Company, states that he has suspended shipment of til such time as the road shall again become passable for ons, and as a consequence he is devoting all his energy elopment work. In only one heading is he working in hat is the drift on the 1,050-foot level, where he still s handsome a face of ore as ever was seen in the mine. ore-bin and other convenient place of storage is now f ore. He is cross-cutting on the 900 foot level and ng on the 1,200-foot. The latter working has to be ex- l several hundred feet to reach the downward extension oreshoot already developed on the 700, 800, 900, and oot levels. As soon as he shall have sufficient power he egin work on the 1,450-foot level, which has to be pushed about the same distance as the 1,200-foot to reach the y. As the Rambler-Cariboo Company has received as- e that the Canadian Pacific Railway Company will build Three Forks a branch line to serve the Rambler-Cariboo ucky Jim mines as early as the weather will permit of y construction being undertaken, he is only awaiting the n survey of the line to begin work on a tramway from ver tunnel to the new site to which the concentrator will moved from its present location. The last smeltery re- received were those from two cars of Rambler-Cariboo ipped early in the month, which netted $2,087 and respectively."

ut Sandon and Cody there are Slocan mines that are ed to do better this year than last. While the Rich- Eureka group will probably maintain its excellent ore- g record, its near neighbour, the Slocan Star group, is tood to have mapped out for it a season's work that result in a larger output of ore than it has made for l years. The Ruth-Hope group, too, also near Sandon, arded as likely to do well this season. In the vicinity y, the Reco is reported to be again in ore containing a ilver value, the Noble Five group is stated to be in a n to resume production, and the Surprise may have its d new workings connected before the year shall close, ich event, with much improved ventilation to allow it done, stoping may be undertaken. The deep-level de- ent work done in the Surprise mine constitutes one of st important features of mining in the district during t two or three years. It has proved the occurrence of of ore down to a depth of 1,100 feet, and has also en- ed others to explore for ore at deeper levels than they reviously done. The Sunset is another Cody mine in development at depth has been in progress, and it is hoped that this will eventually result in a return of dividend paying days, so that mining in the Sunset may again be profitable.

From time to time information has been given concerning the several mines about Four-mile Creek, near Silverton, in which important developments have taken place and which have been proved to contain large bodies of ore. These are the Standard, Van Roi, and Hewitt-Lorna Doone groups. The showing of ore of shipping grade in the Standard has attracted much attention, for it is one of the largest ever opened in the Slocan. The Standard Silver Lead Mining Company, organized to acquire this property, has arranged to put in a 10-drill compressor plant, erect and equip a 100-ton concentrating mill, and construct an aerial tramway from the mine down to the mill site on Four-mile Creek, a distance of 8,400 feet. The compressor has been ordered from the Canadian Rand Company, together with a Pelton water-wheel, six Rand machine drills and accessories, and other plant. The Van Roi concentrator is reported to have been started in April; as much ore has been developed in the mine, the mill run should be continuous for quite a long time. The managing director of the Silverton Mines, Limited, owning the Hewitt-Lorna Doone group, is expected to arrive from England soon, and thereafter to decide whether or not to considerably increase the output of the Hewitt mine. The Enterprise and Eastmont, on Ten-mile Creek, have both been doing underground development, which is reported to have resulted encouragingly, so that these mines should be among the year's ore producers.

Ainsworth division has not made any considerable production of ore since, first, the closing of the Blue Bell mine early last year, and, next, the destruction by fire in the summer of 1910 of the Whitewater concentrator. Work has been continued on the Whitewater group, including the Deep. The Utica, situated between Whitewater and the south fork of Kaslo River, is stated to have an excellent showing of ore, to deal with which the erection of a concentrator is projected. Several mines in the vicinity of the town of Ainsworth are looking well and promise a larger production of ore this year. In the Lardeau, the recent finding of more ore has been reported from the Silver Cup, near Ferguson, and the outlook for the Beatrice, a silver-gold-lead property situated on the Fish River of one slope of the Lardeau mountain ranges, is regarded as good.

Coal mining is active in the Coast, Nicola, and Similkameen districts. At the time of writing little coal is being produced in the Crow's Nest district, for only one colliery has its men at work mining coal, namely that of the Corbin Coal & Coke Company, which has an agreement with the United Mine Workers of America covering a period to expire on May 8. If by that time no arrangement shall have been made for the operation of the other collieries of the district, the Corbin mine will have to stop producing, pending the completion of negotiations for a general resumption of work at all the collieries. Much might be written concerning the expansion of the coal mining industry of British Columbia, and the consequent increase in production of coal, but just now space restrictions prevent this being done. For the present, then, all that will be stated is that the industry certainly is being developed to an extent indicating a much larger annual production of coal as the years shall pass.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax—Prospecting for gold and tungsten is more active this spring than for some years. At Waverley, 13 miles from this city, the scheelite property that belongs to Mr. H. C. Borden and his associates, is showing up in a most promising manner.

fax county at least three gold mines have changed hands.

Port Hood—The collieries of the Port Hood Richmond Railway Coal Company are being again worked up to capacity. During the winter nothing but development work was done, and the mines were put in much better shape than before. The two steamers belonging to the company have been placed in commission and a very active summer is looked forward to.

ONTARIO.

Cobalt—The power siege in Cobalt is over. All the big mines taking air from the Cobalt Hydraulic Company are working full capacity again. The other company—the British Canadian Power Company, expects to start compressors next week.

Toronto, Ont., April 14—One of the officials of the T. & N. O Railway states that they have every expectation of handling freight and passengers to Porcupine before July 1. But they could hardly see their way to giving in the meantime partial service by rail to Frederickhouse River and thence by launch on the river. By the 18th they will have the steel to the river, ten miles from the main line. There will be 10 miles of navigation from where the steel crosses the Frederickhouse on the way to the gold camp.

Porcupine, Ont., April 18.—In the crosscut from the main vein at the 100-foot level of Hollinger another vein now shows in the face. It is 6-foot wide of quartz. This crosscut is near No. 1 shaft, and about 100 feet away from the other crosscut tapping the same vein.

ALBERTA.

Frank, Alta., April 14.—At the meeting of the Executive Board of District 18, United Mine Workers of America, held here yesterday, that body decided to comply with the request of the Minister of Labour that they apply for a board of conciliation, and after sending a short wire to the department stating that they had decided to do so, they followed it up with an application at length, which was filed late this afternoon, and a copy given J. D. McNiven, Fair Wage Officer.

The official telegram is as follows:

"Hon. W. L. MacKenzie King, Minister of Labour, Ottawa —Without prejudice to our case in any way, and acting in accordance with your apparent desire to have the machinery set in motion at the earliest possible moment, to establish a board under the Industrial Disputes Investigation Act of 1907 to investigate matters in connection with the failure to renew the agreement between the Western Coal Operators' Association and District 18, United Mine Workers of America, we hereby make application for such board to be established. While believing that at all times we have acted strictly in accordance with the laws of the Dominion, we realize that it is the desire of the Government to have this matter thoroughly investigated and we are desirous of extending co-operation to this end, as we firmly believe that there can be no permanent peace in the mining industry of this country until the wage questions are settled on a basis of equality."

The parties to the dispute are the Western Coal Operators' Association, composed of the following companies: The Crow's Nest Pass Coal Company, Hosmer Mines, Limited; Corbin Coal & Coke Company; International Coal & Coke Company; Western Canadian Collieries; Canadian Consolidated; Hillcrest Collieries, Limited; Leitch Collieries, Limited; Alberta Railway & Irrigation, Limited; H. W. McNeill & Company, Limited; Bankhead Mines, Limited; and District 18 of the United Mine Workers of America, representing the organized employees of the aforementioned companies to the number of about 6,000, who ceased work at the expiration of the agreement of March 21, 1911.

"The United Mine Workers of America are contending for substantial increase in wages and the elimination of irregularities that exist in contract rates, day wages, scale, hours of labour, and general conditions. The attempts to arrive at settlement are embodied in the minutes of the joint conference that was held in Calgary during March last and which will be attached to the formal application. If it will be acceptable to the department, we will set forth our claims in full, together with formal applications as soon as it is possible to do this, and forward copies to the other party as well as to the department. The name of the person suggested by ourselves as representative is Mr. A. J. Carter, of Fernie, B.C.

"(Signed)—W. B. Powell, President; C. Stubbs, Vice-President; A. J. Carter, Secretary; J. E. Smith, J. D. Jones, McNabb, W. Lees, members of the Executive Board of District 18, U.M.W. of A."

All the members of the Executive Board were present, and the decision was unanimous. Mr. McNiven has with him the necessary forms for filling in names and dates, so that the mine workers, having named Mr. Carter as their representative on the Board, it remains for the operators to act quickly in making their choice so that no more time is lost in getting the Board to work.

Satisfaction is expressed in all quarters at the action of the mine workers to-day.

Vice-President Stubbs stated that in taking this step they were actuated merely by a desire to have the disputed questions between the operators and miners permanently settled. Had the operators in making their offer of arbitration, acted upon an open fair basis at Calgary, the miners would gladly have accepted. That not having been the case, they had relied on the Minister of Labour in his request for an application for a Conciliation Board, which gave both sides an equal chance in the choosing of a board.

BRITISH COLUMBIA.

Phoenix, April 14.—Although the strike in the Crow's Nest Pass coal mines, if prolonged, may cause a cessation of operations with the Granby Company, such an occurrence is not looked for, according to F. M. Sylvester, assistant to General Manager Jay P. Graves.

The Granby Company has sufficient coke on hand to keep the entire battery of furnaces at the smelter in operation for about six weeks, or by running five furnaces, operations could be continued till the middle of June.

The coke consumed represents about half the smelting of Granby ore, so that the freight charges on coke from more distant collieries prohibits the consideration of such a move at the present price of copper.

Asked concerning the Hidden Creek mine, Mr. Sylvester stated the development work continues with gratifying results and it is altogether probable that the Granby will exercise its option which expires in the course of a few months.

The Granby is also looking for the development of a valuable producer in the claims recently bonded on Copper Mountain, at Chesaw, which are now being explored with the diamond drill. The ore is largely copper and iron, and the property will be convenient to the company's smelter.

At the Cliff mine, Rossland, the Granby has a force of 35 men at work, and it is expected regular shipments will be commenced during the summer.

Nelson, B.C., April 17.—It is reported that J. T. Hillis and Dr. A. R. Baker have purchased a controlling interest in the famous Nugget mine, in Sheep Creek, and that new management will install a cyanide plant and stamp mill.

COMPANY NOTES

Abstract of General Manager's Report, Nipissing Mines Co.

April 1, 1911.

David Fasken, President, Nipissing Mining Co., Ltd.,
Toronto, Ont.

Dear Sir,—I beg to submit report of operations for the year ending December 31, 1910.

Shipments in 1910.

	Dry Tons	Gross Ounces Silver	Net Value
High Grade Ore	1531.792	3,999,580.48	$2,018,152.21
Low Grade Silicious Ore	4834.3315	1,008,357.79	427,069.68
Concentrates	319.12	296,490.55	145,805.27
Nuggets	13.6865	293,349.79	151,294.07
Total	6698.93	5,597,778.61	$2,742,321.23

Average Assay of Shipments.

	Oz. Silver Per Ton.	Cobalt.	Nickel.
High Grade Ore	2611.04	9.35 p.c.	6.72 p.c.
Low Grade Silicious Ore	208.58		
Concentrates	929.08	6.46 p.c.	2.68 p.c.
Nuggets	21433.51		
Average of total	835.62		

Summary of Shipments, 1910.

Dry tons shipped	6698.93
Gross Ounces Silver Contained	5,597,778.61
Gross Silver Value	$2,991,891.09
Average Price received per oz. cents.	53.447
Cobalt paid for—pounds	167,532.
Received from sales of Cobalt	$ 16,109.89
Gross Silver Value plus Cobalt paid for	3,008,000.98
Smelter Deduction, Treatment and Freight	265,679.75
Net Value received from Ore Sales	$2,742,321.23

Cost of Producing Silver.

Based on production of 6717.26 tons containing 5,548,651.91 oz.

		Per Ton Shipping Ore.	Per Oz. Silver
Mine Operation—			
Trenching	$ 23,385.75		
Development and Exploration	185,370.32		
Shaping	85,388.41		
Ore Sorting and Loading	27,944.13		
Jigging	1,340.76		
Sampling Shipments	15,641.83		
Assaying and Engineering	8,777.06		
Administration and Office	20,143.64		
Boarding House and Camp Maintenance	21,457.65		
Insurance and Taxes	82,111.74		
General and Legal Expense	20,662.76		
	$492,224.05	$ 73.28	$.0887
Concentration	45,872.95	6.83	.0083
Depreciation	32,325.22	4.81	.0058
Marketing Ore	279,169.61	41.56	.0503
Corporation, New York Office and Travelling Expense	20,057.71	2.98	.0036
	$869,649.54	$129.46	$.1567
Less Rents and Interest	52,668.85	7.84	.0095
Net Cost of Production	$816,980.69	$121.62	$.1472

Marketing Expense on Production.

Gross Value Silver plus Cobalt paid for		$2,984,084.19
Value of smelter deduction on silver	$130,268.26	
Treatment charges	67,301.49	
Freight	67,122.42	
		264,692.17
Net Received from Ore Sales		$2,719,392.02
Assayers, Metallurgists, Smelter Representatives, Ore Insurance, etc.	11,277.42	
Commission to European Agent	3,200.02	
	$279,169.61	

Profit on Production.

Gross Value of Ore produced	$2,984,084.19
Total cost of production	816,980.69
Profit on production	$2,167,103.50

Total Shipments to December 31, 1910.

	Dry-Weight, Lbs.	Gross Ozs. Silver.	Net Val. Rec'd from Smelters.
1904	124,659	32.13	$ 23,887.52
1905	939,373	753,153.90	471,666.61
1906	4,019,494	2,214,821.60	1,421,655.54
1907	4,804,426	2,239,551.89	1,234,492.35
1908	7,009,998	2,893,031.44	1,364,478.03
1909	12,825,169	4,646,869.21	2,180,407.02
1910	13,397,860	5,597,778.61	2,742,321.23
	43,120,979	18,345,238.78	$9,438,908.30

Dividends Paid.

	By Nipissing Mining Co. Ltd.	By Nipissing Mines Co.
1905 To Syndicate	$ 300,000	
1906 To Syndicate	100,000	
To Nipissing Mines Co.	500,000	$ 480,000
1907 To Nipissing Mines Co.	880,000	840,000
1908 To Nipissing Mines Co	740,000	720,000
1909 To Nipissing Mines Co.	1,370,000	1,350,000
1910 To Nipissing Mines Co.	2,122,500	2,100,000
	$6,012,500	$5,490,000

Development.

The usual amount of development and exploration was done through eight shafts and two tunnels. Two new shafts, No. 127 and No. 141, were sunk to explore veins in the Keewatin.

The former is in the northeast corner of the main property near the O'Brien; the latter is near the Gillies Limit in the extreme southwestern corner. The developments have not been very favourable in either.

The work was distributed as follows:—

Drifting	feet	4,480
Crosscutting	feet	1,913
Raising	feet	1,054
Sinking	feet	567
Total	feet	8,014
Stoping	cubic yards	9,810

Surface Prospecting.

The trenching gang worked six and a half months during the season of 1910. An average of 61 men dug 31.7 miles of trenches to an average depth of 2.7 feet. The work was confined largely to the central area which had already been prospected.

Three veins were found in the conglomerate and eleven veins in the Keewatin. No. 134 to No. 147 inclusive.)

The most important of these is vein No. 141, which is now being developed by a shaft; other veins that were worked are No. 143 and No. 145.

In addition to trenching, some prospecting was done by an hydraulic jet.

A small centrifugal pump already on the property was put in operation as an experiment and the bedrock was washed clean over an area of several acres.

The results showed that it would be feasible to operate such a plant on a large scale, so that during the coming season a turbine pump capable of delivering 4,800 gallons of water per minute, under a head of 415 feet, will be installed. It will be run by a 700 h.p. motor.

Present Surface Condition.

	Total Acres.	Partly Prospected.	Unprospected.
Conglomerate	429	306	123
Keewatin	176	166	10
Diabase	241	16	225
Total	846	488	358

Concentration.

The custom plant of the Nipissing Reduction Company, Limited, has continued to treat the low grade ores of vein 63 with the following results covering the period from December 31, 1909, to December 31, 1910:

Dry weight concentrates tons	13,537.4805
Silver contents ore ounces	400,479.63
Average assay ore ounces per ton	29.58
Weight concentrates produced dry tons	326.431
Silver contents concentrates ounces	314,105.80
Average assay concentrates ounces per ton	962.
Net value of concentrates	$153,893.55
Profit of Nipissing Mining Company	$108,020.60

Jigging Plant.

A change has been made in the marketing of the low grade silicious ores, a large tonnage of which has heretofore been sent to the smelters.

The run-of-mine is hand-sorted on picking tables fitted with a one-inch or larger screen; the undersize, which was formerly shipped, goes to a small jigging plant where it is classified and jigged, the tailing going to the custom concentrator. The slime and very fine sand are shipped to the smelters, as it was found uneconomical to concentrate them, but this product constitutes only about 10 per cent. of the whole.

Reduction of High Grade Ores.

A small plant has recently been erected at the mine, to test on a working scale, a process originated by Mr. Charles Butters for the treatment of high grade Cobalt ores.

It has been the earnest desire of the company to find a method by which the silver in the first class ore could be extracted economically and shipped as bullion without going to the considerable expense of erecting the usual smelting plant. To this end, a great many processes have been investigated and some have been tried on a small scale

The results so far in the new plant have been most encouraging; bullion is now being shipped and it is confidently believed that the undertaking will be a success.

Ore Reserves.

The following estimates of developed and partly developed ore include high grade ore only; the large tonnage of mill rock on the dumps and in the mines is not covered by the estimates:

	Oz. Silver.	Gross value at 50c. per oz.
Vein 63	762,250	$ 381,125
" 64	924,080	462,040
" 73	2,127,850	1,063,925
" 80	1,384,100	692,050
" 86	40,000	20,000
" 100	723.600	361,800
" 122	591,000	295,500
	6,552.880	$3,276,440

Results of the Year.

The results for the past year have been most gratifyin both production and profits have exceeded those for any sir lar previous period. Notwithstanding a production of ov five and a half million ounces of silver, enough additional was developed during the year to fully replace the lar output.

The cost of producing silver was reduced from 16.39 ce to 14.71 cents per ounce.

Silver was sold for an average of 53.447 cents per oun compared with 51.547 cents in 1909.

The net profit after deducting expenses of every kind $2,167,103.50; this is 72.6 per cent. of the gross value of ore produced.

Very truly yours,
R. B. WATSON,
General Manag

In its annual report shortly to be issued, the Nipiss Mining Company will announce that a process has been fected whereby all high-grade ore from Nipissing and La R will be reduced to bullion in a plant which has been erec and has already produced 300,000 ounces in silver bars year. The process will be modified to treat low grade ore.

ONTARIO GOLD FIELDS DEVELOPMENT COMPANY

It has been announced by cable that the Northern Ont Exploration Company has incorporated a new developm company for the purpose of dealing with its interests in Porcupine district. The new company is registered under name of the Ontario Gold Fields Development Company, wit capital of $3,000,000, in 600,000 shares of $5 each. The i provides for a working capital of approximately $450,000 addition to the plant and machinery laid down during the two months by the Northern Ontario Company, estimated $50,000. This will give them, at the disposal of the comp half a million dollars.

The directors are: Cyrill Wanklyn, chairman; W. B. Law Johnstone, Hon. Frederick Carson, Charles Algernon More David Richards, managing director of the Northern Ont Exploration Company; D. A. Dunlap, of Toronto; and Cha Hart, of Montreal. The latter two represent the Timm McMartin group.

The Canadian public will have the advantage of a dent committee in Canada comprised of Noah A. Timm president of the Hollinger Gold Mines; Hy. L. Timmins, John McMartin. Messrs. Bewick, Moreing & Company become the general managers. The bankers in London wi Messrs. Robert Lubbock & Company, and in Canada, the adian Bank of Commerce. The secretary and officers wi located at 20 Copthal Avenue, London.

Mr. Lovell, who will be the technical manager, reside Canada, will arrive in the course of the week.

REA CONSOLIDATED.

At a meeting of the Rea Consolidated Gold Mines, ited, the following board of directors was elected: Charl Hill, president Hillcrest Collieries, president; Directors

Butler, vice-president and general manager Canada Car & adry Company; D. Richards, of London, Eng., Canadian esentative of Bewick, Moreing & Company; Thomas H. of Chicago; Henry Lockhart, Jr., New York, manager es Finance Company; John B. Holden, barrister, is acting etary as well as director; L. C. Thompson, Montreal. The tal is $1,000,000, in 200,000 shares of $5 par value. 20,000 es are held in the treasury, and $100,000 in cash. The com- has 321 acres in Tisdale. Up to April 6th, $70,000 has expended in working and equipping the property. The d of directors have entered into a contract with Bewick- eing & Company, to act as managers of this property. e blocks of stock are owned by a Montreal syndicate, Mines Finance Company, and the Consolidated Gold Fields outh Africa.

CONIAGAS DIVIDEND.

niagas directors have declared a quarterly dividend of 6 per cent., and an additional bonus of 3 per cent., payable on the 1st day of May, 1911. This is the same as the last previous payment in January.

DOBIE MINING COMPANY.

The Board of the Dobie Mining Company is as follows: Frank C. Armstrong, president; E. P. Earle, vice-president; D. Lorne McGibbon, Hon. Wallace Nesbitt, and Samuel Dobie, directors. The authorized capital is 300,000 shares of $5 par value; 60,000 shares are held in the treasury. The Dobie Mining Company will start operations with $100,000 cash and 60,000 shares of stock in the treasury. Of the 240,000 shares, 220,000 shares were given to the owners in payment of the property; 20,000 shares were purchased at $5 a share by the Tisdale Mining Company to provide $100,000 for development purposes; 60,000 shares of stock remain in the treasury. Underwriting of 120,000 shares is offered at $4 a share.

STATISTICS AND RETURNS

COBALT ORE SHIPMENTS.

here were new shippers on the Cobalt list for the week ng April 14th, namely, the Badger, of South Coleman; an Bailey Cobalt, of Giroux Lake. Shipments for week and ye in pounds of ore follow:

	Ore in lbs. April 14.	Ore in lbs. Since Jan. 1.
Badger	55,200	55,200
Bailey	40,000	40,000
Beaver	.....	595,243
Buffalo	.....	746,990
Chambers-Ferland	64,000	384,900
City of Cobalt	66,000	362,280
Cobalt Lake	.....	1,315,000
Cobalt Townsite	.....	280,740
Colonial	42,000	42,000
Coniagas	126,800	1,355,890
Crown Reserve	66,000	659,520
Hargraves	.....	41,100
Hudson Bay	.....	185,930
La Rose	87,000	1,359,700
Kerr Lake	120,200	961,808
King Edward	.....	40,000
McKinley-Darragh-Savage	51,600	1,711,660
Nipissing	79,700	1,900,460
O'Brien	.....	401,710
Peterson Lake (Little Nip)	.....	58,430
Right of Way	.....	318,260
Silver Cliff	.....	183,180
Standard Cobalt	.....	44,813
Temiskaming	.....	503,612
Trethewey	.....	326,030
Wettlaufer	.....	60,022

llion shipments during week:

	Ounces.	Value.
Nipissing, 72 bars	72,243	$36,850
Buffalo, 15 bars	12,800	7,000
Kerr Lake, 2 bars	2,000	1,008
Total, 109 bars	87,043	$44,858

OUTPUT OF ROSSLAND ORE.

The Consolidated Mining & Smelting Company of Canada, Limited, ore receipts at Trail smelter for week ending April 15th and year to date, in tons:

	Week.	Year.
Company's mines—		
Centre Star	4.398	55,100
Snowshoe	1,849	25,355
Sullivan	578	10,106
Richmond-Eureka	50	760
St. Eugene	132	2,070
Other mines	943	22,303
Total	7,950	115,694

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending April 21, and those from Jan. 1, 1911, to date:

	April 21 Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger	.....	56,200
Bailey	.....	40,000
Barber	.....	6,000
Beaver	.....	595,243
Buffalo	58,400	868,010
Chambers-Ferland	.....	384,900
City of Cobalt	.....	362,280
Cobalt Lake	123,200	1,438,800
Cobalt Townsite	62,100	351,840
Colonial	.....	42,000
Coniagas	63,170	1,410,060
Crown Reserve	118,600	778,130
Hargraves	.....	41,100
Hudson Bay	.....	185,950
La Rose	311,930	1,671,630
Kerr Lake	120,000	1,081,898
King Edward	.....	40,000
McKinley-Darragh	118,890	1,823,450
Nipissing	146,130	2,046,590
O'Brien	.....	401,710
Peterson Lake (Little Nip)	.....	58,430
Right-of-Way	.....	318,260
Silver Cliff	.....	106,680
Standard Cobalt	.....	44,813
Temiskaming	65,090	568,702
Trethewey	.....	326,030
Wettlaufer	.....	117,232

The shipments for the week were 1.087,510 pounds, or 543 tons.

The shipments from Jan. 1 to April 21 were 15,066,028 pounds, or 7,533 tons.

SILVER PRICES.

	New York. cents.	London. pence.
April 7	53	24 7/16
" 8	53⅛	24½
" 10	53⅛	24½
" 11	53⅛	24½
" 12	53¼	24 9/16
" 13	53⅛	24½
" 14	53⅛	....
" 15	53	24 7/16
" 17	53	Holiday
" 18	53⅛	24½
" 19	53⅝	24 11/16
" 20	53¾	24¾
" 21	53⅝	24¾

GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75.

Coal, bituminous, $3.50 to $4.50 for 1¼ inch lump.

Coke.

April 21—Connellsville Coke (f.o.b. ovens):

Foundry Coke, prompt, $2 to $2.15 per ton

Furnace Coke, prompt, $1.60 to $1.65 per ton.

April 21.—Tin, Straits, 42.45 cents.

Copper, Prime Lake, 12.25 to 12.37½ cents.

Electrolytic Copper, 12.00 to 12.10 cents.

Copper wire, 13.75 cents.

Lead, 4.47½ cents.

Spelter, 5.55 cents.

Sheet zinc, (f.o.b. smelter), 7.25 cents.

Antimony, Cookson's, 9.45 cents.

Aluminium, 21.00 to 21.50 cents.

Nickel, 40.00 to 45.00 cents.

Platinum, ordinary, $41.50 per ounce.

Platinum, hard, $43.50 per ounce.

Bismuth, $2.00 to $2.10 per lb.

Quicksilver, $48.00 per 75-lb. flask.

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous.

	April 20, 1911. Bid.	Ask.
Dominion Steel Corporation	58¾	59
Nova Scotia Steel	97¼	98
Crow's Nest Pass	..	74
Granby	30½	..
Consolidated Mining & Smelting	40	45
Amalgamated Asbestos	11	13
Black Lake Asbestos	..	14

Cobalt Stocks.

Bailey	.04⅞	.05
Beaver Consolidated	.40	.40½
Buffalo	2.20	2.25
Chambers-Ferland	.13¾	.14½
City of Cobalt	.19	.20
Cobalt Central	.07	.08
Cobalt Lake	.19	.20
Coniagas	6.50	7.00
Crown Reserve	3.18	3.25
Foster	.05	.07
Gifford	.05¼	.05½
Great Northern	.18⅝	.19
Green Meehan	.03½	.03¾
Hargraves	.17½	.19
Hudson Bay	97.00	105.00
Kerr Lake	6.15	6.35
La Rose	4.52	4.65
Little Nipissing	.03⅝	.04
McKinley	1.59½	1.61
Nancy Helen	.02	.03
Nipissing	10.50	10.75
Nova Scotia	.10½	.11½
Ophir	.15¼	.16
Otisse	.01½	.02
Peterson Lake	.08⅞	.09¼
Right of Way	.10	.10½
Rochester	.05¼	.05½
Silver Leaf	.04	.04½
Silver Queen	.02½	.04
Temiskaming	.70¾	.71
Trethewey	.89	.95
Wettlaufer	.92	.93

Porcupine Stocks.

Apex	.18¼	.19
Porcupine Canada	1.10	1.12
Porcupine Central	.55	.58
Dobie	3.10	3.20
Dome Extension	.53	.53½
Hollinger	9.70	9.80
Monita	.25	.30
Preston	.34	.35
Pearl Lake	.53	.54
Porcupine Imperial	.14	.20
Porcupine Tisdale	.08½	.09
Swastika	.53	.54
United Porcupine	.05	.09
Vipond	.54¾	.55¼
Standard	.35	.37
West Dome	2.00	2.04
Coronation	.35	.38

New York Curb.

Brit. Col. Copper	05⅛	05½
Butte Coalition	16½	17½
Chino Copper	21⅞	22⅛
Davis-Daly Copper	01⅜	01½
Ely Consolidated	¼	5/16
Giroux Mining	05⅞	06
Goldfield Consolidated	06	06⅛
Greene-Canadian	06⅛	06¼
Harcuvar Copper	...	...
Inspiration Copper	06⅞	07
Miami Copper	18⅜	18½
New Baltic Copper	...	...
Nevada Con. Copper	17½	18⅝
Ohio Copper	01⅜	01½
Rawhide Coalition	3 cts.	3½c
Ray Central	01 7/16	01 9/16
Ray Consolidated	15⅜	15⅞
Union Mines	⅛	¼
Yukon Gold	03⅞	04

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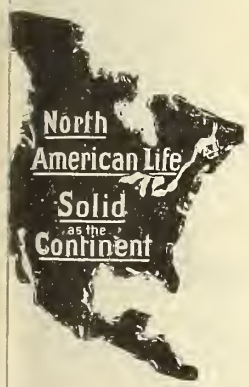

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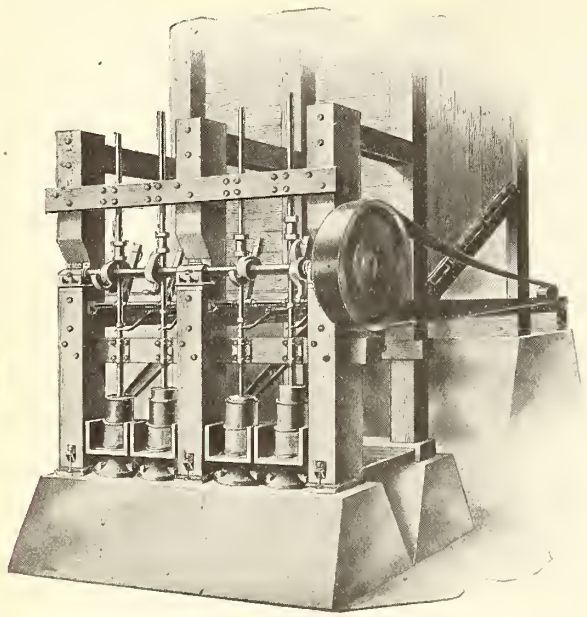

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Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map of Canada, by G. A. Young and R. W. Brock.

NEW BRUNSWICK and NOVA SCOTIA

1107. Joint Report on the Bituminous or Oil Shales of New Brunswick and Nova Scotia. Also on the Oil Shale Industry of Scotland. Part I, Economics, Part II, Geology by R. W. Ells.

QUEBEC

1077. Memoir No. 7, Geology of St. Bruno Mountain, Quebec, with maps, by J. A. Dresser.

ONTARIO

1059. A Geological Reconnaissance of the region traversed by the National Transcontinental railway between Lake Nipigon and Clay Lake, Ontario. Accompanied by two maps covering the region, by W. H. Collins.
1082. Memoir No. 6. Geology of the Haliburton and Bancroft Areas, Ontario, by Frank D. Adams and Alfred E. Barlow.
1091. Memoir No. 1, Geology of the Nipigon Basin, Ontario, by A. W. G. Wilson.

NORTH WEST PROVINCES

1035. Coal Fields of Manitoba, Saskatchewan, Alberta and Eastern British Columbia accompanied by a map, by D. B. Dowling
1115. Memoir No. 8. The Edmonton Coal Field, Alberta, with maps, by D. B. Dowling.

BRITISH COLUMBIA

1093. Memoir No. 2. Geology and Ore Deposits of Hedley Mining District with maps, by Charles Camsell.
1139. Memoir 11-T Triangulation and Spirit Levelling of Vancouver Island, 1909, by R. H. Chapman.

YUKON and NORTH WEST TERRITORIES

1101. Memoir No. 5, Lewes and Nordenskiold Rivers Coal District, Yukon Territory, by D. D. Cairnes.
1080. Report on a part of the North West Territories drained by the Winisk and Attawapiskat Rivers, by Wm. McInnes.
1006. Report on a traverse through the southern part of the North West Territories from Lac Seul to Cat Lake in 1906 by A. W. G. Wilson.

MAPS RECENTLY ISSUED:

CANADA

1042. Mineral Map of Canada. Scale 100 miles to 1 inch.
1084. Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet. Scale 1 mile to 1 inch.
1134. Map 14 A. Hall Harbour Sheet. Scale 1 mile to 1 inch.

QUEBEC

1112. Map 12 A. Vicinity of the Transcontinental Railway, Abitibi District, Quebec. Scale 4 miles to 1 inch.

ONTARIO

1091. Map 8 A, Lake Nipigon, Thunder Bay District, Ontario. Scale 4 miles to 1 inch.

ALBERTA

1132. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.
1117. Map 5A. Topographical map of Edmonton, scale 2,640 feet to 1 inch.
1118. Map 6A. Edmonton. Isobathic lines showing cover over "Clover Bar" coal seam, scale 2640 feet to 1 inch.

BRITISH COLUMBIA

1068. Geological Map (sketch) of the Sheep Creek Mining Camp, West Kootenay, B.C. Scale 1 mile to 1 inch.
1095. Map 1A. Topographical map of Hedley Mining District, Scale 1000 feet to 1 inch.
1096. Map 2A. Geological Map of Hedley Mining District. Scale 1000 feet to 1 inch.

YUKON and NORTH WEST TERRITORIES

1089. Map 9A. Explored Routes on Parts of the Albany, Severn and Winisk Rivers. Scale 8 miles to 1 inch.
1103. Map 10A. Tantalus Coal Area, Yukon Territory. Scale 2 miles to 1 inch.
1104. Map 11A. Braeburn-Kynocks Coal Area, Yukon Territory. Scale 2 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 10 cents is made for maps on linen.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon. Letters and samples that are of a Departmental nature, addressed to the Director may be mailed O.H.M.S. free of postage.

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PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Government of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unsurveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minimum being 40 acres in unsurveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

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Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native orm; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

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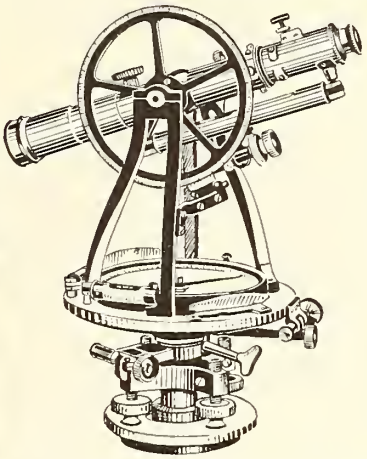

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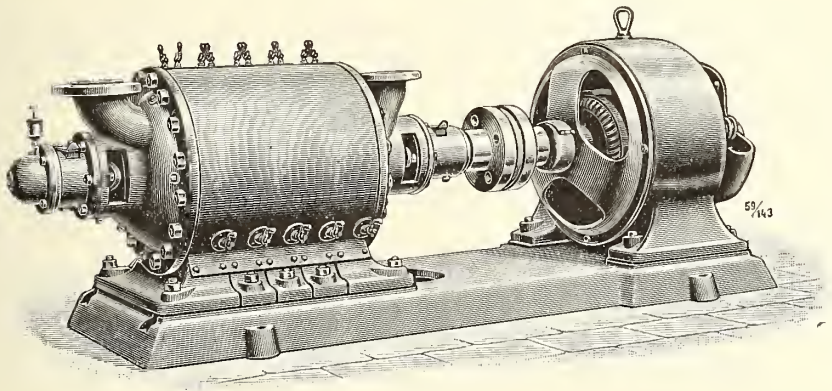

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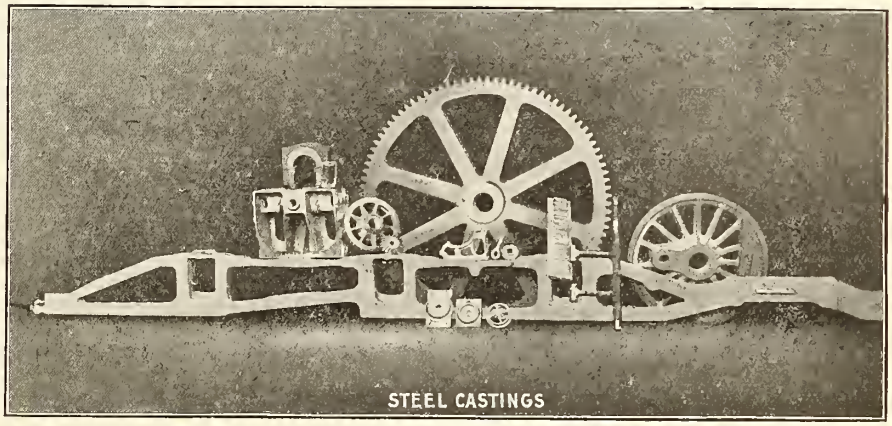
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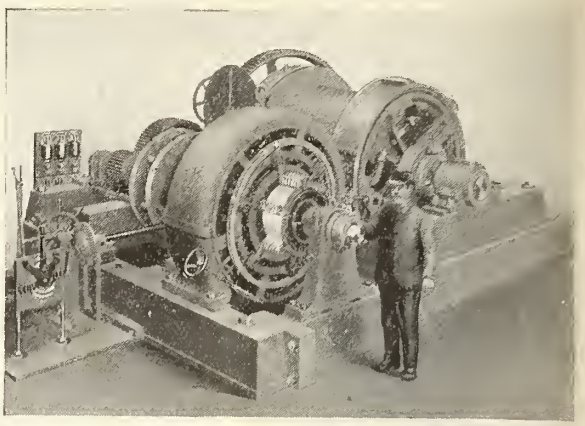

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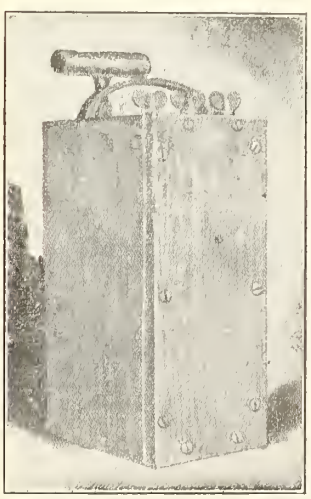

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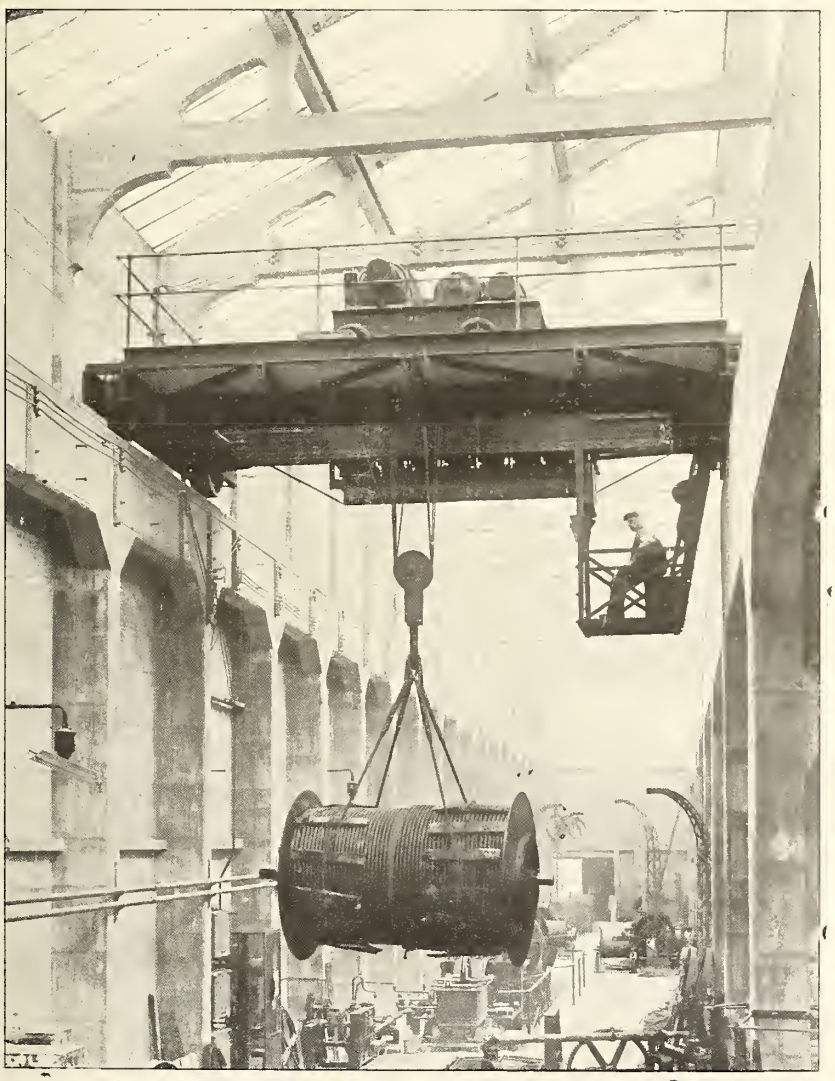

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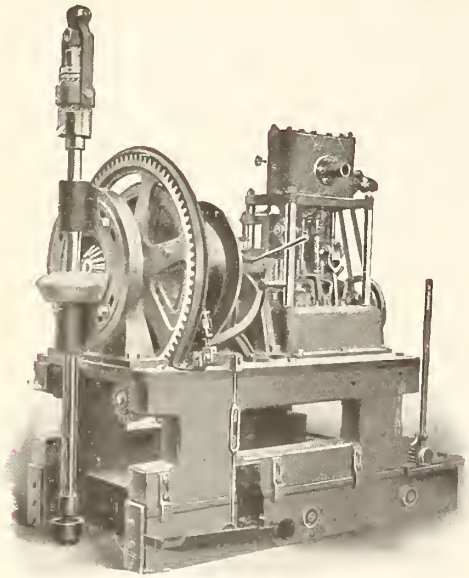

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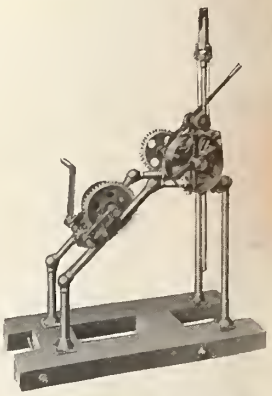

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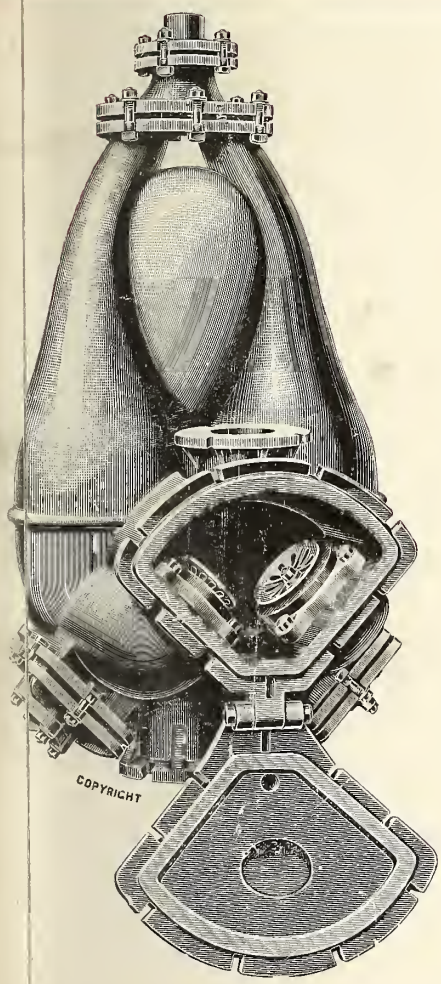

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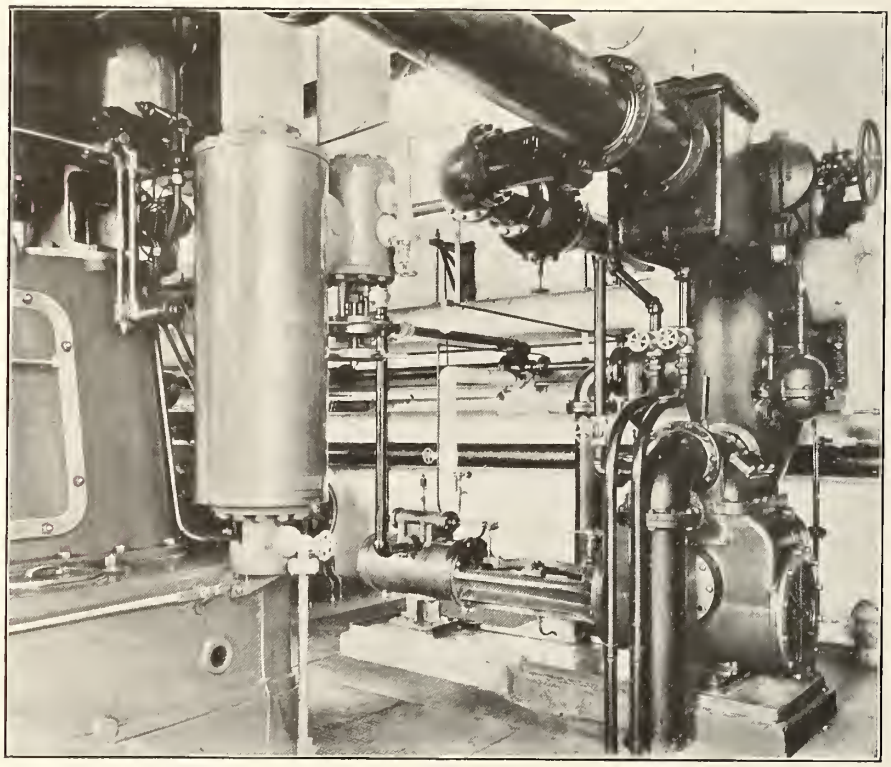

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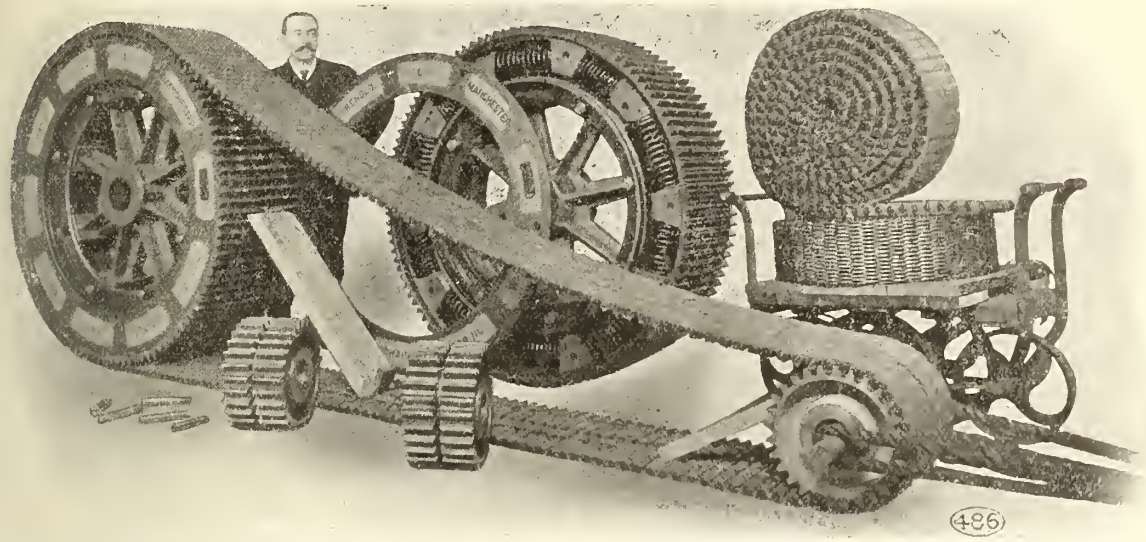

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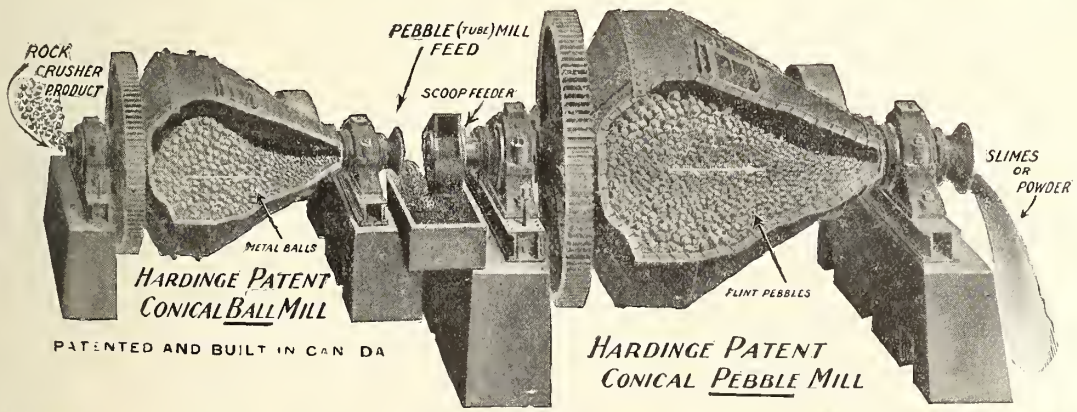

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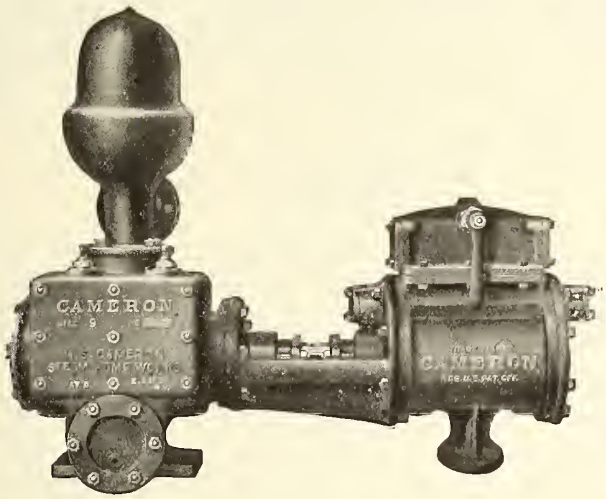

The superior construction of the "Cameron" pump is, we believe, a pretty well known and generally acknowledged fact, however, lest it be forgotten, we desire to draw your attention to some of the contributing factors of this characteristic.

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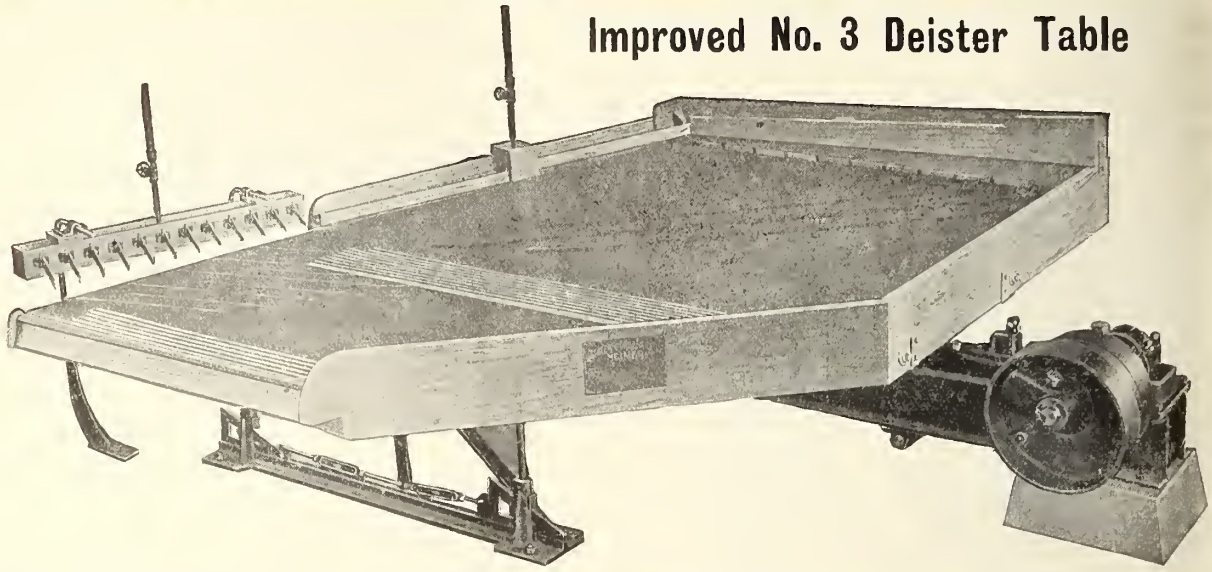

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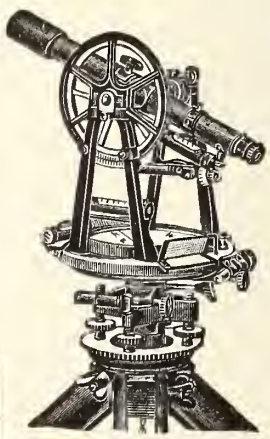

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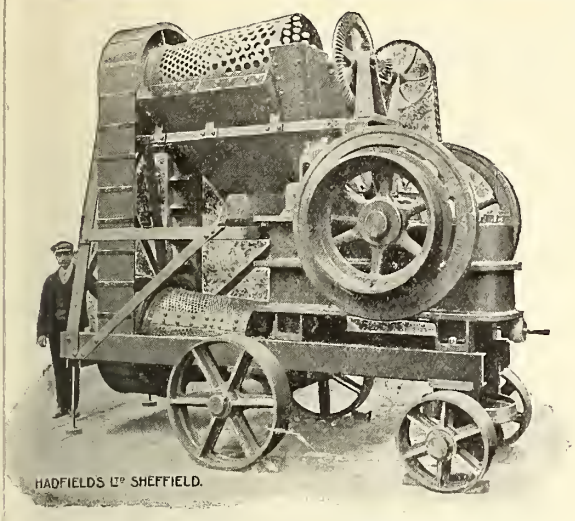

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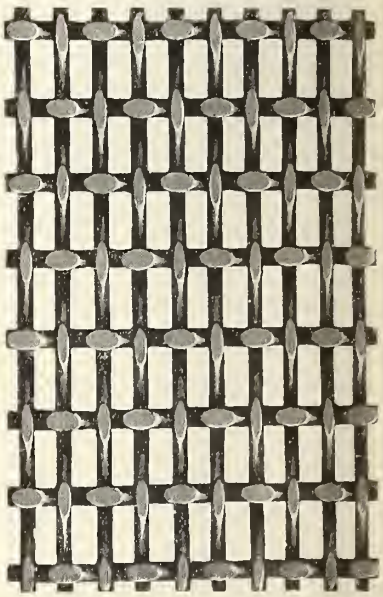

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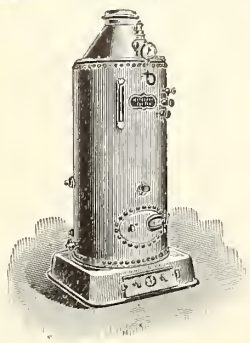

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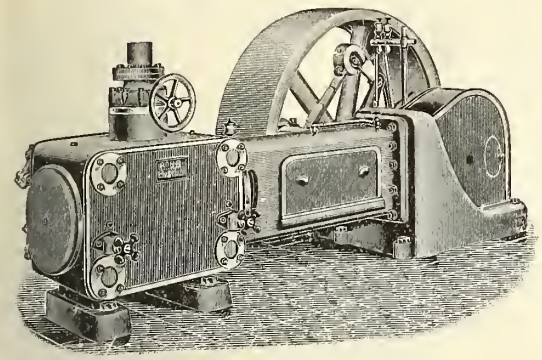

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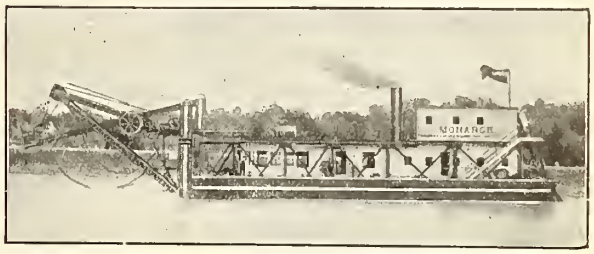

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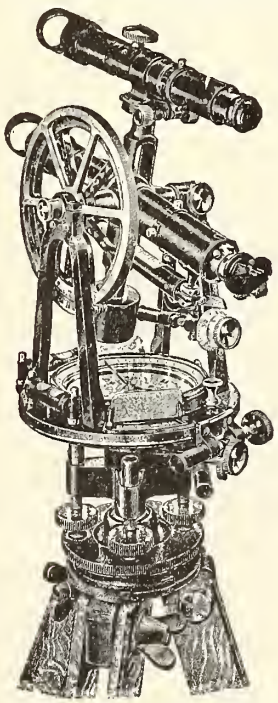

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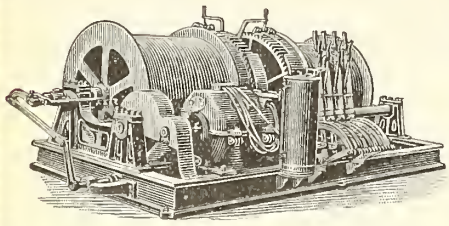

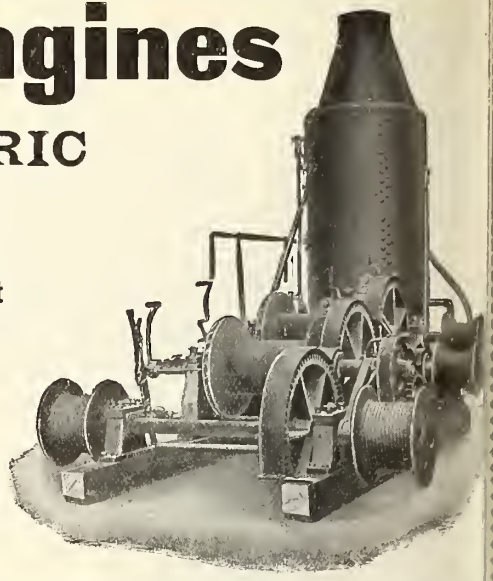

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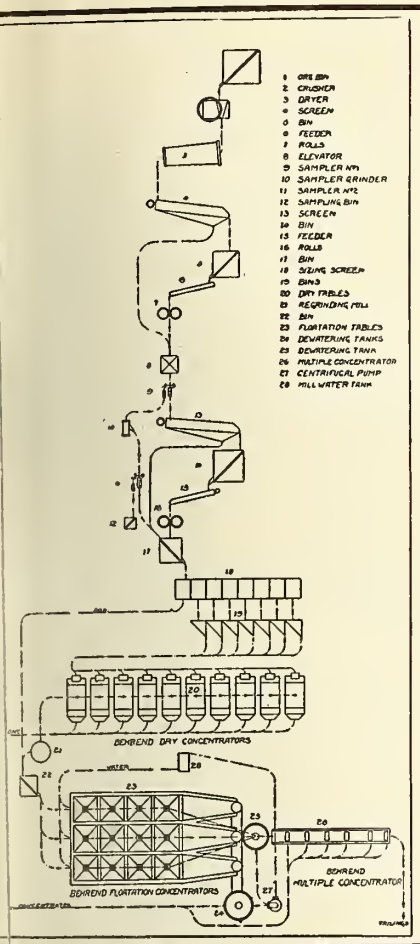

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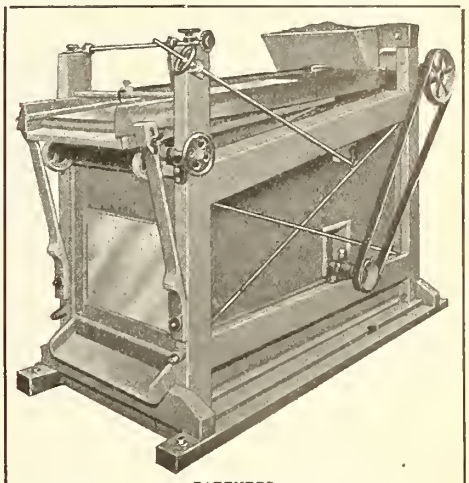

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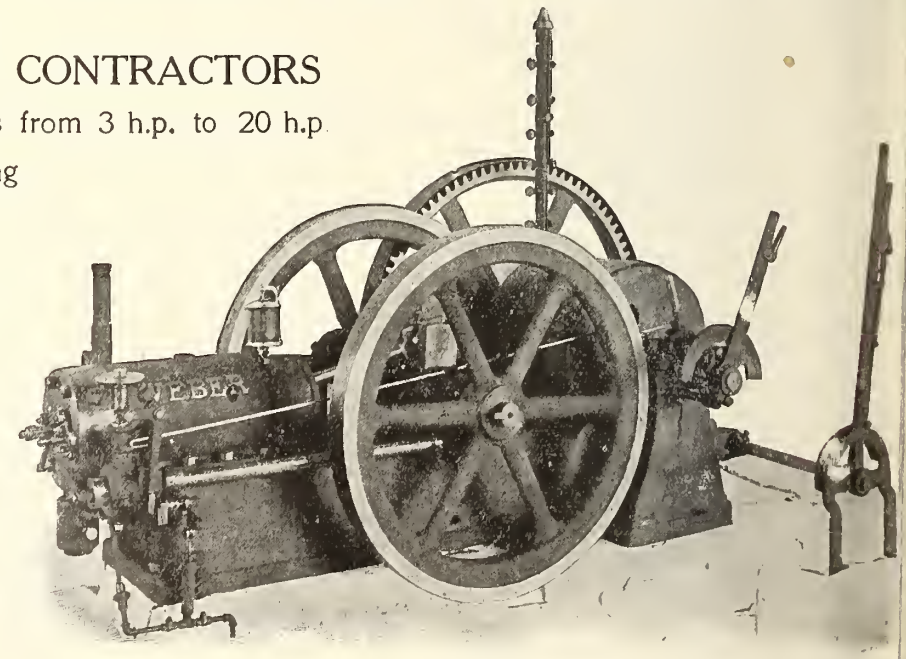

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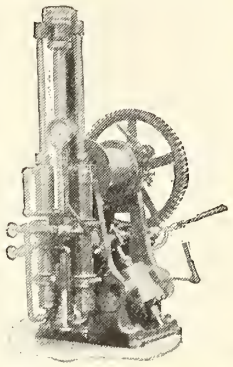

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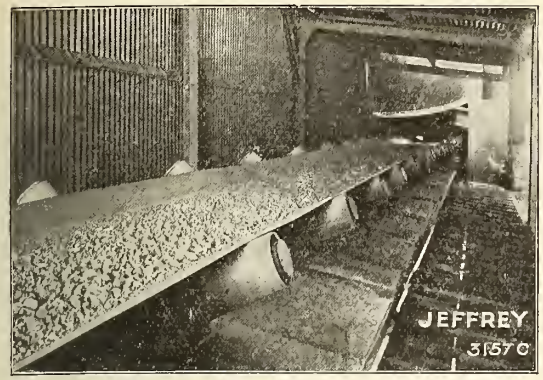

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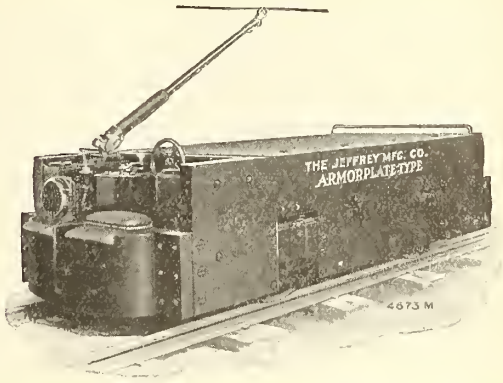

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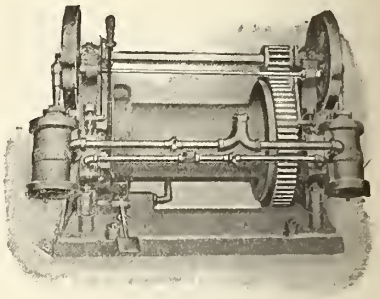

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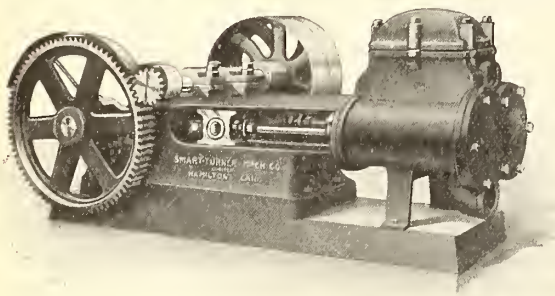

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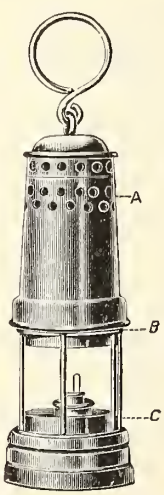

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THE CANADIAN MINING JOURNAL

VOL. XXXII. TORONTO, May 15, 1911 No. 10

The Canadian Mining Journal

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ZINC.

We note that the London price of spelter has risen steadily until latest quotations are £24 2s. 6d. per ton. This is very gratifying to the zinc ore producers and is due to several causes, chief among which are the daily increasing uses of zinc and its products, and the gradual decrease in the supply of spelter on hand in the United States for export.

The zinc industry in the Missouri field has taken a new lease of life and the producers are looking forward to a revival of the prosperity and general good times of 1905 and 1906 and the early part of 1907. During that period the miners received from $50 to $58 per ton for 60 per cent. zinc concentrates, and the lead market reached a maximum of $88 per ton. This latter price, of course, was somewhat inflated owing to certain peculiar phases of the metal market, but nevertheless the ore producers profited by these conditions.

Ontario and British Columbia have several zinc prospects which could be converted into shipping mines if smelting conditions were altered. At present British Columbia is exporting a raw material of high grade, and the country as a whole is gradually increasing the volume of its refined zinc imports. The British Columbia ores could be largely supplemented by the product of Ontario mines if smelting conditions were favourable. We already have the ore. We should be getting our share of the benefits due to gradually increasing interest in this important industry. Let the Government act.

PUBLIC INFORMATION.

Repeatedly have we called attention to the fact that amongst certain mine owners there is a decided disinclination to make public the facts concerning the physical condition of their properties. Generalities cannot take the place of specific data; nor can glittering hopes do duty for actual statements of fact.

In our last issue we had occasion to reprint from a contemporary a very sane article touching on the Porcupine boom. For this we were called to task by a local paper. Certain figures were quoted to show that one mine, the Hollinger, is in an extremely favourable position. Had this answer come from the manager of the mine, we would have accepted it without qualification. Unfortunately no official statement has been issued by Mr. Robbins. This is unwise and regrettable. Mr. Robbins' reports when he was manager of the McKinley-Darragh mine at Cobalt, were models

of accuracy and completeness. A report of this kind can hardly be expected from the Hollinger. But a definite official statement of some kind is absolutely necessary. Even if the public had no right—and a right they certainly have—to demand this, it is desirable to correct all the vain things that are being said and published.

What is true of Hollinger is equally true of all the other flotations. It is cheap and nasty to depend upon the subsidized enthusiasm of the baser sort of newspaper correspondent. Nothing but good will result from full and frank publication of facts. The responsible mine manager is the only man who can provide these facts adequately and rightly.

MARITIME OILFIELDS, LIMITED.

The foresight and perseverance of the organizers of Maritime Oilfields, Limited, will bring their deserved reward if appearances are not entirely deceptive. At the company's New Brunswick gas and oil property a total measured flow of 37,500,000 cubic feet of gas per day has been developed. Considerable oil has also come in, and there is definite promise of large quantities in the future.

Of the thirteen productive wells all yield oil. Initial flows of oil as high as 60 barrels per day mark the maximum. But the backbone of the enterprise is the company's arrangement to supply the city of Moncton, a centre that has large industrial possibilities, with a cheap, plentiful, and highly efficient fuel.

Moncton's present demand is estimated at about one billion cubic feet per annum. Undoubtedly this will increase. New factories and new homes will be multiplied. Not only Moncton, but the whole surrounding country will be directly and indirectly enriched by the exploitation of this new source of fuel.

We note with approval the fact that the New Brunswick fields are being developed in such a manner as to prevent unnecessary waste and loss. Only one well per thirty or forty acres is being sunk. When the time comes to treat the area as an oil-field, it will be easily possible to sink additional wells for every five acres.

We reprint elsewhere an account of the annual meeting of Maritime Oilfields, Limited. A perusal of that report gives the impression that Dr. Henderson and his associates are to be warmly congratulated.

GOLD MINING IN WESTERN ONTARIO.

Under the above heading Mr. W. E. H. Carter writes in this issue of mining districts that from 12 to 15 years ago made as much stir as Porcupine. As Provincial Inspector of Mines, Mr. Carter had special facilities for observing and recording. The general tone of Mr. Carter's article is not discouraging. It is clearly stated that certain factors that contributed towards the lack of success were well within human control. Moreover, the reader is given food for thou in other directions. With much cheaper transpo tion, with better professional talent available, with a public that has a keener and more direct i est in mining than ever before, it may be quite sible that not a few of the gold mines of Western tario will amply repay investigation. A boom is necessary. But we suggest that it would be good ness for investors to look into the merits of a dis that, so far as we can judge, has never had fair

EDITORIAL NOTES.

At the annual provincial exhibition, British umbia, the mineral and mining exhibits will includ types of modern mining and milling machinery. T exhibits will be amongst the chief features.

Advertisements of Porcupine stocks in certai our contemporaries are curiously similar in tone matter. Comparisons with the Rand, usually to detriment of that region, are common. More mon is the exploitation of the merits of the engi in charge of the property. The long-suffering John Hays Hammond is constantly suffering eclip

The gross receipts of the Witwatersrand Deep during 1910 were £709,833. The net profits amou to £290,049, and dividends to £271,824. The yiel ton of ore was 29s. 10d. The total cost of mi treatment, etc., was 16s. 2d., and the profit per was 13s. 8d. Ore reserves to the extent of 1,69 tons are proved. The average value per ton shillings.

The serious phase assumed by the revolutio Mexico has alarmed foreign investors. No longer the trouble be regarded as an inconsiderable i rrection. It is, in scope and effect, a revolution. I dent Diaz apparently must drop out of office—a t cal enough ending to a life that has been crowded gratified ambitions.

The company that publishes Everybody's Mag also publishes a monthly that is devoted largely t past doings and undoings of George Graham Rice. reports have it that Rice is to promote a Porc scheme. It will be instructive to watch the u which he will put his publishers.

The muck-raking habit has caught hold of American magazine. Particularly refreshing is Cosmopolitan June issue. In the text is a seve dictment of graft and corruption. In the advert pages is the advertisement of a thorough-paced cat. The advertisement states that Canada co not one metal refinery. Other glaring untruth obviously visible. Cosmopolitan should be thoro ashamed of itself.

CORRESPONDENCE.

DIAMONDS IN BRITISH COLUMBIA.

Editor Canadian Mining Journal:—

Sir,—Concerning the recently reported finding of diamonds in British Columbia, it should be noted that Mr. Robert A. A. Johnston, curator of the Geological Survey museum, who discovered small diamonds in some rock from Olivine Mountain, Tulameen district, British Columbia, has lately been quoted in a press despatch from Ottawa as having said: "The discovery is of no commercial importance. I have found it impossible to separate the diamonds from chromite and other varieties of rock in which they appear in the specimens found, without necessarily breaking them into small pieces. Of course, we could do this with a slow process, but commercially this would be out of the question."

Another press despatch quotes Mr. Chas. Camsell, also of the Geological Survey, as having suggested that diamonds may be found in the wash in streams near Olivine Mountain. I have no means of ascertaining—without delay—whether or not Mr. Camsell did so express himself, but I may say that if he did, his suggestion may, I think, be accepted as based upon reasonable conclusions. Mr. Camsell has during the four years last past done valuable work in investigating the geology and economic mineralogy of the Similkameen district of British Columbia, and two seasons of this time were spent in the Tulameen, which is in the northern part of the Similkameen district.

My object in writing on this subject is to make it quite clear that diamonds of commercial value may yet be found in the Tulameen region of this province, the small specimens discovered by Mr. Johnston, assuming him to have been correctly quoted, are so small and occur under such conditions as to make them valueless from the point of view of the prospector and miner.

British Columbia had last year's experience with gross misrepresentations relative to gold in the Portland Canal district; now it is risking similarly damaging notoricty in respect to Steamboat Mountain; and even the Tulameen district is being shown under false colours. This last statement is made by me after reading in two of the leading daily newspapers of this province a notice of the alleged doings of the Platinum-Gold Fields Company, Limited, which, it is asserted, has proved 6,000 feet of Tulameen River with a Keystone drill, in which 6,000 feet "the actual value in gold and platinum is estimated at $1,160,000. . . . The scene of present operations is just above the Nickel Plate mines at Hedley, which last year yielded a net profit of $200,000." Since there is absolutely not the smallest connection between alluvial gravels of Tulameen River and the Nickel Plate lode mines situated in mountains downstream and 40 miles away, the deceptive intent of the reference to the Nickel Plate seems obvious, though only to those who know the situation. It will be well that the actual position in regard to the finding of diamonds in this province be made perfectly plain, so that no disappointment and loss may occur by reason of lack of knowledge of the facts.

E. Jacobs.

Victoria, B.C., April 17, 1911.

Obituary.

Mr. James C. Fuller, who since the Le Roi mine at Rossland, B.C., has been operating on only a small scale has been performing the duties of surveyor and assayer as well as mining engineer, met his death as a result of having apparently drunk a solution of potassium cyanide in mistake for water. At the time of the sad occurrence he was alone in the mine laboratory. The mine foreman, answering a telephone call while engaged in his own office, heard Mr. Fuller say "Oh, Pete," but no more, so he hastened to ascertain the reason. The assay office was not far away, and about 75 yards from it he found Mr. Fuller lying at the foot of some steps. He was still breathing but died in a few minutes, before the arrival of a doctor, who had been hastily summoned by telephone. He had on one hand an asbestos mitt, and in the other a sandwich, while near where he fell the small tongs, with which he handled the cupels when assaying, were found. On the table in the assay office were several beakers, containing fluids, and one had been capsized. The fluid spilled was pronounced by other chemists as potassium cyanide. The conclusion was that while attending to his assay work, Mr. Fuller was also eating his lunch and made a mistake in drinking from the cyanide beaker instead of the one containing water. A coroner's jury, after enquiring into the circumstances, returned a verdict of accidental death. Mr. Fuller received his first mining education at the Camborne School of Mines, Cornwall, leaving there to go to Rossland, whence he accompanied Mr. A. J. McMillan from London in 1904. Ever since, with the exception of short periods spent in Rhodesia and Mexico, respectively, on mining engineering business, he had been employed in various capacities at the Le Roi mine. For several years he was chief engineer, under Mr. A. G. Larson, superintendent. He was held in high regard by all with whom he came in contact, and the management bears willing testimony to his ability as an engineer. He was to have been married in June, proximo. The body was interred at Vancouver, B.C.

Capt. B. A. Wroughton, commander of B division of the Northwest Mounted Police, Dawson, Yukon Territory, when in Vancouver, B.C., last month, was reported to have told a newspaper representative, among other things, that "There was very little mining on the creeks during the winter by private individuals, as the rich ground has been pretty thoroughly worked out. Properties have now mostly passed into the control of large corporations which successfully adopt modern hydraulicking and dredging methods during the summer months. The outlook is bright, and the output this season promises to surpass the figures of recent years. There are enormous areas of ground available, and, in fact, the supply of gold is almost inexhaustible. At least twenty dredges will be in commission this season, the majority operated by the Yukon Gold Company, controlled by the Guggenheims. The Boyle outfit last fall completed a gold dredge which has the distinction of being the largest in existence. It will operate this year for the first time on Bear Creek, where the pay dirt is rich."

Personal and General

Mr. J. Edgar McAllister has retired from the position of general manager of the British Columbia Copper Company, Limited, at Greenwood, B.C., and is now the company's consulting engineer, with headquarters in New York. Mr. E. G. Warren, assistant general manager, is now in charge of the company's affairs at Greenwood.

Mr. D. C. Botting, state coal mine inspector, Seattle, Washington, and Mr. J. B. Warriner, mine inspector for the Northwestern Improvement Company, of Tacoma, Washington, owning several important coal mines in that state, were recent visitors to Nanaimo, where they were shown local mines. They were accompanied by Mr. F. H. Shepherd, chief inspector of mines for British Columbia.

Mr. W. H. Trewartha-James, general manager of the Tyee Copper Company, Limited, has returned to Victoria, B.C., from a business visit to England.

Mr. Anthony J. McMillan, liquidator of the Le Roi Mining Company, is again in Rossland, after an absence of several months in the East and England.

Among other mining men who visited the coast cities of British Columbia last month were Mr. James Cronin, of Spokane, formerly manager of the St. Eugene mine, East Kootenay, and Mr. H. L. Rodgers, manager of the Yankee Girl mine, Ymir, B.C.

Mr. Robert R. Hedley, now consulting engineer for a British Columbia mining development company, with headquarters at Vancouver, B.C., has been nominated as chairman of the Western Branch of the Canadian Mining Institute, in succession to Mr. Wm. Fleet Robertson, provincial mineralogist, whose year's term of office will expire this month.

Mr. Robert Musgrave (B.Sc. McGill, 1903) has returned to British Columbia from Mexico. After graduating Mr. Musgrave went to the Copper Queen mine, Arizona. Later he was general superintendent of the El Tigre mine, Ysabel, Mexico. Latterly he has been representing a British company in Mexico.

Mr. Oscar V. White, superintendent of the Byron N. White Company's Slocan Star group of mines, near Sandon, has returned to the Slocan to resume mining on that important silver-lead property. He was accompanied by Mr. B. N. White, president of the company.

Mr. Robert H. Stewart, general manager of the Consolidated Mining & Smelting Company of Canada, Limited, is back at Trail, B.C., from a visit to Los Angeles, California.

Mr. John B. Hobson, of Victoria, B.C., took a trip to California early in April. He intends, shortly after his return to British Columbia, to proceed to Quesnel Forks to commence the season's hydraulicking on his placer gold mine on Spanish Creek, Quesnel mining division.

Mr. Wakely A. Williams, superintendent of the Granby Consolidated M. S. and P. Company's big smelting works at Grand Forks, B.C., recently visited Chesaw, northern Washington, where the company has commenced the exploitation of a group of mineral claims it holds under bond and option of purchase.

Mr. R. P. Williams, of Vancouver, B.C., has resigned the position of western representative of the Canadian Rand and Jenckes Machine Companies, after having been 21 years with the former company. His first visit to British Columbia was made in 1892, in connection with putting in a plant at a slate quarry on Jervis Inlet. He was in this province again in 1893. In 1897 he was in charge of the Rand and Jenckes machi sales office at Rossland; afterwards he removed Greenwood, in the Boundary district, where he mained for three years, but returned to Rosslan 1902. Last year he transferred his headquarter Vancouver. The territory he covered in the capa of representative of the two companies included tish Columbia, Alberta, and Yukon Territory, w for the Ingersoll-Rand Company he sought busine Alaska. His plans for the future are not yet defin decided.

A newspaper despatch from Seattle, Washing states that Thos. Hodgens, of Butte, Montana, and York, on April 28th filed suit against M. K. Rod a mining engineer well known in the West, asking a judgment of $203,000 against Mr. Rodgers, an order restraining him from foreclosing a mort against the Hidden Creek group of mineral claim Observatory Inlet, B.C. The complaint alleges Mr. Hodgens supplied $417,000 to Mr. Rodger purchase and develop mining properties in Br Columbia, and that the latter has declined to acc for any money except that used in purchasing an veloping the Hidden Creek property.

On April 13 the steamer Northwestern arrive Seattle, Puget Sound, Washington, from Cord Alaska, with the first cargo of copper ore from th terior of the mainland of Alaska. The shipment sisted of 1,100 tons of ore from the Guggenheims' anza mine at Kennicott, Chitina region. The n paper account of the enthusiasm aroused by the rival of the steamer at Seattle indicates that much portance is attached to this commencement of pro tion of copper by interior mines of Alaska. The o of unusually high copper tenor, and contains as silver to the stated value of $25 per ton; it wil smelted at Tacoma, at the head of Puget Sound. Copper River and Northwestern Railway, only cently completed, is nearly 200 miles in length, Cordova to Kennicott. It was constructed by the genheim-Morgan interests at a cost of about $20, 000.

A Board of Conciliation and Investigation unde Industrial Disputes Investigation Act, 1907, has appointed to investigate the labour troubles in lberta and Southeastern British Columbia coal mi districts. The Western Coal Operators' Associa nominated Mr. Colin McLeod, of Macleod, Alberta its representative, and the officers of District 18, U Mine Workers of America chose their secretary, M J. Carter. These gentlemen were not able to a upon a chairman, so the Minister of Labour appoi Rev. C. W. Gordon (Ralph Connor), of Winnipeg. board afterwards met in Lethbridge, Alberta, bu fore entering upon its work of investigation, ef were made to get the two parties concerned to to an agreement without the lengthy enquiry would otherwise be necessary. The Operators' A ciation first held a meeting at Macleod, and afterw met the representatives of the U.M.W. of A. in L bridge, but the adjustment of matters concer which the Operators' Association and the repres tives of their employees are not in agreement was brought about, consequently the Board of Conciliation and Investigation proceeded to make arrangement holding its meetings and conducting its investigat

REPORTING ON PROSPECTS

Written for the Canadian Mining Journal by W. E. Segsworth.*

In writing this article I merely desire to set down a few ideas that have crystallized during the course of me, in the hope that they may be useful to others. I wish to disarm criticism by saying that many things which I have said might have been said better by others, or may be disagreed with. I may also have left unsaid many things that may seem to be of more importance to others than what has been said here. If, however, the article results in helpful discussion it will have served one of its purposes.

The examination of a prospect calls for cool judgment, close observation, wide experience, and the ability to weigh against each other many conflicting considerations. In addition to this the engineer must have the power of detaching himself from his own personal prejudices.

Undoubtedly the main facts to be ascertained are:

First, Is any ore exposed on any of the boundaries of the property?

Second, What is the average value and width of the ore exposed?

Third, Can the determined grade and width of ore be worked at a profit under the surrounding conditions?

Fourth, What are the prospects for the continuance of the ore, or for its increase or decrease in value?

To obtain answers to these questions, it is advisable to keep in mind the lines of inquiry that may be followed with profit. It will, of course, be understood that in any one prospect probably not one-half of these lines of inquiry are of immediate importance. Those that are of no importance can be quickly eliminated and attention concentrated upon those remaining. I give below a list of the important points.

Prospects of Ore (Economic Geology):

(a) Is there any ore exposed on any of the bounding planes of the property? If so, what is its length, breadth, and value?

(b) Is the formation favourable to the kind of deposit examined?

(c) Is the formation in which the deposit occurs likely to continue in depth; or to change? If so, what effect will it have on the deposit?

(d) Is the formation much faulted? If so, what effect will it have on the prospects of holding the ore, or the cost of working?

(e) What type of deposit is the one examined? What conclusions may be drawn as to its probable size, continuity, and value?

(f) Are there any evidences of secondary enrichment?

(g) Does the deposit show the effect of surface weathering? If so, to what depth?

(h) Effect of eruptives?

(i) Blind veins?

(j) Evidence to be gathered from surrounding properties?

Metallurgy:

(k) Can ore of the probable extent and value indicated by the exposures be treated at a profit under existing conditions?

(l) If the ore is to be smelted can a suitable smelting mixture be made with the materials to be had within an economically possible freight rate?

(m) What influence will the process of treatment have on costs?

Costs of Operation:

(n) Transportation.
(o) Labour.
(p) Supplies.
(q) Development, cost per ton.
(r) Stoping, cost per ton.
(s) Cost of fuel.
(t) Water, cost of pumping.
(u) Cost of equipment.
(v) Cost of treatment.
(w) Interest and depreciation.
(x) Royalties and taxes.

Market:

(1) Quotation price.
(2) Smelter rate.
(3) Cost of transporting ore to smelter.
(4) Cost of transporting metals to market.
(5) Brokerage charges.
(6) Is the market free or restricted?
(7) Competition.
(8) Influence of increased production on prices.
(9) General market outlook.

Title:

Influence of the mining laws of the country on the industry.

Validity of title.

At the risk of being tedious I have tabulated these points, and will discuss them briefly later. This list might be lengthened indefinitely. Indeed I have seen printed lists of questions in book form for the use of the examining engineer which contained questions in regard to every conceivable matter in connection with a mine or prospect; but it seems to me that the use of such printed forms must lead to reports as stereotyped in form and conclusion as the form on which the data are recorded. For this reason the above list is only given as a guide and should be filled out, altered, or amplified to fill individual requirements and ideas.

Prospects of Ore—In considering (a), it should be kept in view that where there are no extralateral rights the property considered as a whole has the form of a prism of infinite depth, whose top is the exposed surface and whose sides are three or more planes (usually four) being common boundaries of the adjoining properties as in fig. No. 1. On the adjoining property to the south a shoot of ore has been opened on a vein striking north. This shoot pitches to the north and enters the prospect by the south bounding plane at depth. The ore has been mined up to the line of the prospect and has exposed a surface of the vein from (a) to (b) for sampling. It must be evident that such a surface, if it be accessible for sampling, is just as valuable a prospect of ore, other things being equal, as a like exposure on the surface. All exposures of ore should be sampled, measured and assayed just as carefully as would be done in examining a mine. There is no more reason for trusting to one's judgment for

*Mining Engineer, 103 Bay St., Toronto, Ont.

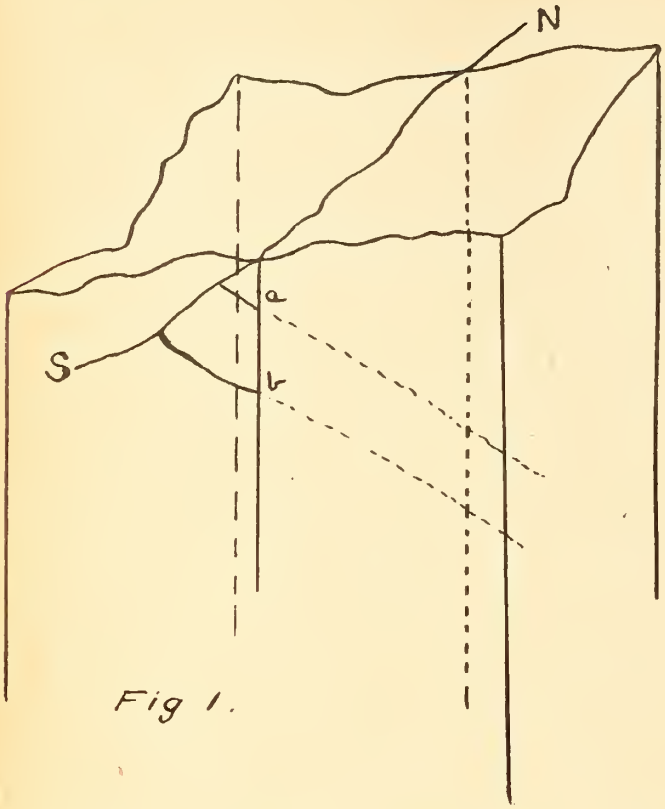


Fig 1.

the value of ore exposed in a prospect than in a mine. Yet this is often done. Before sampling a surface exposure it should be well cleaned of all surface dirt, and a wide deep groove cut in the solid ore. This groove should then be thoroughly cleaned out before taking a sample cut from the bottom. If the sample is cut from the natural surface it is liable to be too high on account of the concentration of valuable minerals in the small surface cracks or irregularities, or it may be too low on account of leaching out of part of the less valuable minerals from the immediate surface. One of the most common mistakes is to measure the outcrop on its horizontal width without taking account of the dip, and to assume that this is the true width of the vein.

(b) The preference which certain minerals have for certain formations is so well known that it needs no discussion.

(c) If a fissure cuts two formations and contains ore in one of them, it is quite likely to increase or decrease either in size or contained values on passing into the other. If the prospect is in a well developed district whose history in this respect is known, one may be able to foretell the change. If in a new district too much confidence must not be placed in comparisons with districts whose economic geology has already been worked out.

(d) In fig. 3, a section of a vein perpendicular to its strike is shown. It will be seen that the vein is faulted by a series of overthrust faults in a rather regular manner. However, as depth was attained, the fault planes were found to be closer together. After each section of the vein was worked out it was necessary to drive to the next section of ore and, of course, the dead work was charged to the development cost of the block so opened up. The first block paid handsomely, the second a little less, but it was found that no profit was derived from the fourth, although the vein was equally wide and of the same grade as in the former sections. This is but one instance of the way faulting may use up the profits of working an otherwise p able ore shoot.

(e) The considerations suggested by questio could not be profitably discussed here as they in the theory of the genesis of ore deposits—a fiel extensive to be even touched upon.

(f) The theory of secondary enrichment shoul be studied elsewhere. Its importance lies in the that where it occurs we have one of the few cas which we may hope for enrichment in depth. I sulphides are in their unaltered form on the su there is no reason to expect enrichment in dept cept in rare instances.

(g) Surface weathering without secondary en ment points to the surface enrichment of the vei a decrease of values in depth. This is due to the l ing out of some of the baser constituents of the leaving the part remaining in a more concent form. It also sets free the gold and silver, lea them in a state in which they may be more re amalgamated and, if they are to be smelted, they ready for smelting without roasting. Howev should be kept in mind that when we pass fron zone of surface weathering to the zone of primary phides, a change in treatment must be made. Su enrichment may not always be an advantage as it necessitate two distinct plants for the treatment o ore, and the interest and depreciation on the first offset the advantage gained by the richer ore.

(h) The effect of eruptives should be thoro studied.

(i) If the prospect is in a district already devel something may be learned on this point. If not, prophecies are as dangerous as prophesying o depth in a fissure devoid of mineral at the surfac der the same conditions.

(j) If a prospect is situated in a camp that h number of operating mines, many of the questions cussed under "prospects of ore" may be studied u the best conditions and much information gaine the economic geology of the district. In most the market conditions, cost of operation, and meta gical treatment may be determined with great a acy. In cases where the adjoining properties each worked up to their end lines nearly every f of risk may be eliminated. In many mines in the Superior copper region adjoining properties hav far determined conditions on a prospect that the agement was justified in designing and installing

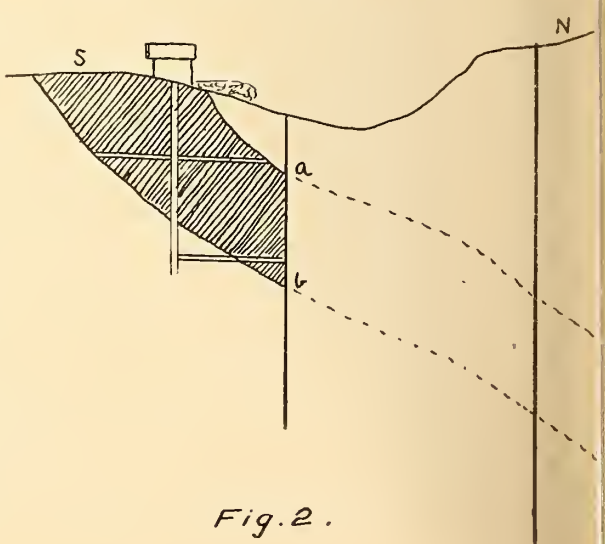


Fig. 2.

ve plant and machinery before the ground was ed. These cases are rare, however, and evidence surrounding properties should only be accepted great care and applied with judgment. In the ns of the inexperienced such evidence is highly erous. It is not seldom part of the stock-in-trade e fakir.

Metallurgy.

() A quartz ore containing a friable copper mineral may be so situated that it cannot be smelted owing to the impossibility of obtaining a base at a sufficiently low cost. It cannot be concentrated without too great a loss, and cannot be cyanided owing to the consumption of cyanide overbalancing the value of the gold or silver recovered. Again, the ore may be an intimate mixture of two metallic minerals having physical and chemical characteristics so similar that they cannot be separated economically. Of course, this discussion is based on the state of the art at the time the examination is made. Later improvements may make ores valuable that are to-day useless.

() If an ore is to be smelted at or near the mine the question of flux and fuel should receive the most careful consideration.

() In any case some limiting figures should be placed on the cost of mining and treatment. If this cannot be done, a report will be of little practical value.

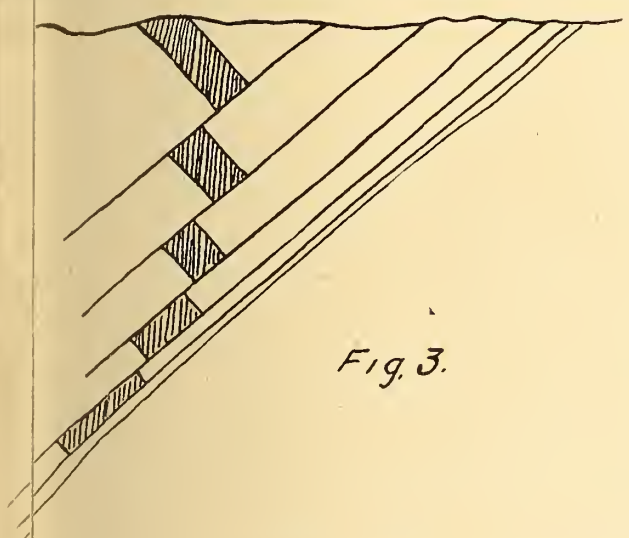


Fig. 3.

The final method of treatment cannot be determined, however, until the prospect has developed into a mine.

Cost of Operation:—This subject has been so exhaustively treated by Mr. Findlay in his admirable book that the different items need no discussion. If the prospect is surrounded by working mines and has the same character and grade of deposit as the surrounding mines, the cost may be taken from them. If the prospect is in a new district one should make as close an estimate as possible of the cost of working the ore, putting limiting values on each item as closely as may be determined, basing the estimate on the supposition that the ore will extend to a reasonable depth and have the same width and value. From this one may possibly arrive at the conclusion that the property is not workable at the time and under present conditions. Estimates made in this way are infinitely more valuable than mere guesses, and at least serve as a guide to the judgment.

Market

1 The price of gold is, of course, always fixed. The ation prices of copper, lead, and zinc, are usually given very closely by the technical journals since these metals enjoy an open market. All the other metals together with the non-metallic minerals have their prices fixed by private contract or mutual agreement and the prices quoted for them in the technical journals serve only as a guide. Before accepting a price on any of these minerals the market should be most carefully investigated.

2. Smelter rates should be obtained from as many smelters as possible. It should not be overlooked that distance is not always of first importance in determining smelter rates, but that desirable fluxing qualities may overrule the long haul.

3. Freight rates may, of course, be ascertained from the published schedules of the railroad companies, but should not always be accepted as the best rate obtainable. By negotiation the rate may at times be lowered considerably The new rate is then published and becomes the public rate.

4. The producer of a metal must always pay for transportation to the open market even if the metal is never actually taken there for sale.

5. A great deal of ore and many mineral products are sold through brokers and selling agencies. In the case of those minerals which are sold in a restricted market the brokerage may amount to a considerable sum. This fact should not be overlooked in estimating costs.

6. As stated under (1) minerals that are sold under private contract or in a restricted market should be the subject of a most searching investigation. If the engineer is not already familiar with and in close touch with the market he should either get the time for an investigation, or frankly state in his report that he is not prepared to report on the state of the market. Many otherwise good prospects fail because when the producing stage is reached it is found that there is no market for the product or that the actual price is much below the quoted price. Another common mistake is to estimate each metal at its full value while, as a matter of fact, the smelter may pay for only one or two of the metals contained in the ore. Indeed, I have seen all the metals in an ore estimated at their full value in a report, and when the ore was sold a penalty had to be paid on some of these metals.

7 and 8 Competition and the influence of new productions on price are closely associated. With the more common metals and those which are produced in large quantities, the addition of a new producer is not likely to affect the price much, but the effect of new sources of production on the price of a metal which is produced and used only in small quantities is likely to be disastrous unless the production is kept within due bounds, or unless some new use can be found for the metal.

9. Mr. Hoover in his book on the "Principles of Mining," treats of what he has called the base price of metals and discusses the fluctuations of metal prices. This chapter should be read.

Title.

When examining a prospect in a foreign country or in one where mining has not long been carried on, the engineer should make a careful study of the mining laws. The laws as regards royalties, taxes, and customs duties should be ascertained. In some countries, especially in the Latin Americas, there are many charges against the operation of properties that do not come under any of these heads, but that nevertheless must be paid.

The validity of title will, of course, be examined

closely by a local attorney, but it is always well for the engineer to examine the title himself.

General Considerations.

The amount of capital to be used in developing a prospect is of first importance. There is a minimum amount necessary. What this is, one can only estimate, but limiting values can usually be placed upon the amount. If the purchasers are not prepared to find this amount the property will probably be a failure no matter how good a prospect it may be.

When a prospect is discovered in a new district and under new geological conditions, too much is often made of comparisons with older districts. Suppose that a mineral has been mined in four properties, A. B. C. and D, in four different parts of the world, and that the geological conditions at A, B, and C, are similar, but quite different at D. Now, if all the properties have been operating for some time, everyone accepts the difference in conditions between the first three properties and the fourth without comment. But suppose A, B, and C have been operated under similar conditions for years and let D be discovered under different conditions; then the impression may immediately arise that it cannot be of any value. This is a very common fallacy. But, while comparisons with older districts are of the greatest value as guides, an occurrence under new conditions should never be condemned on comparisons only.

In any one prospect a great many of the points touched upon will be found to be of little or no importance. However, each must be gone over and those of no importance may be quickly eliminated from the enquiry and the attention concentrated on those remaining. I would suggest that numerous sketches and careful notes of all the above points be made in the field note book. All this information need not go into the report but may become invaluable at some future time. Often after the report is made the engineer may be employed to direct the work, and copious notes and sketches may enable him to initiate operations without a second trip to the property.

It must be left to the common sense and judgment of the engineer as to what material should go into a report, but one should always remember that a report will be read by two classes of people, the layman and the engineer. The first desires a short and lucid statement of the main facts with a clear cut statement of the conclusion arrived at. The engineer, in addition to this, wishes to have the details before him so that he may decide for himself whether the conclusions are justified in the premises.

To fulfil the needs of each class to whom the report will be presented it is usually best to divide the re into two parts, first the general report and conclu and second an appendix containing the details, sisting of measurements, lists of assays, detail des tion of geology and outcrops, estimates of costs, fr rates, markets, etc., or such of these matters as a importance. The report should as a rule conta map of the property, showing the outcrop, assays, geology. If the geology or development of the rounding properties has had any bearing on the clusions arrived at, a map showing these feat should be included, if necessary to a proper un standing of the facts.

A few engineers try to protect themselves by lea out the details, so preventing any criticism of the clusions; but if the prospect is developed and fail fulfil its promise, their lack of nerve receives its ward, for then they are denied the opportunity to sent the details which they should have set out in original report.

When examining a prospect in a district unfam to the engineer, he should always obtain local ad if it can be had. Do not be too ready to cond what is new to you in mining practice, when it stood the test of time. Although it may appear t wasteful, careful study may show you that it is survival of the fittest under the ruling conditions. obtaining local advice you may get a satisfactory planation of what seems bad practice and save you from the mistake of promising economies which cannot fulfil later.

In these days of changing conditions too much s to be made of codes of professional ethics. If one a sound conscience he will have no need of a con tional code of ethics. If he has not this conscie there is no code of ethics he will not break. The rule that should always be followed is to disclos your report and to your principals your true posi in relation to a property. Anything that canno set out there should not be done.

In conclusion, I would suggest that one should be in a hurry when examining a property even be a prospect. Spend some time on a property (warrants it) and by turning the facts over in mind with their bearing on each other, gradually rive at a cool, deliberate judgment by a more or unconscious integration of all the facts obtain remembering that one's judgment of a prospect not always be correct and that your client is pay you to commit yourself definitely one way or the ot He should not, and likely will not, be satisfied wi report that does not commit the engineer.

OUR EUROPEAN LETTER

Mining shares quiet — Oil descriptions more active— Petroleum developements in Galicia, Roumania, Maikop, Persia, and Eastern Siberia — London Organizing an oil exchange — Many new companies Floated — Electric winding developments in British colonies — An interesting plant — The Waihi all-sliming process and tall tank treatment — Why the Rand is out of favour — Northern Nigerian tin a growing industry.

(Exclusive correspondence of CANADIAN MINING JOURNAL.)

London, April 21st, 1911.

Business in mines on the London Stock Exchange continues small and the speculative account for the rise is not large. Throughout the greater part of present year the market in South African mi shares has been persistently dull and at the end March it became acutely weak as the result of fi cial difficulties on the Paris Bourse. Whatever covery has taken place recently has been largely bear covering. Rhodesian shares keep very stagn but Russian gold mining shares have been rather m active. Tin shares have been fairly firm and a tinual stream of new tin flotations proceeds.

Oil is another fairly active spot although the April spurt of activity soon petered out. Here ag new companies are frequent. The oil trade outl in fact, is good and one of the most notable incid

the steady progress that is being made in the utilization of oil for power purposes either in the form of liquid fuel or applied direct in oil engines. The world's production of oil has more than doubled in the last ten years but all the same new areas are being continually opened out. Good oil lands in Galicia are being extensively sought after. One German group, for example, has expended between $150,000 and $200,000 in purchasing small properties in order to consolidate its interests, although only a small amount of drilling has so far been done in their particular district. The English producing companies with plenty of reserve lands for development are in a very healthy position. The Austrian Government intends largely to increase the use of oil fuel on State railways, and Waclaw-Wolski, president of the Crude Oil Producers' Union of Galicia, gave it as his opinion on April 17th that the present price of crude oil would undergo a small rise in the near future.

At a recent lecture by Professor Szainochau it was urged that the theory of the animal origin of petroleum allows of an easy calculation of the immense underground stores of petroleum to be extracted in Galicia. Taking the area of the menelithic slates to be equal to only 1,000 kilometres, and the thickness of the stratum of rocks to be only 50 metres, we have thus a mass of menelithic rock of 50,000,000,000 cubic metres. Admitting, again, the average specific gravity of the rock is equal to 1.2, the total weight of the rock must be not less than 60,000,000,000 tons, which, taking its contents in bituminous matter as equal to only 1 per cent., would give a total of 600,000,000 tons of bitumen. Assuming these bituminous matters to have given origin to only 50 per cent. of petroleum, we attain the lowest estimate of the Galician petroleum wealth as equal to 300,000,000 tons, of which only 12,500,000 tons have been extracted during the last fifty years.

The total production of petroleum in Galicia during last year was 1,762,560 tons, 91.6 per cent. of this being produced on the Tustanowice and Boryslaw fields. Following upon years of uninterrupted increase these figures show a decrease on the previous year—a decrease which would have been larger had it not been for the newer smaller fields in the east and west of Galicia. Activity is also reported amongst Roumanian producers, who are benefitting by the abolition of that portion of the taxes on kerosene known as the communal fund, which is levied at the rate of five francs per 100 kilogrammes. This is considered to be the first step to the total abolition of taxes upon kerosene in Roumania.

From as far away as the Eastern Siberian coast comes other interesting oil information. Engineer Preskuriakoff recently delivered a lecture before the Russia Technical Society, on his investigation during last summer of the petroliferous areas on the east shores of the Isle of Sakhalin. The lecturer gave a short physico-geographical description of the Isle, based on data supplied by scientific expeditions during the last three years, supplemented by his own observations during the four summer months of 1910. The petroleum and coal wealth of the Island of Sakhalin, said the author, was practically inexhaustible, and would be sufficient to supply the whole world with fuel for centuries. A rather large order this!

The Maikop district in the south of Russia is working hard upon its pipe line connections through some of which already oil has commenced to flow. Those Maikop companies that are already producing and have stocks of oil are now in a position to put their product on the market and earn profits. A new Russian law is reported to the effect that foreign companies in the Maikop district must employ only Russian subjects for their technical staffs and as managers of their properties.

From Persia comes the news of proved petroleum. Exceptionally rich are reported to be the basins of the rivers Ab-i-Dizi and Karun and the Isle of Kishma. In these places oil spurts from the earth in large quantities and almost all the deposits are situated near to the sea or a navigable river.

To organize the oil business of London better it is proposed to form an oil exchange which will bring into close touch producers, refiners, carriers, distributers, merchants, company promoters, brokers, underwriters, engineers, and promoters.

Recent oil flotations here include such varied emissions as the following: Franco-British Oil Trust, capital one million and a quarter dollars; Venezuelan Oilfields Exploration, capital $787,500; Central Ohio Oilfields, capital $800,000; Kuban Black Sea Oilfields, capital $1,500,000; Californian Amalgamated Oil, capital, $1,750,000; Caucasus Domains, capital $2,500,000; Asiatic Petroleum Company of Egypt, capital $1,000,000; and West Coast (of South America) Oilfield, capital $500,000. These were all registered within the first fortnight of April.

Colliery owners and colliery engineers in Great Britain are naturally increasingly interested in electric winding, and an installation just put down in the South Kenmuir colliery in Scotland is expected to be the beginning of a series of important changes in British colliery districts. The advent of electric winding here has been hastened by the appearance of the power companies which supply electricity at rates usually lower than the consumers can generate it for themselves. The winding gear at the South Kenmuir pits is designed for winding eventually from a depth of 160 fathoms, although at present it is only working from the 90 fathoms' level. Each cage carries two hutches with a total of 1,904 pounds of coal, the empty hutches being lowered in the other cage, and as a winding schedule of 65 winds per minute can be obtained, the gear is capable of dealing with 55 tons (of 2,240 pounds each) of coal per hour. The main winding drum is of the spiro-conical type, in which at the commencement of the wind the ascending rope is on a part of the drum which has a diameter approximating 5 feet, while the descending rope is on the centre of the drum, whose diameter is 10 feet. This arrangement has the effect of minimizing the effort required from the electrical plant during the period of acceleration, the rope being transferred to the larger diameter towards the end of the acceleration period by a cast iron spiral formed in the drum check. The electrical equipment involves the use of a motor generator which converts the three-phase alternating current taken from the power supply company to continuous current, which is found to be more suitable for driving two motors attached to the gear. The motor generator not only performs this conversion but is so designed that the characteristics of the continuous coal supply are exactly suited to the demands of the gear motors.

The actual control of the gear is manipulated by means of a regulator in the field circuit of the motor generator and by a reversing switch in the gear motor circuit, these two switches being electrically interlocked in such a way as to make it necessary that power should be removed from the motors and the brake applied before they can be reversed. A mag-

netically operated brake is provided, the action of which is controlled by the electrical circuits in such a way that the brake is applied and the cages are brought to rest in response to the movement of the controller or to the opening of the limit switches as well as to any interruption to the main power supply. A depth indicator geared to the winding drum is provided to show the position of the cage and to trip the overwinding switches in the event of the man in charge not attending to the indicator and bringing the controller to the stop position sufficiently early. Although it is not necessary in the regular manipulation of the gear, there is an additional brake having a foot pedal and a trip coil for directly applying it if the supply from the mains should fail. A series of tests have been made, from which it is possible to estimate the cost of winding. The maximum demand of power from the mains does not exceed 120 kilowatts, and the number of units taken when making 65 winds per hour is equivalent to 1.4 unit per ton of coal raised. Assuming that electrical energy can be purchased at the rate of 1½ cents per unit, the cost for power of winding coal from this depth is slightly less than 2.2 cents per ton, a figure which will compare very favourably with the cost of winding by steam, especially in view of the fact that only one man is required and that he only needs to attend during actual winding hours.

Interesting accounts are being published here regarding the remarkable results obtained at the Waihi Grand Junction mine of New Zealand by the all-slimming process and tall tank treatment. Considering that the ore treated is very refractory, and contains a large proportion of silver associated with 8 to 10 per cent. of sulphide-pyrite, saphalerite, chalcopyrite, with arsenic and antimony, a total working cost of under five dollars per ton of 2,240 pounds, after allowing one dollar per ton for ore development working on a 40-stamp basis, is an exeellent result. The results are taken from the actual working of the plant over a period of six months, from January to June, 1910. One authority here holds that if such results on such a difficult ore can be obtained as exists in this mine, the same process, if applied to the simple ores of the Rand, would produce a revolution and allow costs to be reduced by several shillings per ton. With all the experience of the Rand, evidently mueh has still to be learned and mueh unlearned.

With regard to the Rand, as I have before indicated, the market has a sagging character upon which most of the newspapers here from the "Times" downward have been giving their views. Perhaps the truest view of the present dulness in Kaffir shares is that a lower level of prices at the present time suits the book of the big mining groups. Working on very excellent principles the mining houses take in stoek when prices are low and off-load when they are above intrinsic merits. Most of the big Rand mining shares are at about two-thirds the price they stood at in 1909. But they apparently have got to be lower still before the public can be attracted in. The Rand eight hours' day and the miners' phthisis compensation bills have helped those who wanted to bring the market back and there has been a great deal of exaggeration about the results of these measures.

The fact also that Wernher Beit and Company are disposing of their interests in the Central Mining and Investment Company and that the Goldfields people are investing largely in the United States are things that do not tend to encourage the investor here. Neither does the suggestion that the Johannesburg Stoek Exchange may be forced to close its doors. Furthermore, labour is decidedly more expensive on the Rand partly owing to the high cost of recruiting, and general working costs are abnormally high at many well known mines.

Against all these things, however, there is the solid fact that according to one authority there is still ten thousand million dollars' worth of gold to be won on the Rand, that labour is increasing in quality, with the result that good effects should be felt by May, and finally, that the experiments with small rock drills are so satisfactory that hopes are expressed by one of the leading groups that it may be possible by the end of this year to do away entirely with native labour in drilling.

The new tin mining district of Northern Nigeria continues to attract attention, and while there is no boom in Nigerian tin shares, every week that passes sees the registration of two or three new companies to work there. The existence of tin in Bauchi, in considerable quantities, became a recognized fact at the close of 1909, and the evident possibilities of great development are attracting to that district a large number of prospectors and mining engineers. The stanniferous area is very wide and appears to be much more extensive than was at first believed. Some of the alluvial deposits are so rich that they may be profitably worked even under great difficulties, and the prospects of developing our important mining industry are very promising.

The position of the tin market at the present time appears to be that whilst the world's consumption has increased by 1½ per cent., the world's production has decreased by 4½ per cent. so far as last year was concerned It also appears that the production from the older tin fields is likely to decrease in quantity in the future. Even with the primitive methods of winning tin in Northern Nigeria the cost of tin oxide won in the Bauchi province delivered in London does not exceed $250 per ton, whilst the prices ruling for tin oxide from that field at the present time are somewhere about $600 per ton.

The Colonial Government is building a railway from Rigachiku to Leri, which was at the foot of the tin field, without calling upon any of the mining companies for financial guarantees, the simple stipulation being that the companies shall give the railway the carriage at an agreed rate both to and from the field for a period of five years. The machinery, plant, and requisites for this valuable railway extension are to go out to the West Coast by about August of this year. The estimated cost of construction — $15,000 per mile —will make it the cheapest line ever constructed in tropical Africa. Life and property are now as safe in Northern Nigeria as in any other of the African protectorates, although the country has an area exceeding 250,000 square miles and a native population of about eight millions.

It has been announced that the coal lands in Alberta of the Consolidated Coal Fields, Limited, situated miles southwest of Bickerdike on the Brazeau branch of the Grand Trunk Pacific Railway, will be extensively developed during the ensuing summer. Throughout the winter men have been engaged in laying out the lands and preparing for sinking shafts. The area of the property is stated to be 7,600 acres, surveyed last year. Coal from this property will, it is claimed, be the first to reach market from the Brazeau district.

SOME NOTES ON SAMPLING AS PRACTISED ON THE RAND.

(Written for the Canadian Mining Journal by Robert W. Thompson.)*

n view of the likelihood of a gold camp of conerable merit and permanence being developed in ario, it may not be out of place to outline the gen- method of sampling as followed on the large proing gold mines of the Transvaal.

he object of the sampling department is to keep management posted up to date on the values as nd in the development work, drifts, winzes, cross- , etc., and also along the faces of the working stopes.

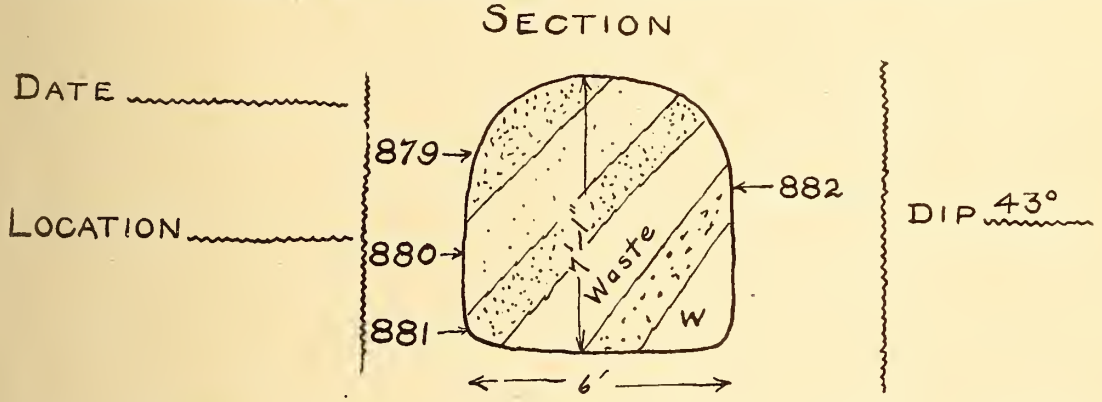
ach sampler has a section of the mine for the pling of which he is responsible.

he sampling house is equipped with drying fur-, electrically driven crushers, and grinders, pan- troughs or tubs, mixing tables, ordinary grocers' s, and shelves for storing discards.

e whole of each individual sample is ground to a 60 mesh sieve before quartering for panning and samples. The crushing and grinding is attended a native "boy" who returns the ground sample e sack in which it came from the mine with the earing the sampler's initials and the sample number.

is is thoroughly mixed by rolling on a piece of ican cloth. The panning and assay samples are selected and the discard filed away until the returns from the assay office are received, when if these are found to harmonize with the panning result the discard is thrown away. If the panning and assay returns do not agree a fresh portion for each is taken from the discard for a check, and the error located.

In development drifts it is customary to take a section across the face after each round. Some managers prefer taking samples at regular intervals of from five to ten feet along the walls. The former method is preferable as more accurate results can be secured and a better conception of the changes in character of the reef obtained by working on a clean face than by working on the dirty walls of the drift.



SAMPLE Nº	WIDTH	REMARKS	PAN	ASSAY
879	14"+	Scattered Pebbles	1 dwt	1½ dwt
880	12"	"	2 "	3 "
881	9"	Well defined Reef	16 "	23 "
Waste	25"			
882	11"	Heavily Mineralized	22 "	37 "
Waste	15"+			
MIXED PAN			9 dwt	14·6 dwt

Figure 1.

The distance of the section from the nearest survey peg is accurately measured so that the results can be platted on the assay plan.

Samples are taken across the face, starting at upper part of reef exposed and working towards the footwall, or vice versa, as the sampler prefers.

The width over which each sample is taken depends on the appearance of the reef and the discretion of the sampler, usually not more than twelve to fifteen inches is covered by any one sample.

A typical section as it might appear, with accompanying notes in a sampler's notebook, is given in fig. 1.

*ining Engineer, 14 West Charles St., Toronto.

A portion of each individual sample after drying and grinding as above described, is panned by the sampler and the result entered in his notebook after the corresponding sample number. Another portion is sent to the assay office and the returns entered in a similar manner. As a check on the pannings as well as on the assay returns, a "mixed pan" is made up by taking an amount from each sample proportional to the width over which the sample was taken. In the example, fig. 1, this would be made up as follows:

From sample 879 take 14 ounces.
From sample 880 take 12 ounces.
From sample 881 take 9 ounces.
From sample 882 take 11 ounces.

These are thoroughly mixed and a portion panned. The result from this panning should agree with the average worked out from the individual pannings. Also the assay returns from this "mixed pan" should agree with the average worked out from the individual assay returns. When it is found that the panning and assay returns check up, the final results are entered up in the sampling ledger with a section as shown in fig. 1. The stoping width and values are also worked out and entered in the ledger. In the example taken, that part of the reef covered by samples 879 and 880 being below pay value, would not be included in the stoping width. This latter would be: Reef 9 inches, waste 25 inches, reef 11 inches, equals stoping width 45 inches, and the average value equals pan 8.6 dwts., assay 13.6 dwts. Again, the milling width and value are calculated from these results and entered up in a separate column. In this case about 12 inches of the waste rock would be fair sorting, leaving a milling width of 33 inches and a milling value of pan 11.7 dwts., assay 18.5 dwts.

In entering up the results on the assay plan the average value of the pay reef is given and the width of the included waste rock noted. The section under consideration would be platted on the plan as follows: W 25 R 20 P 19.3 A 30.7, meaning that there is 20 inches of pay reef panning 19.3 dwts, assaying 30.7 dwts., and having included waste rock of 25 inches.

In sampling stopes the same method is followed except that the "mixed pan" is not used. Sections are taken along the stope face at regular intervals of from five to ten feet. The results are entered in the stope sample book in detail and the final result obtained for each section is platted in its proper position on the plan of the stope as surveyed at that date. From these data the average stope value is worked out.

Sampling records of winzes, raises, and cross-cuts are kept in a separate ledger.

Steamboat Mountain, B.C.

The "Standard," published at Kamloops, British Columbia, on April 7th printed an article headed "Wildcat Staking," in which the opinion of a visitor to Steamboat Mountain district, which is being much "boomed" in Vancouver, B.C., is quoted to the effect that irresponsible staking is very prevalent and that unless it shall be discontinued it will work harm to the whole of this new prospecting camp. The statement is made that there are men in the district staking mineral claims, being paid a salary for doing so, and that the object of some seems to be only to stake claims and sell them for $100 each, if more be not c tainable. It is alleged that up to April 1 there h been about 700 claims recorded and that on one d in March 40 records were taken out. The significa comment is made that those who know what thin are like in Steamboat Mountain district and t amount of snow there is in the hills, will realize t conditions under which staking must have been do

Our British Columbia correspondent informs us th while specimen assays have indicated that ore c taining comparatively high value is found in the d tract, there has not yet been done sufficient develo ment to demonstrate that payable mines will be fou there. The deep snow of the winter has prevent much effective work being done on the claims, so is yet quite premature to conclude that there is wa rant for many statements to which publicity has be given, and which may yet, and probably will, be fou much exaggerated. One extreme case of trying to cite the public in this connection is that of a two-pa advertisement in one of the Vancouver daily new papers, the advertisers seemingly having little rega for anything but how to get hold of the dollars those foolish enough to be induced to part with th money for very small pieces of land platted as to lots in a mountainous district as yet altogether un veloped and the future of which is, and pending s eral years' steady development must remain, quite u certain. Some illustrations, seemingly intended to m lead, suggest that mining and milling has reached stage far beyond what the present situation is in t camp. It will be well, therefore, for those whose tention has been attracted by "boom" notices Steamboat Mountain, in Yale district of British C umbia, to make careful enquiry before putting mon into it. This is not saying that the camp will n eventually be a good one; only that as yet it is qu unproved, and that many very extravagant statemen concerning its value have been and are being giv publicity, against which it is desirable to warn t public.

Keekeek Lake Region

Through the courtesy of Mr. Theo Denis, Superintendent of Mines, Que., the CANADIAN MINING JOURN is enabled to publish the latest map of the Keeke Lake region. It will be noticed that considerable sta ing of gold claims has already been done. A glan at the map shows many names of mining men iden fied with Cobalt and Porcupine. Amongst these ar P. A. Robbins, E. J. Darragh, C. A. Foster, B. Crawfo M. F. Fairlie, Alex. Gillies, W. H. Reamsbottom, Shields, T. J. Renwick, N. Bilsky, and many others.

As Keekeek Lake is in Pontiac County, Quebec, ne the Ontario border, there will probably be a conside able number of prospectors ready and willing to ha their attention diverted to a new land of promise.

The map reproduced herewith shows the number claims staked up to April 10. Only a few claims alo the lake were staked before snow fell.

During the coming summer Dr. J. A. Bancroft, McGill, and Mr. Valequette are to work over the d trict for the Quebec Mines Branch.

PLAN

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Dans

Les Cantons Projetés

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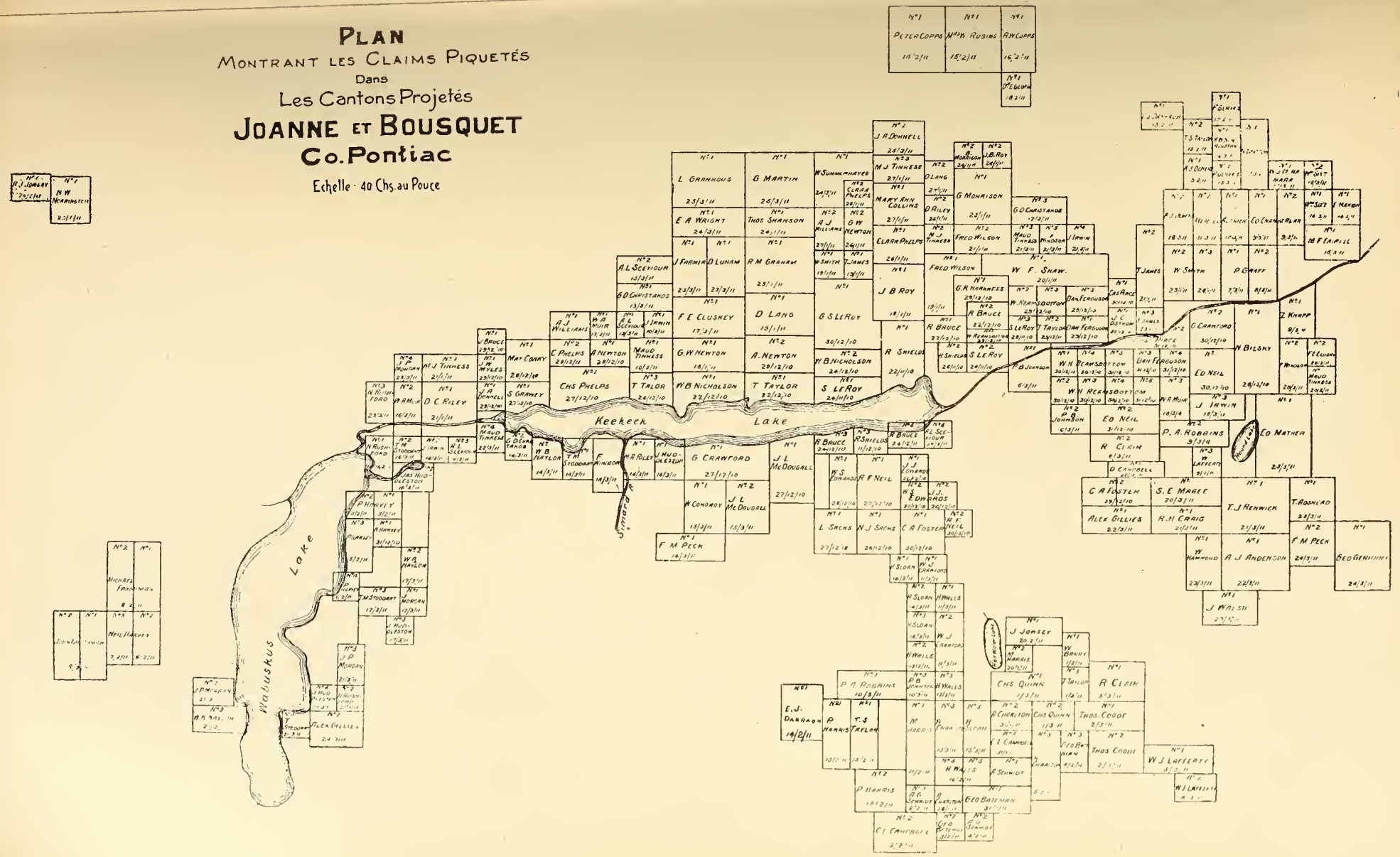


MARITIME OILFIELDS, LIMITED

The following account of the second ordinary general meeting of Maritime Oilfields, Ltd., held recently in Glasgow, is reprinted from The Financial Times, of London, England. To many of our readers the facts here set forth will come as a surprise. It is noteworthy that New Brunswick's chief industrial centre is soon to have a supply of excellent natural gas. 37,500,000 cubic feet of gas per day can now be supplied by the company. The details as presented hereunder are worth reading:—

The chairman said the company's financial position was strengthened during the year by the increase of capital to £100,000 and the issue of 30,000 ordinary shares, upon which 7s. 6d. per share had been called up; 29,000 ordinary shares are held in reserve. During the year Messrs. Claud A. Allan and William Walker had joined the board. After dealing with the accounts the chairman reminded the shareholders that when they last met together in general meeting test wells Nos. 3 and 5 had proved, in addition to high-grade oil, the existence of natural gas in large quantities upon its property in New Brunswick, Canada, and having in view the possibility of immediately turning the latter product to profitable account, it was decided to concentrate all work upon natural gas development on the anticlinal at Stony Creek, in Albert County, upon which these wells had been drilled. Accordingly, development work was carried on energetically and systematically upon this "gas pool," and excellent progress was made, with the result that during the financial year under review eight further wells were sunk at Stony Creek. Of these, two had to be abandoned on account of becoming crooked before the third, or most prolific, group of oil and gas sands was struck, but all of the remaining wells proved exceptionally fine gas wells, with an aggregate yield of 9½ million cubic feet of gas per day. These gas wells are all oil producers, some indeed promising excellently, and were it not for the much greater relative value of their gas yields, would be treated as oil wells. Excellent as these results were, still more remarkable developments took place immediately after the close of the financial year, and in October and November three large gas wells were brought in (well No. 14—12,000,000 cubic feet per day; well No. 15—6,500,000 cubic feet per day; and well No. 16—9,500,000 cubic feet per day), with a combined gas yield of 28,000,000 cubic feet per day. Other wells are being completed or are in course of drilling.

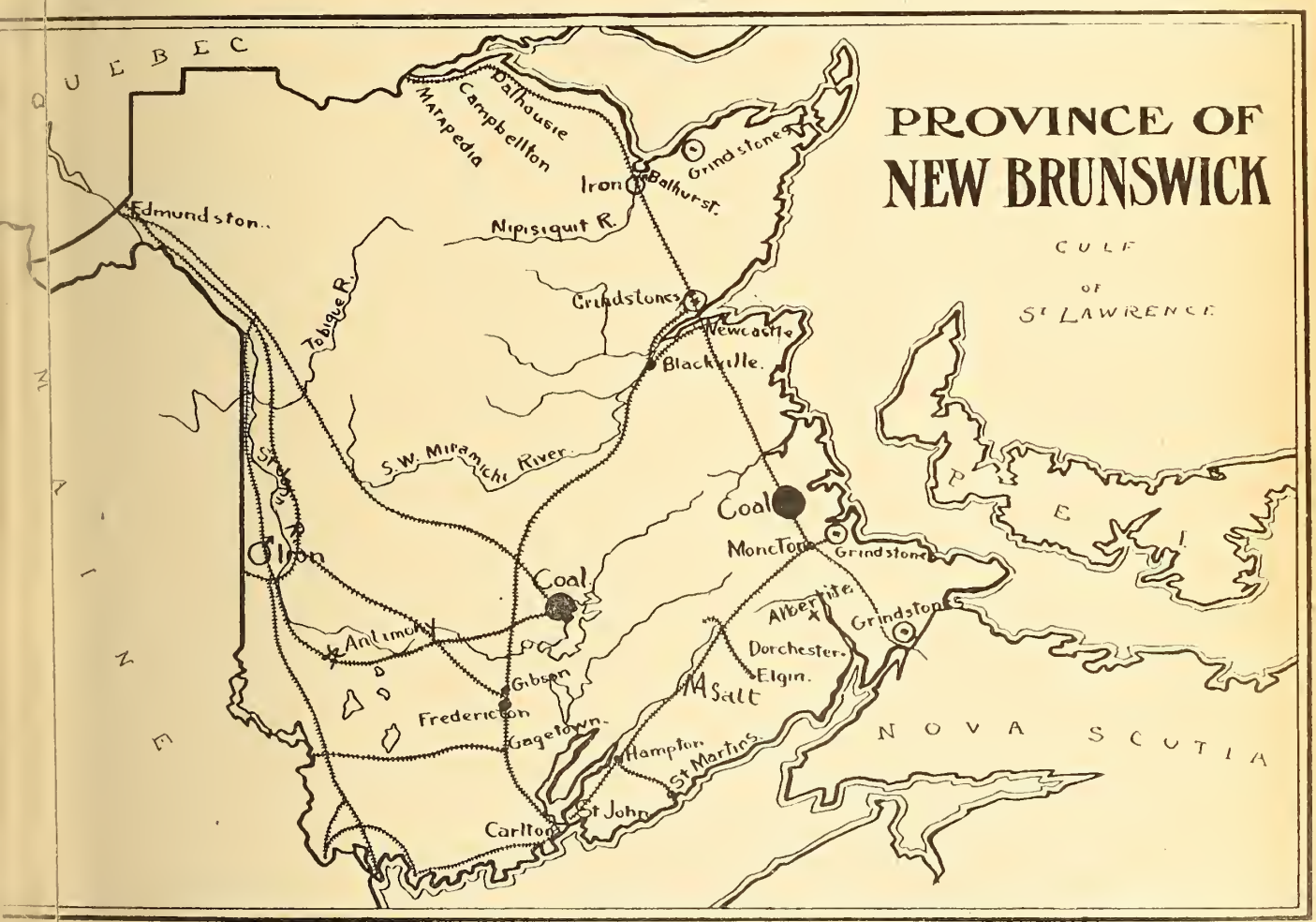
The Company's Property.

The company had now 13 productive gas and oil wells, yielding a total measured flow of 37,500,000 cubic feet of gas per day and a considerable flow of oil, which latter is impossible of measurement owing to the necessity of shutting in the wells under the great gas pressure existing (as high as 600 pounds per square inch), but in certain wells which it was possible to "shoot," initial oil flows ranged up to 60 barrels per day. The development work on the Stony Creek "gas and oil pool" had now thoroughly proved a length along the anticlinal of over 1½ miles and a breadth of over half a mile. The successive wells westwards have proved to be increasingly valuable, and the geological conditions continue favourable. In accordance with the best natural gas practice, the company has sunk only one well per 30 to 40 acres. As the greatest portion of the area developed is oil-bearing also, and as oil-well practice calls for one well per 5 acres or le there is room for over 100 additional oil wells to sunk on the area already developed when the ti comes to treat this as an oil-field. The Albert Coun anticlinals had been traced over 40 miles west, whe natural gas springs occur, and there were thus gre possibilities in this southern section of the company area. The three groups of productive oil and g sands tested at Stony Creek had proved persistent character and extent as gas and oil-bearing. Ea group contained up to six distinct sands—individu sands varying from 2 feet to 100 feet in thickness and the maximum aggregate thickness of sands in a one well exceeded 250 feet. A still deeper group of sands as yet untested at Stony Creek was known exist, whilst the total thickness of the oil-bearing f mation is still unknown, but has been proved to ceed 3,000 feet. The natural gas had been a source very great economy in the company's operations all power, heat, and light purposes, in connection w which about 60,000,000 cubic feet of gas were c sumed during the year; indeed, since gas was fi struck, the company has used for its own purposes less than 100,000,000 cubic feet. The company v now in a position to run three strings of tools conti ously during the current year. Several additional r have also been constructed and a large amount spare material has been purchased in order to sec the best working results. The company's developme have attracted considerable attention throughout N Brunswick and other parts of Canada, and in oil a gas circles in U.S.A. A large number of influen people had visited the property and were much pressed by the results attained. Two directors, Dr. Hope Henderson and Mr. L. A. McGeoch, whilst New Brunswick, took the opportunity of paying a v to the property.

Value of Natural Gas.

In dealing with the question of the value of natu gas the chairman said that it was one of the most portant products in North America, where the gro of the industry had been phenomenal, and it now ra amongst the great industries of the age. In the Uni States natural gas companies' securities are regar as first-class investments, the total capital invested this business approximates $225,000,000, and last ye production of gas was valued at $57,000,000. Natu gas is used for all household purposes—heating, co ing, lighting, etc.—wherever it is available, owing its extreme convenience and economy. The demand these purposes is invariably greater than the sup and in the United States the price of natural ga rising rapidly. For manufacturing purposes natu gas, as is well known, has had an enormous effect the rise of industrial centres, such as Pittsburg. tural gas is eagerly sought after for the productio cheap power, and for fuel in iron and steel industr glass making, cement making, etc. The question a the life of gas wells, which, next to that of markets gas, is most frequently asked, had to be very caref considered in opening up a new field. He was gla say that the Stony Creek wells, from prolonged t had proved good "stayers," and that geological ditions also warranted the confident belief that t gas wells would prove long-lived. Gas wells in United States, in similar sands, have proved, with per care and management, to have great staying q

, and wells of 20 to 30 years of age are not rare, lst it is held that 40 or 45 years is by no means the it in certain districts. For the purposes of the com- y's estimates, however, the soundest and most con- vative natural gas practice had been adopted, and mates were based upon 10 per cent. of the mea- ued yield of the wells as an average effective delivery r an extended period. Abundant markets for na- al gas exist in this long-settled country, within easy ing distance of present and possible future devel- ents. It is estimated that the present demand for estic and industrial purposes within the towns ex- ding from the port of St. John on the west to Sack- e on the east amounts to £500,000 in value per an- . The city of Moncton, an important and growing way and industrial centre, lies about 8½ miles due



of the gas wells, and the company had, through edium of Acadia Syndicate, Ltd., entered into a factory arrangement with Moncton Tramways, ricity & Gas Company, Ltd., for the supply of al gas to the city. It was estimated that the de- for natural gas for domestic and manufacturing ses in Moncton would be at least 1,000,000,000 feet per annum, and it was hoped that the Monc- ompany's gas installation would be completed by utumn, when Maritime Oilfields, Ltd., should be- a regular profit-earning institution from this one alone. During the year applications had been ved for the purchase of the company's oil output extended periods, but the board considered it pre- re to enter into any such arrangements. The poli- tlined in last year's report had been adhered to into consideration, hold that it is important to secure a large amount of working capital by the flotation of a large company whenever a favourable opportunity oc- curs. They believe that the very favourable results already achieved fully justify them in appealing to the public. Drilling operations will be carried on as usual during this year until other arrangements are made. The chairman referred in terms of high appre- ciation to the services of the field manager, Mr. Oren P. Boggs, and the staff in New Brunswick.

The reports were adopted.

Mr. L. A. McGeoch, in referring to his visit to the company's property, said he had nothing to add to the speech of the chairman, which covered the ground very fully. He was much struck with the scope of the field development work, and the thorough and busi-

nesslike manner in which it was carried on in the face of difficulties which were not always realized at home. He considered it an extraordinary thing that only two or three scout wells had been necessary to locate the anticlinal upon which the company was obtaining its results. The great pressure of the gas and its terrific roar made him realize the amount of gas which existed there. He referred to the local confidence in the future of the field, and to the possibilities in store f the city of Moncton, into which the gas would be i troduced this year.

The retiring directors, Messrs. Claud A. Allan, Wi liam Walker, and W. Hope Henderson, were re-electe The auditors were reappointed. A vote of thanks t the chairman brought the proceedings to a close.

Gold Mining in Western Ontario, A Lesson from Mining History.

(Written for the CANADIAN MINING JOURNAL by W. E. H. Carter.)*

Illustrations furnished through courtesy of the Ontari o Bureau of Mines.

The great activity in the hunt for gold in the Porcupine area and adjacent fields, brings forcibly to the writer's mind another gold-bearing region in this province, and also the fact that there is a psychological element in the growth and success of any mining camp, probably most pronounced in the case of gold. Unless this element be understood one may look in vain for adequate causes for the unfortunate subsidence into obscurity of certain mining fields, once the cynosure of the eyes of the mining world. As regards Western Ontario, this fact never was appreciated.

It is easier to look back and see the mistakes made, than to recognize them in the making. In the first case one sums the subject up for himself. In the second, there are endless interests in the field, each working out his mining problem in the way in which each thinks lies the salvation of his pocket. That the lining of his pocket should be derived from actual dividends earned by the mine has almost always been the last object provided for.

There is no desire on the writer's part to draw comparisons between past and present, for such comparisons do little good. Only with the advancement in knowledge by the public of the legitimate business side of mining and with a growing appreciation of the evils attending the exploitation of any new field, will the real value of any mining camp be properly and thoroughly determined.

Our experiences in the past six or seven years with mines almost at the doors of residents in Central Canada, as for instance in the Cobalt and outlying mining camps, have been manifold and without doubt are already exercising a beneficial effect in the development of the most recent discoveries of gold in the Porcupine areas. Had it been any mineral other than gold, which in a new and apparently deserving field always has awakened afresh the interest of the world, no such general speculative and investing interest as is already in evidence would have resulted.

In the April issue of the Mining Magazine (London) is an article entitled "Mining Speculation," signed by "A Director," of whom the editor speaks as "a financier not without authority." These remarks amongst other things put in words a truth that we have probably all realized dimly before, to the effect that "The speculator is a more important factor in mining finance than the investor." The speculator is a psychologist in operation if ever there was one, and therefore let us not now tax his credulity to too great a extent by asking his financial aid in any and eve forty acres of ground in the north country. If tho who make it their business to sell mining property the company promoter (not, of course, the prospect offering his own claim, for he is too strongly biassed will only take the trouble to secure ground which the report of a technically and morally qualified me ber of the mining engineering profession has a fa chance of success with development., there will many less failures, the public interest will be retain long enough to provide working capital for those pr perties which are gradually proving themselves dese ing and the speculator will in the end give place to t investor. Indeed the speculator will himself oft enough become the investor.

As a community we are, I believe, much better t ted than we were a few years ago to appreciate th "mining engineering is now one of the scientific pr fessions, a high standard of technical knowledge demanded and is forthcoming and, what is of equ importance, a high code of professional conduct a etiquette has been set up and is for the most part o served." To quote further, "In all respects the co trasts between the conditions to-day and those obta ing ten years ago is striking and unmistakable."

In my opinion, formed by actual contact over period of five years, first as operating engineer, a later as Inspector of Mines for this province, it was t utter carelessness of those who put up the mon speculator and investor alike, that finally, about t beginning of the last decade, brought to naught t Western Ontario gold areas in spite of the many veloped and finely equipped mines, a number of wh had for some years been producers.

Gold was first discovered in the Lake of the Wo country in 1883. Sporadic attempts at mining c tinued only for a year, or two. Soon, however, fr discoveries gave a renewed impetus and operati were steadily enlarged extending to practically ev accessible part of the western end of the provi The height of activity was reached in 1897, after wh the reaction set in, inevitable after the abuse of codes of mining business, and the industry gradu lost ground. Even then a good deal of irregular more or less successful prospecting was done, for til as late as 1900 new gold-bearing territory was a ed, the last land of promise being Sturgeon Lake,

*Mining engineer, 85 Front St. East, Toronto, Ont.

s north of Ignace on the C.P.R., and the Eagle
area, south of Eagle Lake station on the same
way.
the numerous gold properties in Ontario, 34 had,
e year 1901, stamp-mills ranging in size from 2

Golden Star, and Olive mines. The following table gives the number of gold mines that attained in their underground workings a greater depth than 100 feet:

Mikado mine, depth between 800 and 900 feet.
Sultana mine, depth between 500 and 600 feet.

View on Railway from Mine to Mill at Camp Bay.

Mikado Gold Mine, View of Works.

stamps to 40 stamps. The total number of stamps installed was 460. With the exception of a very small number these were all erected on Western Ontario gold mines.

The most important producers during the last years active work were the Sultana, Mikado, Sakoose,

Three other mines, depth between 400 and 500 feet.
One other mine, depth between 300 and 400 feet.
Ten other mines, depth between 200 and 300 feet.
Twenty to thirty other mines, depth between 100 and 200 feet.

The deepest mines have been the largest producers.

To-day, transportation facilities in that western part of the province are greatly improved, along the southern boundary by the advent in 1904 of the Port Arthur to Winnipeg branch of the Canadian Northern Railway; and in the north by the addition of the Grand Trunk Pacific. In the early days, however, and even as late as 1903, the whole area was handicapped with the greatest difficulty of access. There was but one line of railway, the Canadian Pacific, in addition to which practically the only means of travel in the summer was by the endless chain of waterways, rivers and lakes, and that mostly by canoes; although on the larger lakes there were a few small steamers. On account of the numerous portages, transportation of supplies was extremely expensive, hence practically everything, and, of course, all machinery, had to be hauled in during

The final reckoning was a long time coming—years or more. There is no particular need of mou ing now. It is well, however, to profit by the err committed. These errors may have been numer but after all none compared with, and all were m or less the result of the one unpardonable sin of or sion, that in almost every case no qualified advice sought, nor apparently wanted. I have discussed fairs with mine managers whose qualifications dou less were all right up to their limit, but whose origi occupation ranged from a one time bar-tender up t General of the British army, each having in his c trol the expenditure in mining development and pl of large sums of money. Any crack in the solid co try rock, a few short quartz stringers and sim "showings" were in numerous cases sufficient for

Sultana and Burley Gold Mines.

Regina Mine

the winter months by team over winter roads, frozen lakes and rivers.

The hunt for gold had carried the prospector to such distant outlying areas that many camps in the early days of their development could be reached in winter only by dog-team, or by the lonely snowshoe tramp with pack on back. Many a time has the writer attained the end of his journey by such means, to find there a busy little mining camp with development going eagerly forward.

Such was the general enthusiasm at that time in the gold mining region of Western Ontario. No obstacle was too great to be overcome, and no expense too heavy for the investing public to meet.

establishment of a camp and the attempt to devel mine. These are the regrettable incidents. M thousands of dollars thus wasted in useless mi might have been saved by the outlay at the very ginning of a small fraction of the subsequent exp ture in fees for technical advice, which would warranted the turning down at once of such so-c mining prospects.

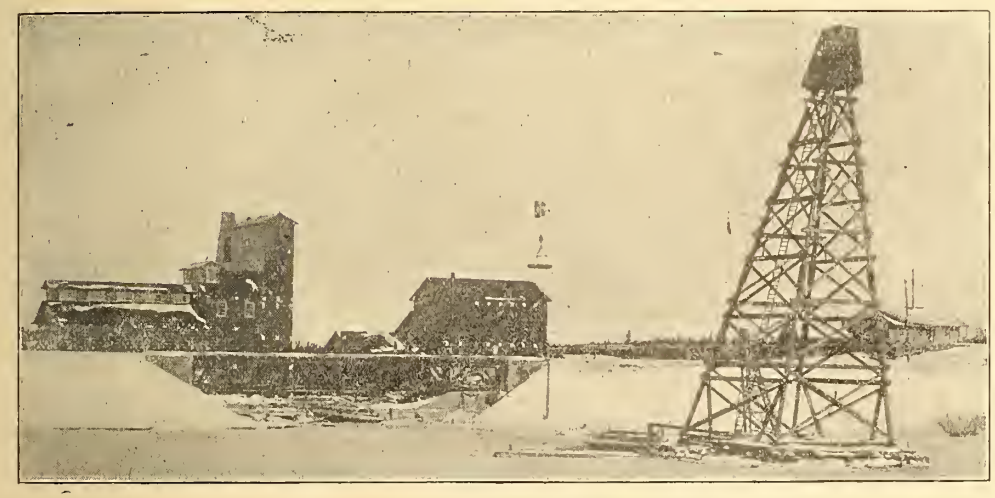
On the other hand, there were many worthy pr ties, a number of which produced pay ore in cons able quantities. Had the visibly worthless ones culled out of the way, the interest in the area w have been confined of necessity to the smaller nu of possible mines, and these would at least hav

d a longer lease of life than they did. So far as n there were no particular bonanzas, such as the nger mine in the case of Porcupine, to stimulate st. Such outstanding prizes make the heart glad, is not they alone that are able to pay dividends. an ore body of less value per ton is well worth ttention of the miner, and Western Ontario may several of these.

e worst that may be said of these more promising properties in Western Ontario is that they never fair show, either financially or, with but few exons, technically. The money of the investing or lating public was spread over an immense area ntry in prospects everywhere. It is history with ew exceptions, of which latter Cobalt may be ined, that in no mining camp or field does more than y small percentage of the properties exploited out profitably. To preserve the balance, nature ot been overlavish with the miner. Hence when t countless prospects, which either at the start er a course of preliminary development could have mpetent men been reported worthless, continued parts of this western field to give no promise of the public confidence in the whole field waned.

from their inception, twenty years ago, been carefully compiled, with the result that a complete history of the underground and surface workings of practically every property, from the prospect up, is now available as a guide to those interested. Of the actual gold content of the veins, little definite information will, however, be found. The chief reason for this is that the operators themselves did not always know. Outside of this source of information the only means of determining the same would have been by systematic sampling, and this was not one of the functions of the mine inspector.

Among the most interesting mining properties in Western Ontario, which might bear inspection, may be mentioned the Sultana, on the Lake of the Woods. This reached the depth of 470 feet at the seventh level, with many hundred feet of drifting on all the levels. One of the ore stopes was of great size, measuring (I write from memory) at its greatest cross-section about 40 feet wide, by 100 feet or more along the strike of the vein, and extending from the surface down to the fifth or sixth level. The surface plant was elaborate, including a 40-stamp mill, a roasting and chlorination plant.



Ottawa Reduction Works– Keewatin.

e deserving properties suffered with the rest.

height of activity in these western gold fields d, as mentioned above, in 1897. By 1900 the l public had lost interest (as well as their money) nly a few mines struggled on. By 1903 practievery property had ceased to operate.

cupine has come to Ontario as the saviour of the ining industry. It took a good year to instil inmind of the public and mining men alike the idea ossibly after all Ontario could produce a valuold mine.

now how rapid has been the effect upon this camp in the west end of the province. Within ar the old Mikado mine, the deepest and one of ost completely equipped, absolutely abandoned, ve, by the former operators, has been reopened ong financial interests, who have placed a ca- engineer in charge. Already an entirely new of pay ore has been found, which is now under development. Other of these better known old rties are being spoken of in mining circles and press, which can be taken as an indication of may shortly come about, the re-opening for extion at least of more of them.

reports of the Bureau of Mines of the Depart- of Lands, Forests and Mines of Ontario have

The Regina mine, on Regina Bay, Lake of the Woods, was sunk to a depth of 535 feet. At this time also extensive drifting was done. No later than 1900 the mine changed hands. More underground development was then accomplished and an entirely new reduction plant erected, including a battery of 30-gravity stamps to replace the original 20 Tremaine steam stamps. The Golden Star just north of Mine Centre in the Lower Seine River area, is another well developed property, having attained a depth of 530 feet at the seventh level, with a great deal of drifting on all the levels. The ore was treated in a 20-stamp mill connected by a mile or so of aerial cable-way with the mine.

In addition to the above, one might continue enumerating gold mine after gold mine in this western part of Ontario, each with defined and substantial veins, and all more or less elaborately equipped with the best of mining plant. Of many of these it may be safely said that the value of the veins for profitable operation has never been definitely determined.

It is not my purpose here either to state or to imply any more than this. I often enough, then and since, felt that many of the gold mining properties of Western Ontario never had a fair chance to show whether or no they were, under the proper conditions, capable of profitable operation.

An Efficient Steam Pipe Support

The accompanying sketches illustrate a design of steam pipe support which has proven very efficient about the plants of the Southern Division of the Republic Iron & Steel Company.

In figs. 1 and 2 are shown the support, which allows of a free movement of the steam pipe both in the direction of the steam line and also at right angles to that direction. The uprights are standard W. I. pipes fitted on the upper ends with standard companion flanges, and with the lower ends imbedded in a concrete foundation. Attached to the flanges is a channel iron, in the trough of which are placed five short pipe rollers at right angles to the axis of the channel. On these short rollers and with its axis at right angles to the axis of the short rollers is placed a long transverse pipe roller on which the steam pipe rests. Usually, however, a pipe saddle is attached to the pipe, and rides on the upper roller as it affords a greater bearing surface.

In figs. 3 and 4 are shown the end and side elevations of anchor towers, which are used about every twelfth support.

On one occasion in which is was desired to conserve the steam generated from the waste gases of an iron furnace, to run the plant of an adjacent dolomite (flux) quarry, an 8-inch pipe line about 1,200 feet long was used with supports spaced every 20 feet and having four anchor towers and three expansion joints. The short rollers on these supports were 6 inches long and made of ¾-inch W.I. pipe, while the long roller was of 2-inch W.I. pipe, 2 feet 4 inches long. The uprights were W.I. pipes 4 inches in diameter.

The anchor tower braces in the sketch show an item to which usually very little attention is paid namely that the brace turnbuckles to permit of convenient handling should always be placed near the ground.

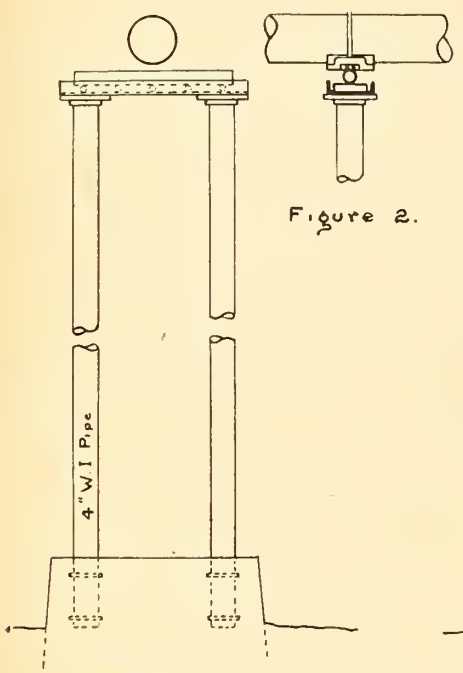


Figure 2.

Figure 1.

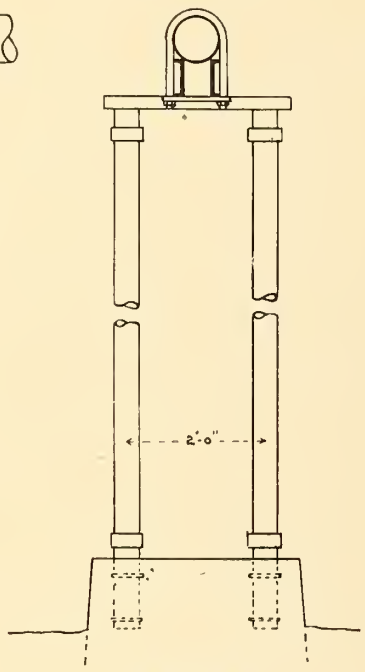


Figure 3.

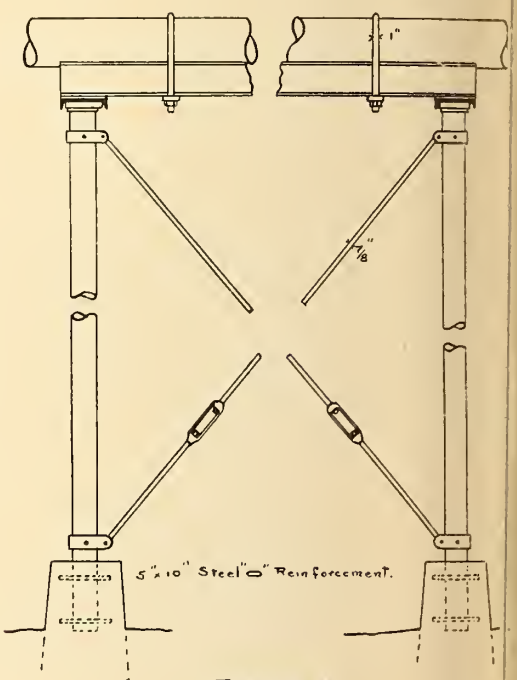


Figure 4.

AN EFFICIENT STEAM PIPE SUPPORT

Scale ¼" = 12"

On March 22 the Nelson, B.C., "Daily News" published a list of the contributions to the fund in aid of the widow and orphans of the late Fred C. Alderson, who sacrificed his own life in saving that of an Italian miner in the Bellevue coal mine, Alberta, last December. The statement, which was supplied by B. L. Thorne, secretary-treasurer of the committee having the matter in hand, showed a total of $4,795.91. To this there will shortly be added $500 from the Government of British Columbia. Probably the Government of Alberta will also contribute, if so, its amount should bring the total up to nearly $6,000

The gold output of South Africa is now one-third of the world's total. In 1887 the output was only 0.75 per cent. of that of the whole world. In 1910, $45,000,000 was paid in dividends.

PROGRESS IN MEXICAN MINING AND METALLURGICAL METHODS DURING THE CENTURY OF INDEPENDENCE

Read by A. Grothe on behalf of the Mex. Institute of Mining and Metallurgy at the meeting of the "Congreso Cientifico y Artistico del Centenario," promoted by the Mexican Academy of Jurisprudence and Legislation on Feb. 25th, 1911.

To the present generation, accustomed to look upon steam and electricity as indispensable auxiliaries to our industrial operations, means of locomotion and everyday life, the ore-yard of the Mellado and Rayas mine at Guanajuato, on an early morning of the year 1800, would have presented a strange and interesting scene.

In the dim twilight the general contour of an irregular polygon surrounded by high walls, is faintly discernible. At the corners, substantial watch towers, provided with loopholes for musketry fire, protrude above the skyline. Several massive buildings are contained within the walls, among which the splendid chapel, erected in 1730 at a cost of $54,000 by Don Vicente Manuel Sardaneta (afterwards the first Marque de Rayas) forms a strong contrast to the shingle-covered sheds in the background, where the 1,400 mules and horses forming the motive power equipment of the mine are housed. Aside is seen the gallow-frame (horca) over the main shaft of "tiro general" On each of its eight sides a set of "lechuguino" ropes are ascending to bring up water or ore and descending with tools and supplies. Just now a squad of the nightshift is coming up, clinging to the hoisting rope and dexterously jumping to the ground as the surface is reached. The men gather their rags about them as a feeble protection against the cool morning air, which they feel the more on account of the contrast with the stifling heat of the badly ventilated workings they have just left. One or the other gives a last re-adjustment to the sample of rich ore which he has concealed on his person and intends, if possible, to add to his private collection.

At the massive gateway, which forms the only exit from the yard, the portero, muffled in his sarape, is waiting to search the men before they are allowed to leave. He is a man of experience, has been through the mill himself, and is certain to detect any ordinary place of concealment on the person of those who are not friends. But a new trick may have been invented and at any rate one may succeed where others fail. Once outside the gate the booty is in no further danger and the successful robber, unrestricted by any sense of wrongdoing, (for has not God made the stones for us all?) is safe and can easily find a purchaser for his ill-gotten gains. Large sums are thus abstracted from their legitimate owners, but these themselves are not by any means free from blame in the matter, for they view these delinquencies with indulgence, and seldom take adequate steps for the punishment of the offenders. One of these gentlemen on his return from a journey to Rome, announced to his miners that he had procured for them a complete absolution for past misdoings of this kind! Thereupon the stealing went on as before, in the expectation that the owner would have to go on another journey to Rome sooner or later. Another, who acted on the principle that the people should be rigorously searched, but not molested when they got safely outside, was made the bearer of a rich sample which had been placed in his pocket by a miner who demanded it back after passing the gate, saying: perdone Ud., senor Conde, eso es mio! Such misplaced leniency bred a laxity of morals which is felt to the present day. The least of its evil consequences is the loss of a large amount of money to the rightful owner, and the far greater one that of obliterating the moral sense and honesty of a whole class of workmen, a degeneration which cannot fail to spread to their families and associates. To eradicate this evil by education will take as long a time as it has taken to grow.

The dayshift (pueble de dia) has now assembled and is mustered under the capataces near the mine entrance (boca-mina). First there are the miners, the aristocracy of the workpeople, working either in days-wages, by contract, or on "partido," in the latter case receiving by way of remuneration for their work one-half of the ore they extract. We shall presently follow them into the mine and be able to judge of their skill and methods. In the next group are the tenateros and charqueadores, the former carrying the ore and waste in sacks of ixtle fibre, hanging by a band from the forehead, and the latter the water in leather sacks suspended in the same manner. These two classes may rightly be considered the pariahs among the workers, and it is doubtful whether the mine slaves of antiquity led a more hopeless existence than these unfortunates. Probably still under the influence of last night's debauch, in which every cent of yesterday's earnings was spent; clearly not having broken their fast this morning; more than half naked, they form a pitiful spectacle and it seems impossible that they should perform the feats of strength and endurance which we shall see them capable of. They go to their work literally with nothing; having even to leave their own name behind, for each receives a new one by which, for purposes of accounting, he will be known for the day, from an alphabetically arranged list of biblical names. They are not on the regular paylist of the mine and apply for work when they choose. The capataz counts off the necessary number for each day's work from the file, the rest are sent away and perforce have to remain idle as it is now too late to apply for work at another mine. At two o'clock in the afternoon they cease work for the day and are at once paid off according to the work performed and depart to spend their earnings as soon as possible.

The pepenadores (ore sorters) have already begun their task as they too, are paid by results. They have to break the large pieces of ore with short hammers, throw out the waste and sort the ore into heaps of different classes. Not the least skilful are the women, some of whom have a wonderful eye for rich ore and consequently have to be examined with particular care by female searchers appointed for the purpose. Over every group of workers stand veladores to watch their doings. There is no sign of the slightest trust in the honesty and integrity of the people under their charge, either as concerns their abstinence from pilfering or their intention to perform an honest day's work in return for the wages received.

The capataces or foremen, after receiving their final instructions from the administrador, are now preparing to go into the mine accompanied by their morrongos, smart boys who carry a torch made out of tallow and vegetable fibre. Some of these morrongos later attain eminence as first class miners, having profited by the conversations of their chiefs.

The whole force (pueblo) has now left the patio. But who are those men, evidently waiting for coming events, with a kind of chair strapped to their backs? We are told they are the "caballitos," and on the chair the administrador or the minero mayor will presently seat himself for the purpose of making his tour of inspection through the intricate mineworkings in greater comfort than if he went on his own feet. This office, in our opinion more degrading to those who make use of it than for those who perform it for the sake of making a living, is still in existence at the time of our supposed visit, though abolished shortly afterwards.

Before descending into the mine let us cast a look at the main shaft or tiro general. It was started in 1805 by Don Jose Maria Sardaneta (second Marques de Rayas) to obtain access to the rich oreshoot of Sangre de Cristo. Its depth, when completed, will be 475 varas (398 met.) but at this time it has only been sunk 318 varas (266 met.), at which depth it is to remain for several years. The shaft is octagonal in section, measures 38 feet across, and is lined with substantial masonry from the mouth to the level at which firm rock is reached. Its cost, including accessories, has been not less than $1,700,000.

It is surrounded by eight horsewhims (malacates). The hoisting ropes lead from the overhead sheaves in a few turns round the vertical drum, to which a rotary motion is imparted by 16 horses, harnessed to four long crossbeams on which the drivers are seated. Their monotonous chant, mixed with frequent imprecations, the beat of the horses' hoofs, the cracking of whips, and the creaking of the overhead sheaves of mezquite wood, produce a strange unharmonious concert which is not easily forgotten. By keeping the horses steadily at a short gallop a hoisting velocity of 0.8 met. per second is maintained, but the horses have to be changed every four hours. Some of the malacates are used for lifting the water from the sump at the bottom of the shaft by means of a sack of about one cubic meter capacity, consisting of two raw cowhides sewn together and held open at the top by an iron ring which is suspended with leather straps from the hoisting rope. The quantity of water to be lifted is not great; about four litres per second in times of drought, to fourteen litres during the rainy season. With modern appliances, 50 h.p. would suffice to keep the mine drained; but here 576 horses, without counting the sick and invalid, are barely sufficient for this purpose.

For the hoisting of ore a single cowhide, suspended from the four corners, is used. When the load reaches the mouth of the shaft, it is pulled sideways to the firm ground and emptied. In the meantime the harnessing of the horses has been reversed and on the signal from below that the load is ready they start in the opposite direction.

We now direct our steps to the "boca-mina," a commodious entrance to a massive stone stairway, leading at an angle of 45 degrees to a large open space at a depth of about 40 feet, which has been expressly blasted out and fitted as a chapel. From here the stairway continues on somewhat less imposing dimensions, following the dip of the vein, but at times at an incline of 50 to 70 degrees. Suddenly the masonry steps come to an end and before us we have a yawning abyss, depth of which can only approximately be jud when an occasional light appears at the bottom. our left and right crooked drifts lead away, one fo ing the direct road to the loading station at the l tom of the shaft. Here a timekeeper is in attenda with the alphabetical list and a weighing beam, case of need. A weird figure, carrying a heavy l on his back, slowly emerges from the winze at our and on passing the timekeeper gives his name as A ham. The timekeeper feels the load, suggesting arrobas as its weight, and the tenatero, being satisf passes on his way. He could have the load weigh but the loss of time would not be compensated for the addition of a few pounds to his credit. The wei these men carry seems incredible, being ordina from 9 to 12 arrobas (103 to 161 kilos), but loads from 18 to 22 arrobas (206 to 247 kilos), are so times carried. A truly wonderful performance, es cially when considered in connection with the r these men have to travel 8 to 10 times a day, the vit ed air of a temperature of 20 to 35 degrees they h to breathe, and their usual mode of life. And for they receive, if all goes well and they do not slip one of the chicken ladders or get crushed by a fall rock from a shaky roof, the sum of 75 cvs! And most pathetic part of the story is that this is fa excess of what they can wisely spend.

Let us now descend to the lower workings f which our friend Abraham has just emerged. The r becomes much more difficult and without our p finding morrongo we should make but little progr After a time we turn into a low and crooked c now rising, then falling. The roof in some place so low that we are obliged to abandon the upright p tion, and again we have to scramble over debris fa from the roof. We now come to a raise accessible c by means of a chicken ladder, consisting of a si notched pole, which leads to another drift, and f there we descend into a winze at the bottom of w two men, surrounded by a misty halo, are dril holes. The drilling tool is an iron bar with a bit point of steel, and naturally has frequently to be paired. These men are "buseones," who have fo a good field and are working it for all it is wo without giving a thought to the fact that they danger the safe working of the mine. Each sq follows its own instincts, with the result that the in ior workings consist of a labryinth of intricate dr raises, and winzes, without direct connection with e other; mining, instead of being a science directing efforts to the finding of ore, and at the same tim the most rational and economical method of extr ing it, becomes simply a matter of luck. This sp characterizes the whole industry and finds even this day too many adherents, to the great detri of mining, in which, like in any other undertaking, element of mere chance should not find a place.

We leave our friends, who have no idea that by t reckless proceeding they are providing endless d culties for the future working of the mine, and make great riches forever inaccessible, with the u underground salutation "alabado sea Dios" (pra be God), and receive the pious reply, 'siempre alabado su santo nombre," (His holy name be for praised), and proceed with our investigation, now ward then backward, now down winzes and up ra to meet everywhere the same conditions: a ruined for future work by ignorance and greed.

But as we proceed upwards, out of the reach of pestilent atmosphere, and again perceive the ligh

the comforting thought comes to us that these s cannot be for ever; that a time of greater en- nment will come, and that when the yoke of op- ion under which the people have suffered for than two centuries shall have been thrown off, natural intelligence possessed by the people of co in such high degree, shall bear fruit under a and peace-loving government, and a more rational economical exploitation of the mineral resources e country will follow.

reaching the patio again, we find a scene vastly rent from that of the morning. A large cavalcade arrived and the dismounted riders are busy ex- ing the numbered ore-heaps. It is the day appoint- r the ore-sale or "rescate" and the visitors are the rs or managers of the many reduction works in valley near town, all intent upon purchasing ore heir "haciendas." Note book in hand they pro- from heap to heap, judging the weight by the and the contents by panning in a small lacquered d (jicara). They are wonderfully expert at the tion (tentadura), when dealing with ore of which have experience. The art of assaying is hardly ised as yet (any more than that of mine survey- and in consequence grievous mistakes occur oc- nally; as, for instance, when some years later ore found in abandoned workings in the upper levels alenciana, which had the look of compact iron- es and gave no indication of silver in the tenta- Nevertheless, it was found by fire assay to con- from 22 to 24 marcos of silver per "monton" (3.5 kilos per ton). Still these mistakes are the ex- on, and ordinarily the estimate of weight and nts is astonishingly correct.

hen all are ready with their calculations, the ger of the mine (administrador) takes his posi- near one of the heaps and invites bids for this per. The competing buyers approach him one by and make their bids in whispers. The proprietor e mine or his representative do the same as a pro- n against possible collusion amongst the resca- es. When after the auctioneer's solemn: No hay diga mas? no further offer is forthcoming, the of the highest bidder and the price to be paid nnounced, and the group moves on to the next on, until all are sold. In this manner thousands llars' worth of ore are sold every week. Losses nade, and great bargains secured, and it seems this gambling nature of the method makes is so ctive to those interested, that it has survived in ajuato until the end of the last century, when an Cayetano Company still sold the production their mines in this manner. And crude as the m was, perhaps no great injustice resulted to r buyer or seller. Writer had the ore offered for by those mines in 1888 carefully weighed and as- l, and found that at the end of the year the com- tion of the value on this correct basis, differed 2 per cent. with the price realized, the latter be- he higher. He thereupon published his figures e day before the rescate and sold the ore on the thereof. This put an end to the picturesque but proceeding of former times.

the conclusion of the rescate the mules which to convey the ore to the reduction works, swarm nd the arrieros proceed to load the ore in leathern s, while their masters sit down to a sumptious n, after which the tables are cleared for a friendly of cards, which is often prolonged far into the t, in the course of which many of the purchased s of ore change hands.

Not being possessed of the gambling spirit, we shall rather follow the ore to the reduction works.

At the hacienda it is weighed, without, however, a determination of the moisture being made. This and other inaccuracies make the returns as to results obtained not quite so trustworthy as might be desirable. The coarse ore (grueso) is then crushed to pea size in crude wooden stamps, or equally primitive roller-mills with stone runners, and, after being mixed with the smalls, is fed to arrastres where it is ground to impalpable slime under addition of water. The arrastre is a circular stone tub of about 9 feet diameter, half sunk below the floor and provided with a bottom of hard basalt or porphyry, the stones being placed on end. The grinding stones are large pieces of the same material suspended by chains from crossbars fixed to a vertical shaft, to which a mule imparts a rotary motion. Eighty or more arrastres are placed in row in a large shed or galera. The bottom of the arrastre is covered by a thin layer of silver or copper amalgam, to which the fine particles of metallic silver and gold contained in the ore adhere. Every morning the arrastres are emptied of the ground pulp, which goes to the "patio" for further treatment. The capacity of an arrastre is from 7 to 8 cargas (1,100 to 1,300 kilos) per day, according to the degree of softness of the ore. Every two to three months a "raspa" is made, that is, the amalgam is removed from the bottom and joints. The scrapings are thinned out with mercury, filtered, and the remaining mercury distilled off in vertical iron retorts or "capellinas." The resulting bullion, which is very rich in gold, is then melted in charcoal furnaces, cast into bars and taken to the mint, where it is assayed and parted, that is, the two metals are separated, and obtained in an almost pure state. By this process about one-half of the gold contained in the ore is recovered, the other half, remaining in the pulp, is lost, as we shall see.

The pulp is collected in flat heaps, called "tortas," each containing about 100 tons of ore, on the flagged floor of an open yard, called the "patio," from which the name of the whole process is derived. It was invented by Bartolome de Medina and first practised by him in Pachuca in 1557. It was admirably adapted to the available resources and the requirements of the country, and, crude as it may appear to the modern metallurgist, has been of incalculable benefit to the mining industry.

(To be continued.)

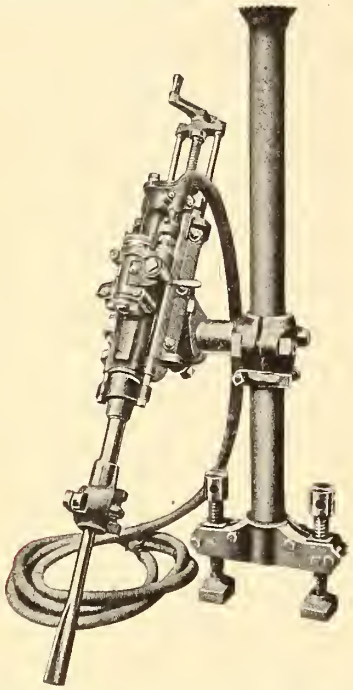
The San Salvador Spanish Iron Ore Company, Limited, an English corporation, operates ironstone quarries near Santander, Spain. The annual report of this company contains the information that in the first half of 1910 the rainfall interfered seriously with the operation of the quarries. The fall amounted to no less than 38 inches. As the ore is embedded in a very tenacious clay, it may easily be imagined that work was badly impeded. All the ore has to be concentrated. Despite adverse climate, bad labour, and low grade ore, this company has a fine dividend record.

The Crown Reserve mine, Cobalt, has paid a total of $3,006,983.80 in dividends. The record of the company by years is as follows: 1908, $353,762.80; 1909, $1,238,169.80; 1910, $1,061,288.40; 1911, $353,762.80. The grand total of disbursements is $3,006,983.80. The capital of the company is $2,000,000, divided in shares of $1 each. The stock was quoted as low as 20 cents in 1908. It ran up to $6 in 1909, and now stands about $3.20.

INDUSTRIAL SECTION

HOLMAN DRILL.

The Holman Rock Drill, which has attained success in South Africa, Australia, and Great Britain, is now being introduced in Canada.



Holman Drill Mounted on Column.

The Holman drill is manufactured by Holman Bros., of Camborne, Cornwall, who are considered to be one of the most progressive manufacturers of rock drills in the world. Established since 1839, and continually improving their product, has made the name "Holman" known most favourably wherever rock drills are used.

In bringing their drill to its present state of perfection, Holman Bros. have been materially assisted by the practical experience gained as very large users of rock drills in their numerous underground undertakings; they being miners as well as manufacturers. Their dual experience places Holman Bros. in an unique position, as compared with other makers, and is without a doubt an advantage, the value of wh cannot be overestimated by mining men the wo over.

That the Holman drill possesses real merit is sho by the many records it has established and ho Among the most important of these are:

The world's record for incline shaft sinking.

Six world's records for shaft sinking and drivi during the last two years.

Winners of the $12,000 prize in the 1910 Rand st drill competition.

Also numerous local records.

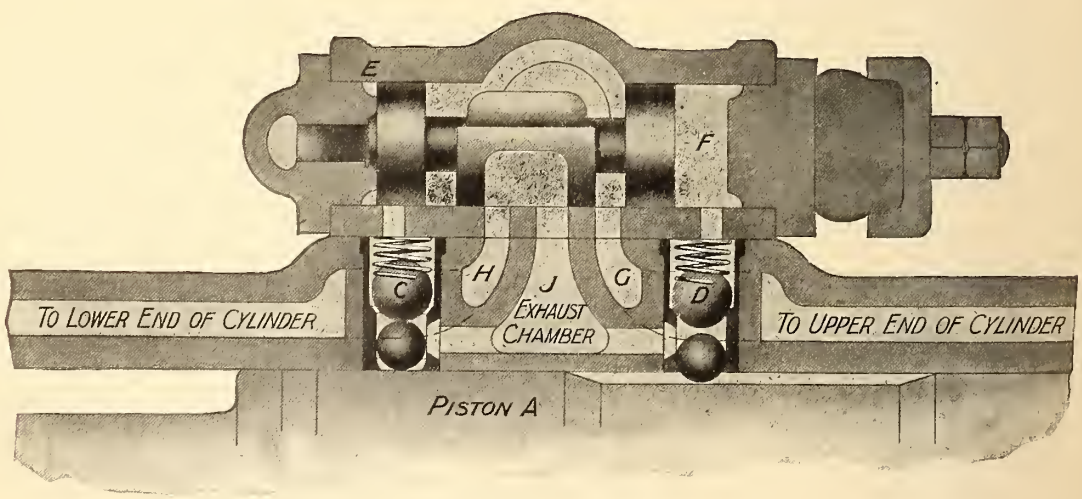
The Holman 1911 model, air valve drill, is c sidered by many mining and mechanical engineer be the best machine on the market to-day, becaus combines:

Simplicity of mechanism.
Compactness of build.
Lightness, in comparison to strength.
Quality of material and workmanship.
Economy in the consumption of air.
Economy in upkeep.
Drilling speed over long periods.

The drill has a comparatively small number of pa has large bearing and wearing surfaces, and is ea adjustable and accessible.

As will be seen from the above illustration, Holman valve is simple, durable, efficient, and nomical. There is absolutely no chance of live passing over the valve into the exhaust, and from position of the piston and valve, there can be "sticking" or "fluttering."

The Holman drill has a variable stroke, from inch upwards, depending on the size of the drill. value of this variable stroke is well understood.



Holman Air Valve.

The Holman patent chuck is without a doubt of the greatest improvements made on rock dril many years. Not only does the Holman chuck blacksmith costs, but it saves labour charges, as changing of steel is a much quicker operation with the old type chucks.

The Holman drill has a split front head, with movable half bushing, and taper gland, which is

Chuck

eid l improvement on the old style four or six-bolt hea.

l Holman drills are tested at varying pressures up o one hundred pounds, and are given a thorough tri under conditions severe as those obtaining un- del round. The drills are covered by a broad guaran- tee both as to efficiency, material, and workmanship. Jussens, Limited, are stocking these drills, with all spaes, in Montreal, Cobalt, Porcupine, and Vancou- ver and are always able to make immediate shipment of rders.

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talogue of Eugene Dietzgen Co.—Ninth Edition —ugene Dietzgen Co., Limited, Toronto, Ont. To pu ish a strongly bound, profusely illustrated volume of nearly 600 pages is no small undertaking. The catlogue before us is one of the most complete and mo instructive that we have seen. Everything that the draughtsman and engineer need is here described an listed plainly with prices. The catalogue is so co plete, and comprises so many modern refinements, tha it is genuinely educative to study it. It can be obtined by applying to the Toronto branch.

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he death-rate amongst mine labourers in South Af ca is 30.75 per 1,000. In 1905 the rate was 38.8.

LABOUR TROUBLES AT WESTERN COAL MINES.

Following receipt of notice from the Minister of Labour, Ottawa, that unless either the Western Coal Operators or their employees made application for the appointment of a Board of Conciliation and Investigation under the Industrial Disputes Act, 1907, the Government would proceed to appoint a Royal Commission, with power to make full investigation into all the conditions bearing upon the labour difficulties that occur periodically in the coal mining districts affected, the representatives of District 18, United Mine Workers of America, on April 13, telegraphed a preliminary request for the appointment of such Board of Conciliation and Investigation. Meanwhile it is expected the men will return to work in the mines on the understanding that whatever rates of payment to them shall eventually be agreed upon, they will take effect as from the time of resuming work.

No serious effects of the cessation of production of coal and coke have yet been felt in the copper mining and smelting districts of British Columbia, the smelteries having a sufficiently large reserve supply of coke on hand to keep their furnaces going for several weeks after regular supplies had been stopped. It is now hoped that an agreement will be reached without necessitating the shutting down of the copper mines and smelteries of Kootenay and Boundary districts. There is no certainty, though, that the findings of the Board of Conciliation will be accepted.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Dominion Coal Outputs.

The output for April is approximately 285,000 tons, this being quite a low figure. There were only 24 working days in the month. The drift ice was a great hindrance, the whole island being ice-bound. For a week together no ships were able either to leave port or to enter.

The total outputs for the first four months of the year compar during the past four years as follows:

1908	1,249,535 tons
1909	957,471 tons
1910	899,250 tons
1911	1,164,954 tons

The Coal Company is undertaking an extensive programme of improvements and additions to its plant during the ensuing summer. At Sydney a new shipping pier—to be known as International Pier No. 3—will be erected, and a Baum coal-washer, with the necessary railway extensions and sidings. In anticipation of largely increased coal traffic on the railway additional rolling-stock is being purchased, which will include two locomotives, and 100 fifty-ton pressed steel cars. Several new railway branches will require to be built to the new collieries. In the Lingan-Victoria field a large amount of new construction is projected. No. 12 Colliery is now almost complete, and is producing well over 1,000 tons daily. At No. 14 Colliery the coal is now being put over the permanent bankhead, and the large permanent hoisting engine is in use. An electrically-operated air-compressor is nearing completion and a number of percussive coal-cutters will be operated as soon as the compressors are in working order. This mine will produce up to 800 tons daily this season. At No. 15 Colliery it is intended to complete the permanent bankhead, compressors, boiler-plant and all the plant necessary to make this mine a regular producer for the season of 1912. At No. 16 Colliery the usual colliery buildings, such as wash-house, lamp-house, office, etc., will be erected, and the foundations for the bankhead put in. Contracts have been let for about 150 dwellings for the workmen and officials in this district. It is not unlikely that an electric tram-line will be constructed to connect with the Sydney & Glace Bay Railway. The population of this district is growing very rapidly, and this necessary convenience cannot be long deferred. The site of No. 17 Colliery will be cleared and the slopes driven for preliminary development.

The slopes at Birch Grove, on the narrow coal-basin situated to the rear of Morien, on what were known as the Cumberland

areas, have been developed and are producing about 1,000 tons monthly. The block of coal which it is proposed to work is quite narrow, and the slopes are being driven from crop to crop. The coal is proving to be of excellent quality and shows a good analysis for metallurgical uses. It is expected to connect the slopes with the Sydney & Louisburg Railway this summer, and to install the permanent plant. The motive-power will probably be electricity, transmitted from the central plant at No. 2 Colliery, some 5 miles away.

The Labour Situation.

The leaders of No. 26 District of the U.M.W.A. take themselves very seriously, far more so, indeed, than anyone else. It was a foregone conclusion that none of the coal operators of Nova Scotia would take cognizance of the request—or perhaps demand would be the more correct word to use—made by the Scale Committee of the U.M.W.A. for a joint meeting of the operators and U.M.W. representatives to consider a wage schedule. Nevertheless the committee attended at the place and time appointed, and afterwards gave out a statement to the newspapers that as the Scale Committee had not received the assistance of the operators the responsibility of drafting a satisfactory wage schedule had devolved upon themselves and had been undertaken. The operators will doubtless appreciate at its true value the self-sacrificing labours of this self-appointed committee. The public, if informed that the U.M.W. numbered among its adherents less than one-third of the miners of the province, the other two-thirds being at utter variance with their methods, would also appreciate the humour of the situation. It must be conceded that the U.M.W. leaders in Nova Scotia are thoroughly impressed, or obsessed, by a sense of their own importance. The Scale Committee were very insistent, both in their letter to the operators and in the statement to the newspapers on their desire to promote harmonious relations, peace, and amity all around. It is therefore significant that the submissal of this schedule to a United Mine Worker meeting at Glace Bay was attended by an unfortunate shooting affray in which two men lost their lives. It is rather singular that a propaganda which claims to have for its end the establishment of peace and harmony should have been accompanied by riots, shooting affrays, murder, dynamiting, and other little pleasantries. The leaders of the United Mine Workers of America in Nova Scotia preach with whole-hearted enthusiasm the principles of international Socialism. These principles viewed academically and in the abstract, may be held by the quietest of men, but translated into action by unlearned and untravelled miners, who follow the lead of agitators irresponsible and destructive to the extreme, even abstract principles become dangerous. But when these doctrines are preached by citizens of the United States, who are here to-day and gone to-morrow, who regard with undisguised contempt the laws of Canada and teach that all forms of outward authority are the outcome of capitalistic oppression and bureaucratic greed, the menace is no longer local, but national.

There are not lacking signs of dissatisfaction among the local members of the U.M.W. with the dominance of the Socialists, and it may well be that the doctrine of the social revolution will prove the final undoing of the U.M.W. in this province.

Since the appointment of the Police Commissioner at Springhill, conditions have steadily improved. It is now possible for the men who are at work to visit the town and to move about without molestation. The strikers are returning to work in twos and threes, and it is the general opinion that the strike cannot last very much longer.

Fatal Accidents and Work.

The "Colliery Guardian" recently had a short paragraph stating that an English colliery company and its workmen had entered into an arrangement whereby in the event of a fatal accident in the mine the work should not cease as had hitherto been the custom. The colliery company undertook to contribute £25 and the men devoted a portion of their earnings to the relief of the dependents of the deceased workman, wh they could easily afford seeing that their earnings were not duced by going home after a fatal accident. This seems a v practical solution to a difficulty which is felt at every collie benefitting, as it does, the colliery company, their workm and the relatives of those who are overtaken by death in mine, and should commend itself to employers and workmen Nova Scotia.

ONTARIO.

Cobalt and Other Silver Areas.

A disagreement as to site having led to the abandonm of the establishment of a customs plant at Kerr Lake, Crown Reserve Mining Company has signed a contract with Nova Scotia Mining Company to have all its low grade treated at its mill. The Nova Scotia mill is a distance 5,000 feet from the Crown Reserve, and the distance will bridged by the construction of an aerial tramway to be bu by the Nova Scotia. Under the terms of the agreement Nova Scotia is required to treat the ore and return the bull to the Crown Reserve for shipment. The contract calls a hundred tons of ore per day for five years. The Crown serve has on the dump alone 35,000 tons that will run betw 15 and 20 ounces to the ton.

With the improvement of power conditions the product of the camp has reached a normal level again. The Brit Canadian has now all the water that it can possibly requ and is giving full pressure to all its customers at Cobalt, K Lake, and South Lorrain, and there is very little probabil that there will be any serious breakdown this season. Cobalt Hydraulic was not so fortunate. No sooner had t company a sufficient head of water, when there was anot accident at the intake pipe and the power had to be shut for a time. It has now been turned on and there should be further intorruption of service. That the interruption of pov has been a source of great loss and inconvenience to the wh of the Cobalt camp needs no demonstration.

Many silver prospects allowed to lie idle while the air v off are now going to be worked again. This is particularly case round Peterson Lake, where most of the leases will worked this summer. There will again this summer be a termined attempt to find ore on some of the silver prospe

The Nipissing is prospecting with but a small gang this s mer, the management having decided to carry out the grea part of the surface work with a turbine pump to wash off overburden. The gang of prospectors will thoroughly tre that portion of the conglomerate area adjoining the Sav mine on the east side of Cart Lake, where so far no systema surface work has been carried out. The turbine pump will stationed on Cobalt Lake and will operate on Nipissing Hill

At a depth of 450 feet the Carson vein of the Crown Rese shows two inches of 1,000-ounce ore. The greater part of output is still from the 100-foot level, where exploration showing extraordinary enrichment in a very small area.

The Crown Reserve is shipping but a very small proport of low grade ore and the management states that for the p three months the ore despatched will run 5,000 ounces.

Development work at the Lawson has now been resumed, being available as required. A raise has now been put up 60 feet from the 200-foot level of No. 8, and while the ore by no means as spectacular as in the bottom, it still sh in the roof of the stope. When the main shaft is connec with the 200-foot level of No. 8, No. 8 shaft will be sunk to 300-foot level and the vein cross-cut. From No. 8 a long cr cut is being run to catch No. 9 vein at 125 feet. This l near the Foster line has shown up some unexpectedly g ore during the past quarter and has contributed handsom to the monthly output of the mine.

In prospecting its claim near North Cobalt the Temiska ing Mining Company has opened up a narrow calcite vein ab an inch wide showing flakes of native silver. This, and fact that some nice ore has been taken out of the 100-f

of the Green Meehan, will ensure active development of any prospects in the Township of Bucke between the ce of North Cobalt and Lake Temiskaming.

At he beginning of next month Mr. Chas. A. O'Connell will ate upon his duties as manager of the Trethewey Cobalt in place of Mr. George MacNaughton, who has resigned to look after his Porcupine and Nova Scotia interests. During the past wo months two new finds have been made on the Tre-hew', one at the No. 4 shaft near the T. & H. B. line, and the the at the 60-foot level of the old No. 1 shaft.

Th Silver Leaf shaft is now being pumped out preparatory o pu ing down the shaft to a depth of 450 feet. It is under lease o the Crown Reserve and the work is undertaken by th t ompany.

Th e is little doubt expressed that the Cobalt Central will ome nder the hammer when it is offered for sale on May 18.

Th e are at the present time five men working on the entr l property, one to look after the pump and the other four caretaker of the building and to keep steam up in the boiler At the bottom level of the mine the vein in one place sh w two inches of rich ore in the floor but otherwise the pro y seems to have been pretty well stoped out.

Ow g to power conditions last month the Nipissing was for two eeks compelled to cease underground work entirely and, speak g generally, its operations during April consisted mainly in pu ing ore from old stopes.

Porcupine and Other Gold Areas.

Th e passage over the Porcupine trail has always been poss le, this spring it has been arduous and no one who could escap it has made it. Consequently there has been comparatively little intercourse between the Porcupine camp and the outsi world; nor will there be until the railroad gets in, about the b ginning of June.

Th e has been much building activity at South Porcupine. The ovincial authorities are forcing the burning up and disp l f all rubbish, but the water question still remains unsolved The wells that are being used should be safeguarded from ontamination by a collar of clay or concrete. At South Porcupine there is some talk of getting water from Porcupine River

Wi increased interest in the Porcupine camp all over the world sales of properties for big sums are reported. The claims of th Watson syndicate have been sold to Mr. Frank Armstrong of New York, for $25,000; the Brydge claims in Deloro have een taken over by an English syndicate and a preliminary payment made on the total purchase price of $200,000. e Martin properties have been sold to New York capitalist and many other purchases have been made. English syndi ites, while unwilling to make substantial first payments, are eager to take over claims at big prices if long options are grant .

Bef re the ice went out and left the Cripple Creek district isolat , some excellent samples were brought down from this camp 0 miles to the west of Porcupine. Two hundred men remaine d in there doing their assessment work. All the veins occur n intrusions in the granite, and while there is little visibl gold, the assays run surprisingly high from many of the best aims. An engineer of Augustus Heinze has been in the camp nd has taken up some properties, and a Scotch company known as the Aberdeen syndicate, has bought some claims and is now working them. The Great Northern and the Josey, Wood syndicate, sent in three months' provisions to their gangs f men before the ice went out.

Sev al mining men with prospectors in the field are taking stere in the finds reported in the Matachewan district half way b tween Gowganda and Porcupine. Nothing can be known r so e weeks yet, until men can be sent up to make a thorough xamination.

The Great Eastern Mining Company, with properties in De- installing prospecting plant and will at once sink a t o a hundred feet.

Underground work has been resumed at the Dome, where the main shaft is now being sunk to the 500-foot level. Good progress is being made with the new power plant and the big mill.

Interest in gold at Porcupine has wakened speculative interest in the yellow metal in other centres. A considerable number of men are waiting with their outfits ready for the first news that they can get into the Keekeek country in Northern Quebec. In the meantime many are going into the Swastika country, where the inevitable townsite is being laid out for the first flight of stakers and settlers. Mr. Frank Armstrong and other big interests have bought claims in here and a considerable amount of work is being undertaken in the neighbourhood of the Swastika mine, from the lower levels of which it is reported some very rich ore is being taken.

From the Jupiter properties near Pearl Lake comes a report that an excellent discovery has been made. All of the specimens brought into camp were chipped, so it was stated, from the surface of the main vein. Captain Anchor, of the Dome Extension, is sampling the property, and when his examination is concluded the owners will know better what they have got. Mr. A. W. McDougall, of Montreal, has acquired control of this company.

In opening up a wood road on a part of the property hitherto unexplored, the Porcupine Imperial exposed a wide lead of quartz in which some free gold was discovered.

The burning of the sawmill at the Cobalt Power Company's plant at the Mattagami River will not set back the opening of the service more than two weeks. It is confidently expected that the Hollinger and adjacent properties will be given the opportunity of getting electric power by the middle of June or before the railroad reaches the gold camp.

BRITISH COLUMBIA.

East Kootenay—The "Prospector," published at Cranbrook, recently printed the following comment on district mineral resources: "We are proud of the progress made in the development of the Cranbrook district, but do we recognize that we have not exploited ten per cent. of the area of the district? Think of the extent of its mineral wealth in the shape of gold, silver, copper, and lead, which has been proved to exist in the few square miles which have been developed, and enquire what there may be in the thousands of miles which have not had a dollar expenditure. . . Think of the magnificent water-powers on fifty rivers and streams and only three—Mark Creek, Bull River, and Wasa Creek—in process of development.

"We see what the development of a small fraction of the coal areas has done for Southeast Kootenay. We know what the operations of the North Star, St. Eugene, and Sullivan have done for the mining interests of the Cranbrook district The actual development of these big silver-lead mines to a shipping stage entitles us to the first position among the mining districts of British Columbia. The whole Dominion can see the result of the opening of the coal areas in the Crow's Nest Pass by the building of the Crow's Nest Railway, but can anyone realize the extent of the prosperity to Cranbrook and the whole of Southeast Kootenay when the Kootenay Central Railway shall be completed and in operation? What shall we do to induce capital to take hold of our yet undeveloped water powers, timber, and mining resources? This is a question which affects us all, for we have the most valuable and largest undeveloped resources of any district in British Columbia."

The Prospector's information may be supplemented by the statement that the aggregate production of the St. Eugene mine alone to date is about 1,000,000 tons of ore, containing approximately 5,300,000 ounces of silver and 225,000,000 lbs. of lead, of a combined value of about $11,000,000. The production of coal from Crow's Nest district coal mines in British Columbia has reached an aggregate of approximately 9,000,000 short tons gross, part of which has been made into

coke, of which latter, between 2,200,000 and 2,300,000 tons has been made. The total value of this fuel—both coal and coke—may be placed at not less than $30,000,000.

Kaslo.—There now appears to be promise of the Kaslo & Slocan Railway from Kaslo to Sandon being again placed in running order. The Nelson Daily News has published an account of a public meeting held in Kaslo on April 21, under the auspices of the local board of trade, at which there was announced a definite plan for repairing and again operating this railway. It is stated that the Great Northern Railway, owning the line, offered the line to citizens of Kaslo for $25,000 if that amount should be forthcoming by April 30. Negotiations were opened with the Provincial Government with the object of obtaining from it financial assistance requisite to allow of the railway being repaired and bridges rebuilt, providing new rolling stock, and for making other necessary improvements. It has been announced that the Government has guaranteed a loan of $200,000 for three years without interest, and this amount, it is estimated, will be sufficient for the purposes indicated.

Slocan.—The Van-Roi Mining Company's new concentrating mill had, by the middle of April, produced about 350 tons of silver-lead and silver-zinc concentrates. The first starting of this mill took place on March 15, after many delays caused by non-delivery of some of the machinery and plant by those who had the contract to supply it. The new equipment, having been adjusted to suit Van-Roi ore, is working effectively, and a long run is confidently expected, there being much ore blocked out in the mine ready for stoping. The management of the Standard mine, which is situated on the opposite side of Four-mile Creek to the Van-Roi, is proceeding with preliminary work in connection with the erection of a concentrating mill, provision of water supply for the mill, and construction of an aerial tramway between mine and mill. Meanwhile good progress is being made with the further development of the big orebodies opened in the mine. The season's work on the Slocan Star group, near Sandon, has been commenced. It is reported the Colonial, a Slocan mine over which there has been much litigation, is to be worked again this year.

Nelson.—The Consolidated Mining and Smelting Company is repairing and remodelling the concentrating mill at its Molly Gibson mine, above Kokanee Creek. Tests of ore from this mine have been made at the company's testing plant established last year at its St. Eugene mine, East Kootenay, with the result that changes in the Molly Gibson mill are being made for the purpose of ensuring the saving of a larger percentage of silver and lead from the second-class ore that has to be concentrated before shipment to the smeltery. More work is to be done on Eagle Creek this season; the Shoestring group has been bonded to Spokane men, who state they intend deepening the two 30-foot prospect shafts and afterwards to drift. Some rich gold ore has been taken out of this prospect, which is situated in the vicinity of the Granite-Poorman gold mines, the latter having been productive for years. The Athabasca is reported to be developing profitably, and yielding gold to an extent that is encouraging those operating it to plan for production on a larger scale. There is a 10-stamp mill and cyanide plant on the property, which in past years was one of the important producers of Nelson district.

Sheep Creek.—Vancouver men have purchased nearly 142,000 shares of treasury stock of the Nugget Gold Mining Company at $1 per share, this sale bringing the total of issued capital up to $500,000. In connection with this transaction, it is stated that the proceeds of sale of these shares are to be used in further developing the Nugget mine, and in the erection and equipment of a 20-stamp mill and providing other plant and machinery requisite for the economical mining and milling of the gold ore, of which there has already been proved to be ample to warrant putting in the mill and considerably extending the development work in the mine. The registration of the Mother Lode Sheep Creek Mining Company has been gazetted; its authorized capital is $1,250,000, and its head office in city of Portland, Maine, U.S.A. Mr. E. C. Wragge, of Ne is attorney for the company in British Columbia. Report developments at some of the other Sheep Creek properties, t that have not yet commenced production, are, in severa stances, favourable, and the outlook for a busy season in part of Nelson mining division is considered promising.

Rossland.—A news despatch from Rossland states that Consolidated Mining & Smelting Company of Canada, Lim intends to increase the quantity of ore sent from its Ce Star group of mines to its smelting works at Trail to 90 950 tons a day. The Le Roi mine is still shipping a com tively small quantity of ore to Trail. It is stated on authority that it is making a profit on its limited operat and that a few more men will be employed from now on. March report of the Le Roi No. 2 Limited, has been pri The information given includes the following: "Josie mi Shipped 2,240 tons of ore and 147 tons of concentrates. ceipts from the smeltery were $34,289, being payment 2,133 tons of ore and $4,573 for 147 tons of concentrates; i $38,862. Estimated costs for corresponding period were: velopment work, $8,000; ore production, $11,000; milling, 600; total costs, $20,600." Development of the Cliff min the Granby Company, under a working bond and option of chase, is being continued, but it is not yet sufficiently adva for much to be known of the ore-producing capabilities o mine.

Boundary.—While the Granby Company still has a cons able quantity of coke in reserve at its smelter at Grand F the work of raising it to the furnace charging bins, into v under ordinary conditions the coke is dumped direct fron cars bringing it from the ovens) is too great to admit c eight furnaces being operated, so two have been blown out is stated that there is sufficient coke on hand to meet th quirements of six blast furnaces until about the middle of but if operations shall not be resumed at the collieries a or two before then, it will not be practicable to keep smeltery running. The British Columbia Copper Compa supplementing its coke supply on hand by shipments of sylvania coke, notwithstanding the higher cost of this from so distant a source of supply. This company is now ing its Lone Star mine, situated immediately across the national Boundary line, and distant nine or ten miles fro smeltery, to which the ore is conveyed, first by a long tramway to near Boundary Falls, and thence to Greenwoo railway. A vein of ore of good grade has been cut in th tunnel the Greenwood-Phoenix Tramway Company is dr from Boundary Creek into the mountain towards Phc Where cross cut in the tunnel it is 818 feet from the surfac

Portland Canal.—Recent information received at the land Canal Mining Company's office is to the effect that i 2 adit another shoot of ore of good grade has been en and the working for 40 feet is in it with ore still in the of the drift. The ore varies in width from two to six feet. 3 adit, which had been in concentrating ore, at last a seemed to be entering the downward extension of the ore just mentioned as having been opened in No. 2.

At the annual general meeting of shareholders in the St Mining & Development Company, held in Victoria rece the directors reported as follows: "The tunneling done d the year on the four ledges amounts to about 1,000 feet. No. 4 ledge, where the most work has been done, an ore of great promise was encountered. Considerable work has done and a winze sunk to a depth of 50 feet in this ore. ledge widened with depth. Careful assays taken all the down, give an average value of $20 per ton in gold, s and lead. This is highly satisfactory, but, owing to the ence of water, we decided to postpone work on the winz the present and continue drifting in the face of the tunn this ledge, which is one of the best on our property. A time of writing we are advised by the foreman at the

work on this drift continues to expose good ore. . . st feasible plan for working the property as a mine by a tunnel from the Bear River side. This will obe necessity of constructing an aerial tramway, and will proximately 700 feet vertical depth below the present s, beside permanently draining the mine. The mouth tunnel will be only a short distance from the railway, ill be in operation before the end of next June. At a stimate, the tunnel will be 1,000 feet in length and, spur from the railway to its portal, it will facilitate g the ore at lowest possible cost.'' It is estimated t will cost about $20,000.

Hidden Creek copper mine, on Observatory Inlet, an arm land Canal, which mine is under option of purchase to aby M. S. & P. Company, Limited, is reported to be well. According to a printed statement attributed to y P. Graves, general manager of the company, ''the property has developed tonnage much more rapidly than we expected or hoped for, and has revealed ore in the deeper levels of considerably higher grade than was known to exist at the time we bonded it. Everything indicates that it is the best property we are now developing, and it is going to make a most important producer.''

It has been announced that the Glacier Creek Mining Company has made arrangements with Mr. W. J. Elmendorf (with the approval of the Portland Canal Mining Company, of which he is general manager) to direct development work on its claims throughout the ensuing summer. As its property is in the same part of Portland Canal district as that of the Portland Canal Mining Company, the additional work this arrangement will entail is not likely to interfere with Mr. Elmendorf's continued close supervision of operations at the latter company's mine and concentrating mill.

GENERAL MINING NEWS.

NOVA SCOTIA.

ness, May 1—W. D. Barclay, general manager for Mac- & Mann in Eastern Canada, visited Inverness some days McGillivray, the superintendent of Mackenzie & Mann's rests in Cape Breton, accompanied the general manager tour of inspection. So far as can be learned, it apat Superintendent McGillivray's jurisdiction will soon the famous ''Chimney Corner'' coal property. The from a reliable source is that Mackenzie & Mann intend lop this rich and extensive coal bed.

hreatened difficulty between the U.M.W. and their emhere will not result in a strike. Both parties underat in future arbitration will be first invoked. Manager McLeod has the confidence of the men.

extension of the railway line to St. Rose is an early ity. It is contingent upon the projected development St. Rose coal deposits.

ghill Mines, April 26.—Some sixteen English miners eir families arrived in town on Monday, having been t out under contract with the Dominion Coal Company. ars that they understood they were to work in Glace nd when they arrived here and found a strike on they committee to interview the officers of the local union U.M.W. They did not show up for work on Tuesday, day nearly all began work, the remainder leaving for al, where they will probably go to the West for emnt.

evening some nineteen Spaniards arrived to work in es here. They were also brought out by the Dominion ompany and are the first of their nationality to arrive n. It is claimed that they are good miners and present ype of manhood.

ght twelve more English miners arrived and will add to t of employees of the colliery. They are experienced and will add materially to the working of the mines.

fax.—Anticipating the construction of the new Canavy, the Nova Scotia Steel & Coal Company is about all machinery and adopt a scale of manufacturing far in e of anything yet attempted in Canada, which will enhe company to manufacture all classes and kinds of st steel forgings. A new forge house, equipped with e hydraulic forging presses, is to be built at New Glas- This plant will be able to handle work of a much larger ion than ever before attempted in Canada, and in size, ent and capacity will rival the best similar establishin Great Britain or Germany.

ONTARIO.

nto.—Silver Queen shareholders at their annual meeting voted to increase the capital from $1,500,000 to $2,000,000. The company's assets were shown to be $51,074, and their total liabilities $3,593.

The statement showed a nominal loss on operations to date of $27,518.74. Messrs. E. P. Smith, J. H. Stephens, H. Yeomans, Thomas Shortiss and N. D. MacLean, all of Toronto, were appointed directors for the ensuing year. The first two named were on last year's board.

Cobalt, May 5.—The power situation is gradually improving. Yesterday two carloads of machinery arrived at Gillies depot for the Cobalt hydraulic plant. It will be floated down with expedition. For the present, temporary head pieces over the intake pipes are working and since Sunday morning a pressure sufficient to work drills has been maintained. It is hoped to get the permanent machinery in next week. With two power plants furnishing air again many silver prospects are getting ready to start development again. On Peterson Lake, Cross Lake and Giroux Lake, companies that were obliged to shut down when the air went off are preparing to resume operations. The Cobalt Gem, a Philadelphia flotation, will diamond drill from the bottom of their shaft when air is available.

Cobalt, May 3.—A contract has just been let whereby the Nova Scotia Mining Company agrees to treat at its mill 100 tons per day for five years, of ore from the Crown Reserve mine.

South Porcupine, Ont., May 6.—Favourable weather has done much in clearing the trail into camp. The usual spring weather is a rainy season following the long winter, causing everything to be covered with slush and mud. This year bright sunshine, almost summer weather, followed the breaking away of winter, and the snow went off with a rush.

BRITISH COLUMBIA.

Phoenix, B.C., May 5.—Negotiations are now under way for the bonding of the McKinley group of claims in Franklin camp to the British Columbia Copper Company.

The property is owned by the McKinley Mines Company, Limited, and a meeting of shareholders will require to be held before the deal is put through.

The ultimate consideration for the McKinley group is $100,000, with an initial payment of $1,000 on the signing of the bond. The option will extend over a period of 12 months, during which time the company will carry on vigorous development work and prove up on the property. Although provision is made for an extension in the time of the bond the company intends to have it sufficiently developed within the year to warrant full payment.

Nelson.—The various contracts in connection with the mill of the Mother Lode mine on Sheep Creek have been let, the machinery will shortly commence to arrive and work will start

immediately. These facts were admitted last night, May 2nd, by William Watson, general manager and consulting engineer of the Mother Lode Sheep Creek Mining Company, who has just returned from New York.

YUKON.

Dawson, Y.T., May 3.—The spring clean-up in the Klondike district has begun. Water is running everywhere and hy[dr]lic plants are getting into action. All the large dredges [are] started and individual miners are washing out their [sl]dumps. It is believed that the gold output this year wil[l be] the largest in years, early estimates placing the yield in ex[cess] of $5,000,000.

COMPANY NOTES

Bell's Asbestos.

The directors of Bell's United Asbestos Company recommend the payment of a balance dividend of 1s. 6d. per share, making 12½ per cent. for the year. The amount to be carried forward is £16,122.

Northern Ontario Exploration Company.

The report of the statutory meeting of shareholders of the Northern Ontario Exploration Company, held in London on April 24th, has just been received. The Earl of Erroll presided, and in his address gave some interesting information. The company was formed in January, 1911, with a capital of £400,000. Of this, 100,000 shares, or £100,000, have been issued and freely called up. The company was formed to acquire properties and mining claims, and to carry on generally the business of an exploration and finance company, primarily in the Porcupine district of Northern Ontario.

Mr. C. A. Moreing and Mr. David Richards came to Canada and entered into negotiations with Messrs. Timmins, who owned a group of fifty mining claims, which claims are believed to occupy some of the most favourable positions on the Porcupine field. As a result of these negotiations a one-half share in the whole of the fifty claims was acquired by the company.

There is a group of four claims at the end of Gillies L[ake] which is in a direct continuation of the Hollinger line of r[eef] and on the south claim a big vein has been located sho[wing] gold. The claims known as the Miller claims are on the di[rect] line of veins of the Rea Mines, Limited. Veins showing [gold] have been discovered on this property.

At the extreme north there is a group of five claims, on [one] of which a large vein showing gold has been discovered. T[hese] are three claims situated on the line of reef of the D[ome] extension. There is also a block of fourteen claims situ[ated] at what is known as the "Reserve." It is stated several large veins have been located on this group. All the claims have been selected because they have showings of [gold] and veins of some sort or other on them. These fifty cl[aims] thus jointly owned by Messrs. Timmins and this company [have] recently been acquired by the Ontario Porcupine Goldf[ields] Development Company, Limited. This company has [been] formed with a capital of £600,000, in 600,000 shares of [£1] each. Mr. Moreing and Mr. Richards, while in Canada, [were] also successful in acquiring, on behalf of the company, 50[,000] shares in the Hollinger Gold Mines, Limited, owning the [well] known group of Hollinger claims.

STATISTICS AND RETURNS

DOMINION STEEL IN APRIL.

April was a good month at the Dominion Steel Works, although no records were broken. The output follows:

	Tons.
Coke	36,142
Pig	21,580
Ingots	24,875
Rails	11,570
Rods	8,390

The shipments totalled only 17,825 tons, but over 7,000 tons of rails are stocked awaiting the arrival of a steamer.

In the by-product department, there was a record output of sulphate ammonia, 380 tons being turned out.

The coal output for the four months ending the last of April totalled 1,165,000 tons, being an increase of 250,000 tons over the same period last year.

DOMINION AND N. S. COAL COMPANIES.

For the first three months the Dominion Coal Company's shipments showed a substantial increase, as follows:

Three months 1911	602,373
Three months 1910	510,082
Increase three months 1911	92,291

The coal shipments of the Nova Scotia Steel & Coal Company for the same period were under last year. The figures follow:

Three months 1911	83,455
Three months 1910	103,565
Decrease three months 1911	20,110

BULLION SHIPMENT.

The Crown Reserve sent out 23,128 ounces of silver in bars to London, England, on Tuesday, May 2nd. The shipment was valued at nearly $12,000. To date, this year, nearly a million of bullion has left the camp, the bulk of it going across the water.

COBALT ORE SHIPMENTS.

The shipments for the week ended April 28th were:

La Rose, 3 high, 1 low	272
McKinley-Darragh, 3 high	186
O'Brien, 1 high	64
Chambers-Ferland, 1 low	64
Cobalt Lake, 2 low	124
Trethewey, 1 high	63
Nipissing, 1 low	61
Buffalo, 1 high	61
Provincial, 1 high	40
Total	938

Pounds.

GRANBY.

During the first quarter of the current year, Granby produced 5,380,159 pounds of copper, 107,311 ounces of silver and 13,551 ounces of gold. There was produced during March 988,341 pounds of copper—the largest output for many mo[nths] —40,400 ounces of silver, and 4,912 ounces of gold.

SILVER IN APRIL.

Average prices of bar silver in London during April [were] one-eighth of a penny better than during March. There

little change in average monthly quotations this year. ighest was 24⅞ in January, followed by 23¾d. in Febru- to 24 5/16 in March and a slight recovery to 24 7/16d. for A year ago the April average was 24½d., against in 1909, 25⅛d. in 1908, and 30¼d. in 1907.

BRITISH COLUMBIA ORE SHIPMENTS.

following are the returns of the ore production and movement for the past week, ended April 28, and for the year to date:

Boundary Shipments.

ranby	22,261	386,624
Mother Lode	6,090	107,803
awhide	4,412	57,833
thlestan	254	406
Vellington	1,017	1,017
ther mines		40,041
Total	34,034	593,924

Rossland Shipments.

entre Star	4,450	64,673
e Roi No. 2	520	8,728
e Roi No. 2, milled	300	5,100
e Roi	280	4,340
X. L.	15	36
ther mines		271
Total	5,565	83,148

Slocan-Kootenay Shipments.

ullivan	766	11,865
t. Eugene, milled	2,775	47,175
ichmond-Eureka	60	880
ope	29	298
ueen, milled	420	6,930
ranite-Poorman, milled	250	4,250
ugget, milled	110	1,870
ilcox, milled	75	1,275
eatrice	68	319
ankee Girl	71	1,383
nob Hill	42	655
an Roi	33	33
thel	5	5
ther mines		3,872
Total	4,728	80,843

total shipments for the week, including the estimated g, were 44,327 tons, and for the year to date, 757,915 ons.

B. C. COPPER COMPANY'S RECEIPTS.
Greenwood, B.C.

other Lode	6,090	107,803
awhide	4,412	57,833
thlestan	254	406
ellington	1,017	1,017
surgent	166	166
ther mines		10,304
Total	11,939	177,529

GRANBY SMELTER RECEIPTS.
Grand Forks, B.C.

ranby	22,261	386,624

CONSOLIDATED COMPANY'S RECEIPTS.

Trail, B.C.

Centre Star	4,450	64,673
Sullivan	766	11,865
Le Roi No. 2	520	8,728
Le Roi	280	4,340
Richmond-Eureka	60	880
St. Eugene	136	2,278
I. X. L.	15	36
Hope	29	298
Beatrice	68	319
Yankee Girl	71	1,383
Knob Hill	42	655
Van Roi	33	33
Ethel	5	5
Hayward & Simpson	33	33
Other mines		35,258
Total	6,508	131,784

The total receipts at the smelters for the week, including concentrates, were 40,708 tons, and for the year to date, 693,940 tons.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending May 5th, and those from Jan. 1st, 1911, to date:

	May 5. Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger		55,200
Bailey		40,000
Barber		6,000
Beaver		595,243
Buffalo	57,520	1,006,980
Chambers-Ferland		448,900
City of Cobalt	65,500	427,780
Cobalt Lake	124,340	1,687,850
Cobalt Townsite		351,840
Colonial		42,000
Coniagas	116,120	1,526,180
Crown Reserve	168,830	946,960
Hargraves		41,100
Hudson Bay	60,170	246,120
Kerr Lake		1,081,898
King Edward		40,000
La Rose	210,790	2,154,620
McKinley-Darragh	70,310	2,080,080
Nipissing	74,900	2,183,290
O'Brien	78,000	543,770
Peterson Lake (Little Nip)		58,430
Provincial		40,510
Right-of-Way		318,260
Silver Cliff		106,680
Standard Cobalt		44,813
Temiskaming	83,130	651,832
Trethewey	139,500	528,630
Wettlaufer		117,232

The shipments for the week were 1,249,110 pounds, or 624 tons.

The shipments from Jan. 1 to May 5 were 17,372,198 pounds, or 8,686 tons.

In 1910 the shipments amounted to 34,420 tons.

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous.

	May 9th, 1911. Bid.	Ask.
Dominion Steel Corporation	.55¼	...
Nova Scotia Steel	...	...
Crow's Nest Pass	...	...
Granby	.33½	...
Consolidated Mining & Smelting	.40	.45
Amalgamated Asbestos	...	...
Black Lake Asbestos	...	.16

Porcupine Stocks.

Foley	1.50	1.52
Detroit New Ontario	.50½	.51
Rea	6.60	6.68
Apex	.19	.21
Pore. Canada	1.10	1.20
Pore. Central	.73	.80
Dobie	3.55	3.75
Dome Extension	.54½	.55
Hollinger	12.65	12.90
Monita	.25 sellers	
Preston	.38½	.39½
Pearl Lake	.53	.57
Tisdale	.14	.14½
Swastika	.53	.54
United Porcupine	.06	.08
Porcupine Gold	.60¾	.61⅜
Standard	.24	.26
West Dome	2.50	2.55
Coronation	.37½	.40

Cobalt Stocks.

Bailey	.05¾	.06
Beaver Consolidated	.37½	.37¾
Buffalo	2.20	2.25
Chambers-Ferland	.13	.14
City of Cobalt	.19	.20
Cobalt Central	.05	.07
Cobalt Lake	.23	.24
Coniagas	7.50	8.00
Crown Reserve	3.50	3.60
Foster	.05	.06
Gifford	.05	.05¾
Great Northern	.20½	.21
Green Meehan	.03¾	.03⅞
Hargraves	.19	.20
Hudson Bay	93.	105.
La Rose	4.60	4.70
Little Nipissing	.04½	.05
McKinley	1.70	1.71
Nancy Helen	.02	.03½
Nipissing	10.60	10.70
Nova Scotia	.15	.18
Ophir	.14	.18
Otisse	.01½	.02
Peterson Lake	.12½	.13¼
Right of Way	.13½	.15
Rochester	.06¼	.06⅝
Silver Leaf	.04½	.05
Silver Queen	.05	.07
Temiskaming	.70¾	.71¾
Trethewey	1.07	1.12
Wettlaufer	.95	1.00

New York Curb.

Brit. Col. Copper	4
Butte Coalition	17
Davis-Daly Copper	1⅜
Ely Consolidated	⅜
Giroux Mining	6
Goldfield Consolidated	6⅛
Greene-Canadian	6
Harcuvar Copper	..
Inspiration Copper	7⅜
Miami Copper	20
New Baltic Copper	6
Nevada Con. Copper	18⅝
Ohio Copper	1 9/16
Rawhide Coalition	.5½
Ray Central	1⅝
Ray Consolidated	17¼
Union Mines	¼
Yukon Gold	3⅞

Silver Prices.

		New York. cents.	London pence
April	22	53⅞	24
"	24	54⅛	24
"	25	54⅛	24
"	26	53⅞	24
"	27	54	24
"	28	54⅝	24
"	29	53¼	24
May	1	53⅜	24
"	2	53½	24
"	3	53¼	24
"	4	53	24
"	5	53¼	24
"	6	53¼	24
"	8	53¼	24

GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.

Coke.

May 8.—Connellsville Coke.
Foundry coke, prompt, $1.90 to $2 per ton.
Furnace coke, prompt, $1.50 to $1.60 per ton.
May 8.—Tin, Straits, 42.20 cents.
Copper, prime lake, 12.30 cents.
Electrolytic copper, 12.10 cents.
Copper wire, 13.75 cents.
Lead, 4.47½ cents.
Spelter, 5.55 cents.
Sheet zinc, (f.o.b. smelter), 7.25 cents.
Antimony, Cookson's, 9.45 cents.
Aluminium, 21.00 to 21.50 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $41.50 per ounce.
Platinum, hard, $43.50 per ounce.
Bismuth, $2 to $2.10 per lb.
Quicksilver, $46.50 per 75-lb. flask.

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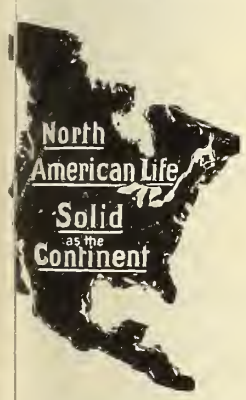

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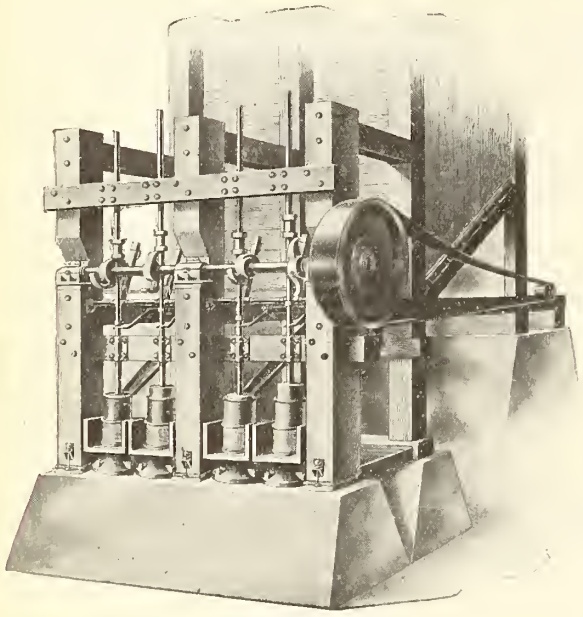

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Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mini Institute, etc.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map Canada, by G. A. Young and R. W. Brock.

NEW BRUNSWICK and NOVA SCOTIA

1107. Joint Report on the Bituminous or Oil Shales of New Brunswick and Nova Scotia. Also on the Oil Shale Industry of Scotla Part I, Economics, Part II, Geology by R. W. Ells.

QUEBEC

1077. Memoir No. 7, Geology of St. Bruno Mountain, Quebec, with maps, by J. A. Dresser.

ONTARIO

1059. A Geological Reconnaissance of the region traversed by the National Transcontinental railway between Lake Nipigon a Clay Lake, Ontario. Accompanied by two maps covering the region, by W. H. Collins.
1082. Memoir No. 6. Geology of the Haliburton and Bancroft Areas, Ontario, by Frank D. Adams and Alfred E. Barlow.
1091. Memoir No. 1, Geology of the Nipigon Basin, Ontario, by A. W. G. Wilson.

NORTH WEST PROVINCES

1035. Coal Fields of Manitoba, Saskatchewan, Alberta and Eastern British Columbia accompanied by a map, by D. B. Dowling.
1115. Memoir No. 8. The Edmonton Coal Field, Alberta, with maps, by D. B. Dowling.

BRITISH COLUMBIA

1093. Memoir No. 2. Geology and Ore Deposits of Hedley Mining District with maps, by Charles Camsell.
1139. Memoir 11-T Triangulation and Spirit Levelling of Vancouver Island, 1909, by R. H. Chapman.

YUKON and NORTH WEST TERRITORIES

1101. Memoir No. 5, Lewes and Nordenskiold Rivers Coal District, Yukon Territory, by D. D. Cairnes.
1080. Report on a part of the North West Territories drained by the Winisk and Attawapiskat Rivers, by Wm. McInnes.
1006. Report on a traverse through the southern part of the North West Territories from Lac Seul to Cat Lake in 1902, A. W. G. Wilson.

MAPS RECENTLY ISSUED:

CANADA

1042. Mineral Map of Canada. Scale 100 miles to 1 inch.
1084. Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet. Scale 1 mile to 1 inch.
1134. Map 14 A. Hall Harbour Sheet. Scale 1 mile to 1 inch.

QUEBEC

1112. Map 12 A. Vicinity of the Transcontinental Railway, Abitibi District, Quebec. Scale 4 miles to 1 inch.

ONTARIO

1091. Map 8 A, Lake Nipigon, Thunder Bay District, Ontario. Scale 4 miles to 1 inch.

ALBERTA

1132. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.
1117. Map 5A. Topographical map of Edmonton, scale 2,640 feet to 1 inch.
1118. Map 6A. Edmonton. Isobathic lines showing cover over "Clover Bar" coal seam, scale 2640 feet to 1 inch.

BRITISH COLUMBIA

1068. Geological Map (sketch) of the Sheep Creek Mining Camp, West Kootenay, B.C. Scale 1 mile to 1 inch.
1095. Map 1A. Topographical map of Hedley Mining District, Scale 1000 feet to 1 inch.
1096. Map 2A. Geological Map of Hedley Mining District. Scale 1000 feet to 1 inch.

YUKON and NORTH WEST TERRITORIES

1089. Map 9A. Explored Routes on Parts of the Albany, Severn and Winisk Rivers. Scale 8 miles to 1 inch.
1103. Map 10A. Tantalus Coal Area, Yukon Territory. Scale 2 miles to 1 inch.
1104. Map 11A. Braeburn-Kynocks Coal Area, Yukon Territory. Scale 2 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 1 cents is made for maps on linen.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and econom geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature r ported upon. Letters and samples that are of a Departmental nature, addressed to the Director may be mailed O.H.M.S. free of postag

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PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Government of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unsurveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minimum being 40 acres in unsurveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

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Copies of the Mining Law and any information can be had on application to

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Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOT

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

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$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,57 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral lan been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province i Dominion, or than any Colony of the British Empire.

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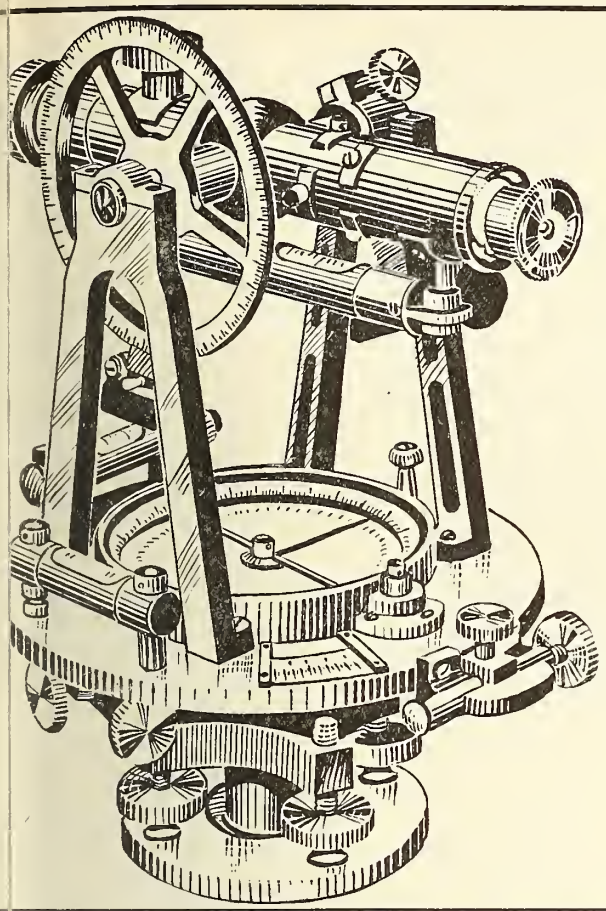

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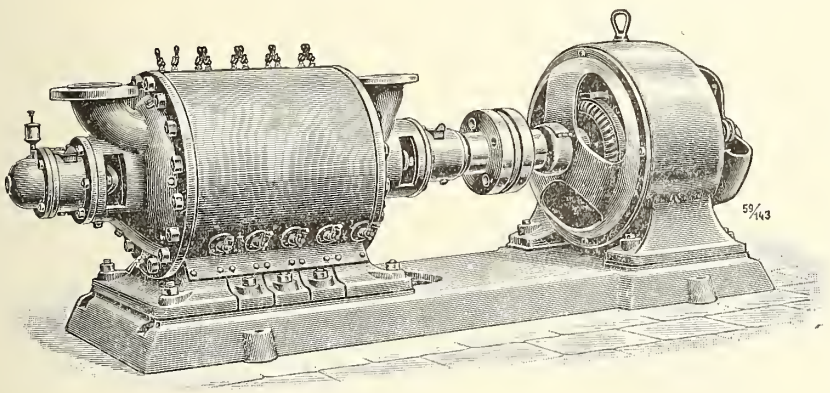

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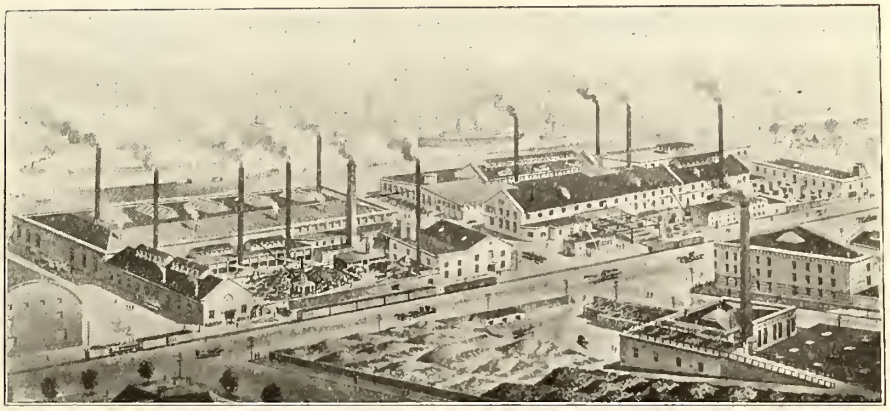

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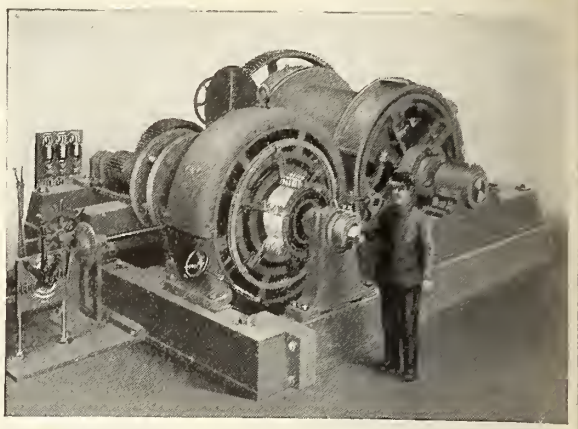

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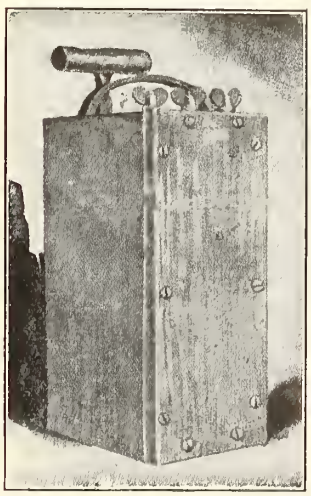

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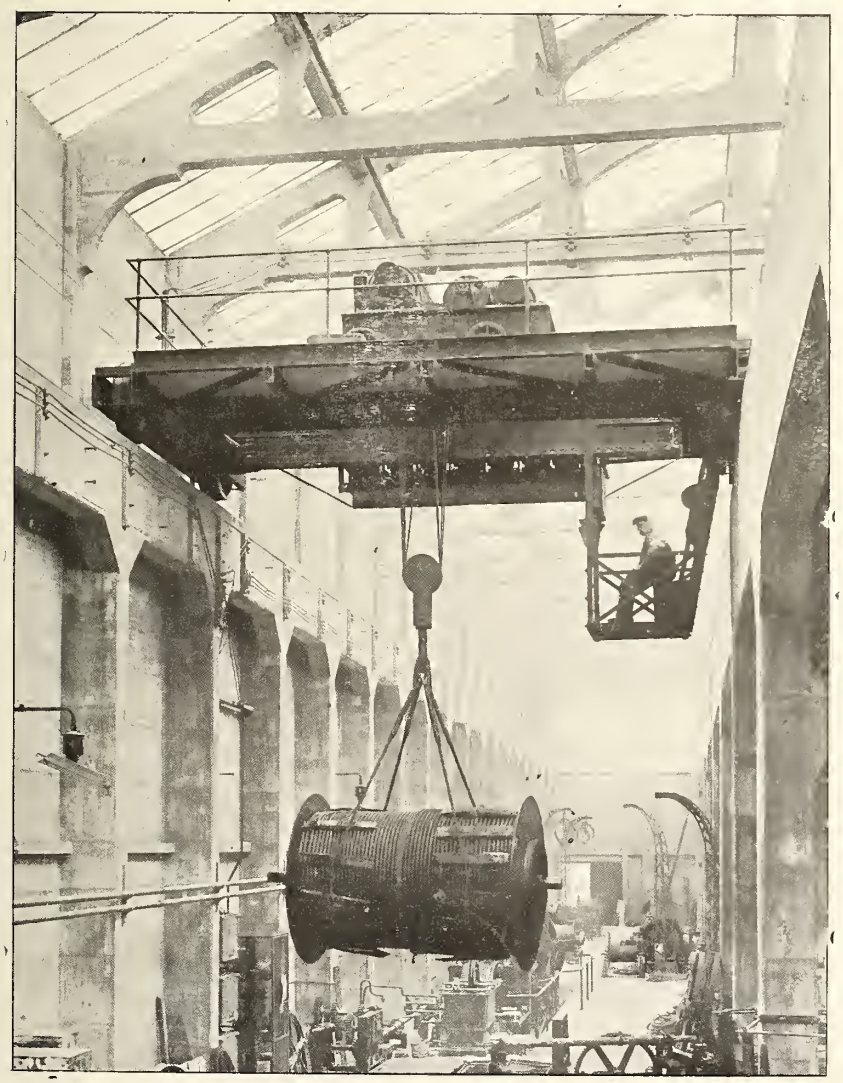

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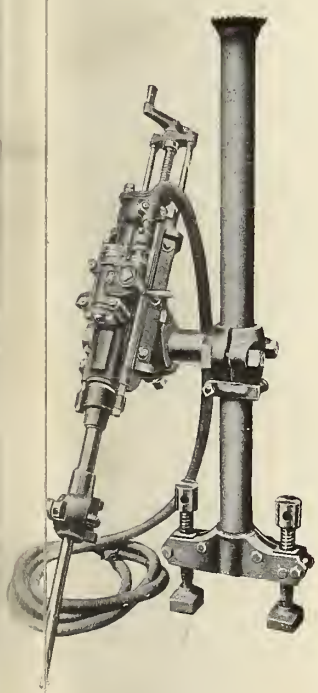

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I beg to state that I greatly prefer your drill to any on the market. I have used practically every drill made, and find in your drill a less consumption of air and much greater capacity. I have found by repeated trials that your drill works better, as compared with others, running under high pressure.

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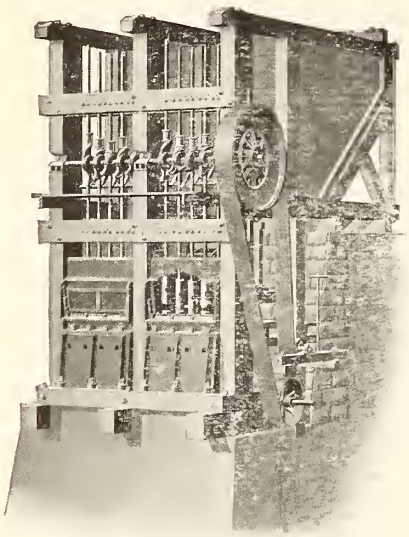
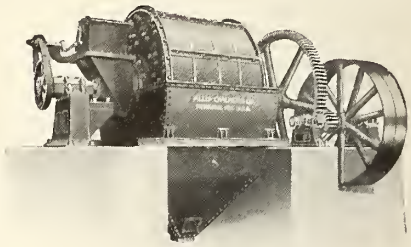
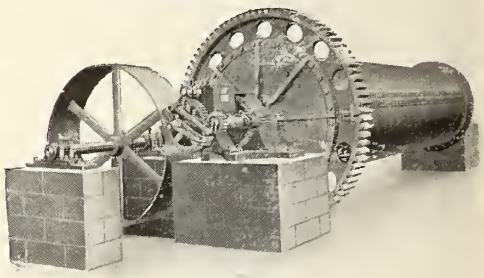


Stamp Mills
See Bulletin 1432



Ball Mills
See Bulletin 1444



Tube Mills
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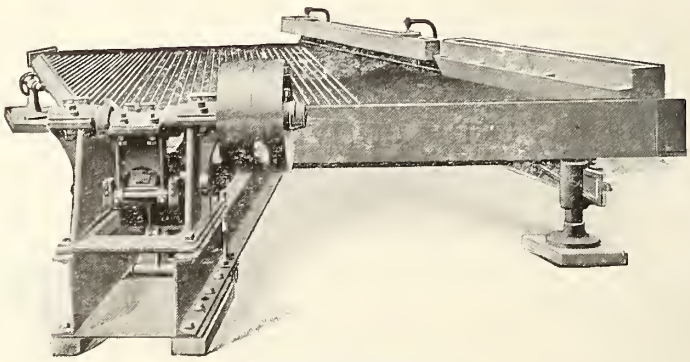

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What Users Think

MONTREAL, Feb. 8, 1909.

Messrs. Jones & Glassco, Montreal.

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GENTLEMEN,—In reply to your enquiry of Jan. 30th, I may say that the Renold Silent Chain Drives we have installed are giving every satisfaction.

Our first drive was installed to replace a 12 in. belt which was giving us trouble on account of short centres; this chain has run continuously for four years without the slightest trouble.

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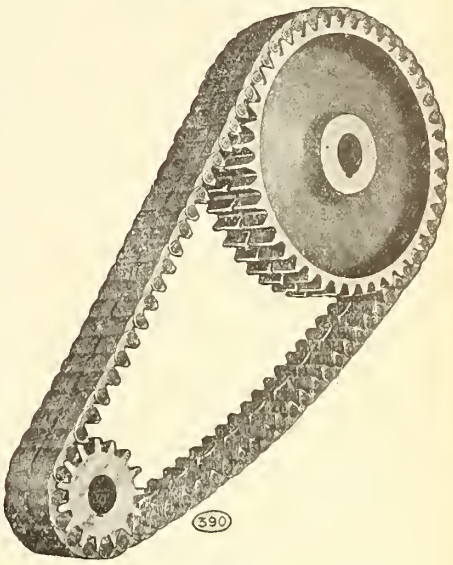
Our third drive was installed on a calendering machine after breaking two sets of helical gears and this has been so successful that we are now installing two more similar drives.

I would be perfectly willing to make an appointment with any person genuinely interested and show him the drive in operation.

—The above comes from one of the largest manufacturers in Montreal and is signed by the Mechanical Superintendent. Up to the present (1911) these drives have not received repairs of any kind.



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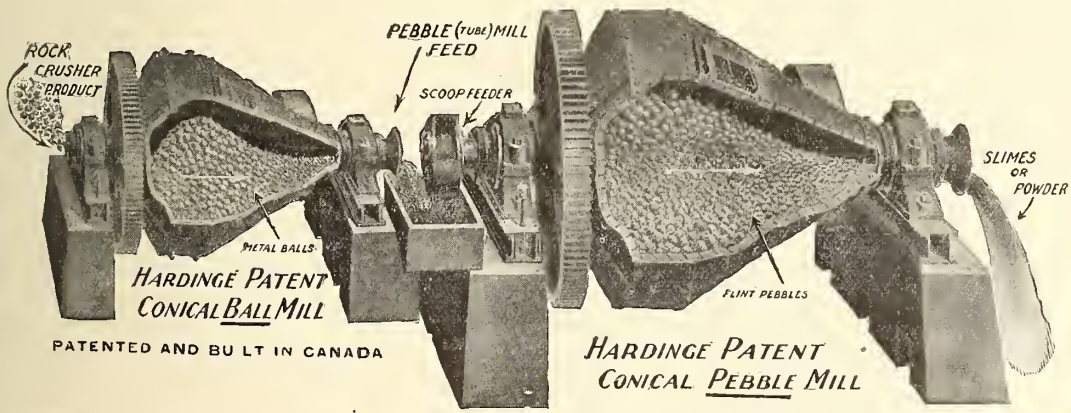

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Runners will tell you that the "DA21" works more **smoothly** an with **less jar** and **vibration** than other tools; also that it is easy to clea and care for because it contains **no screw joints,** and every part can b reached by loosening three nuts.

We want to tell you more about **what** this drill is doing and **how** it is able to do it.
May we send bulletin "660 D?"

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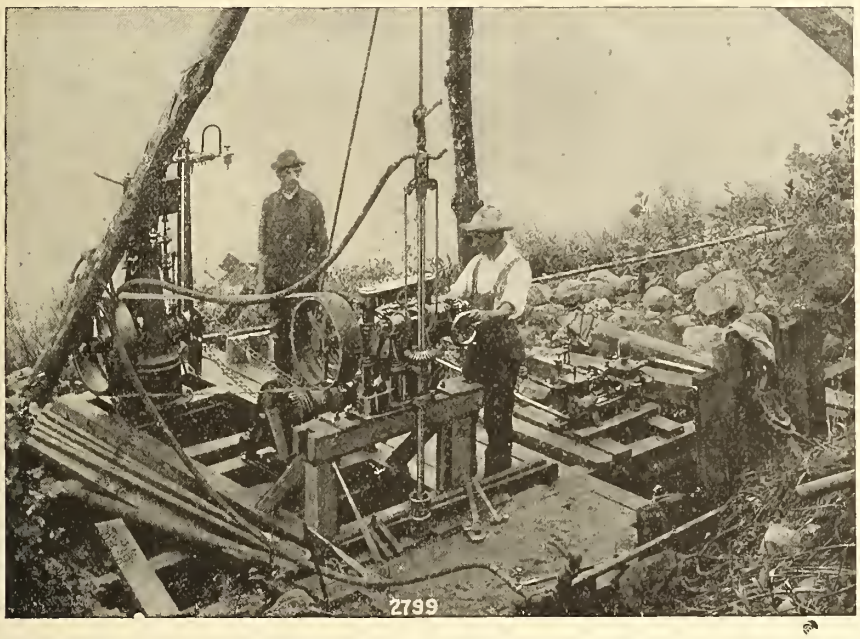
DIAMONDLESS CORE DRILLS



The "Davis Calyx Core Drill" has practically no limitations. It is the most practical, economical and reliable core drilling outfit on the market.

It will bore to any depth required; in any formation, either hard or soft; will remove any size of core; is reliable, rugged and powerful.

The machine was originally designed for economy, and has fulfilled these requirements to the last degree.

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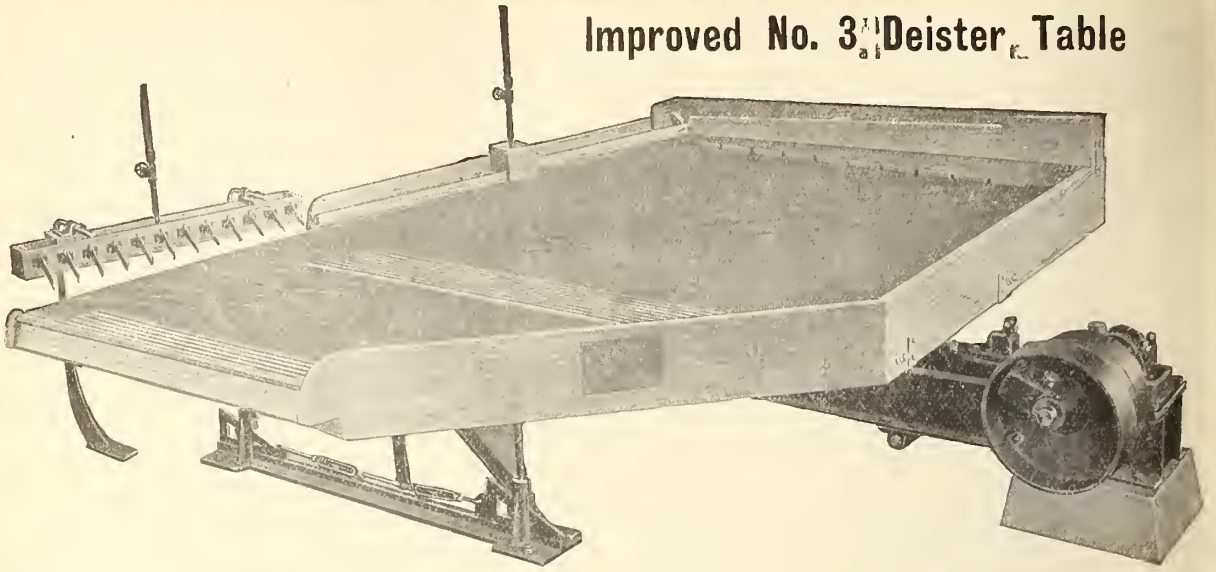

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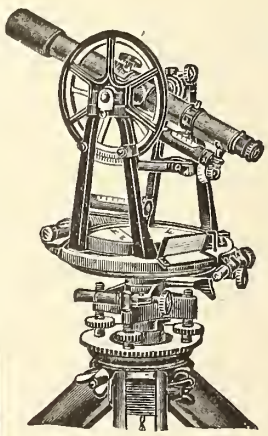

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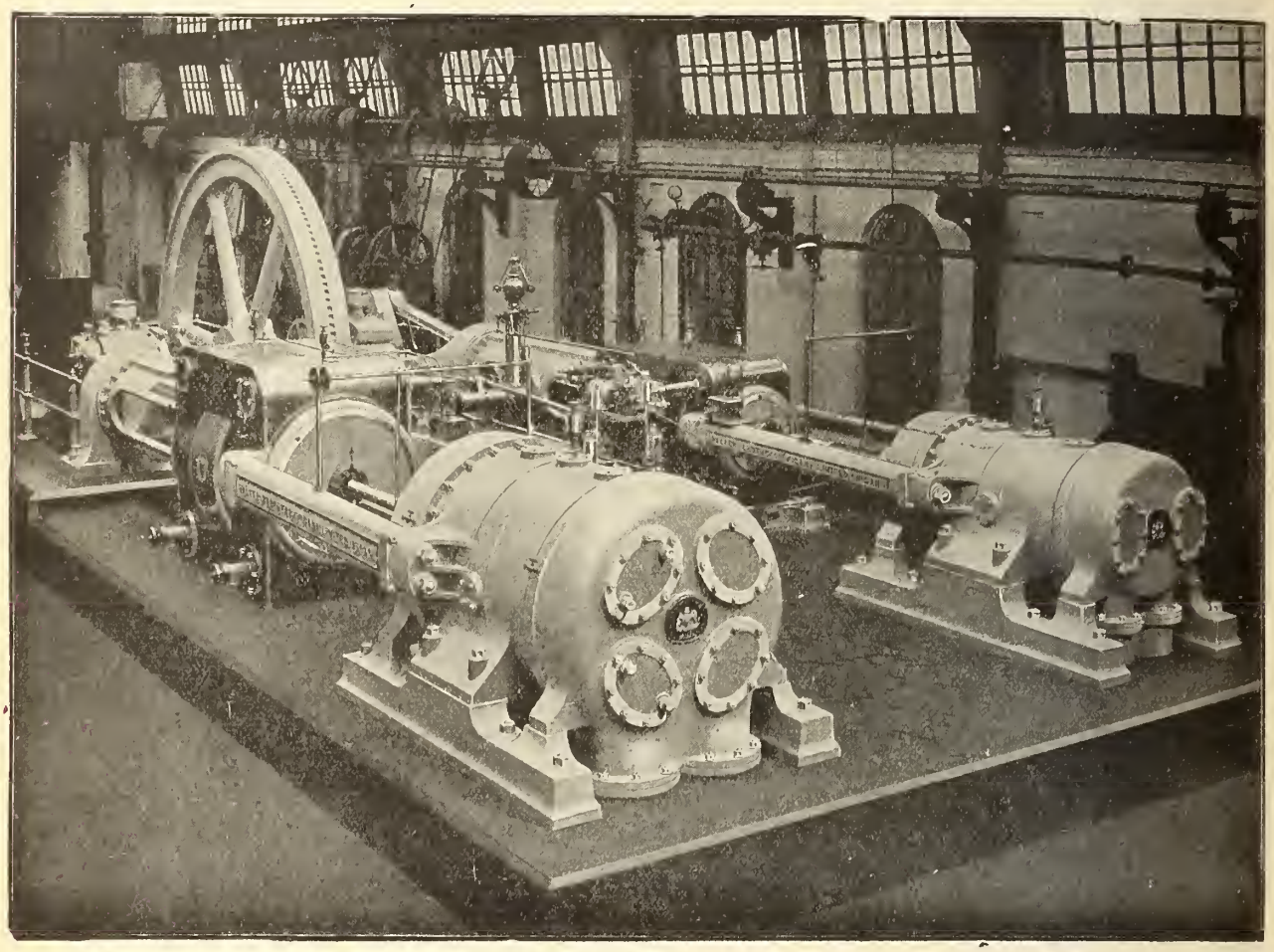

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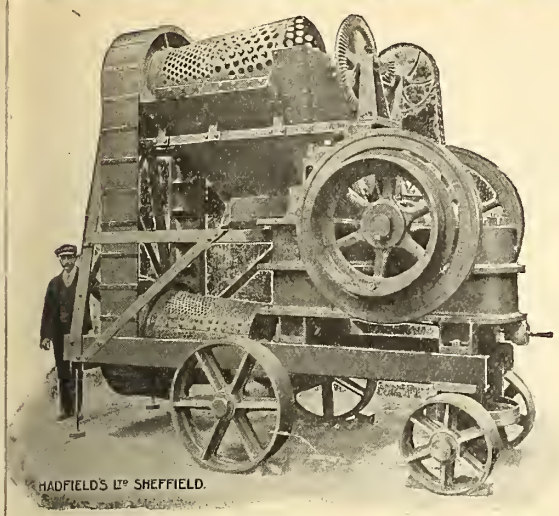

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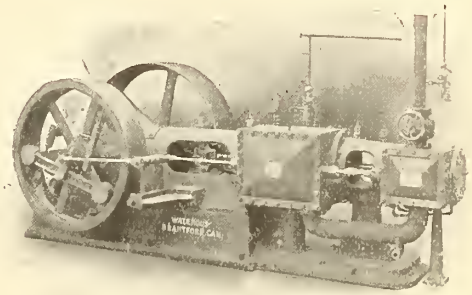

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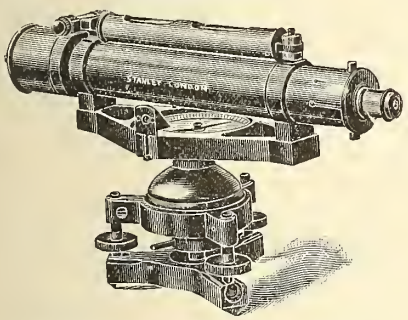

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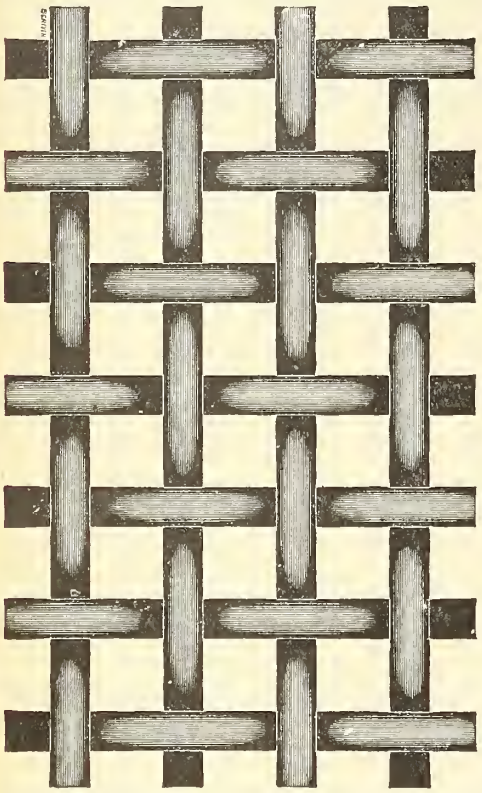

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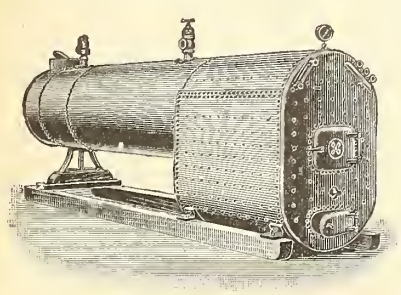

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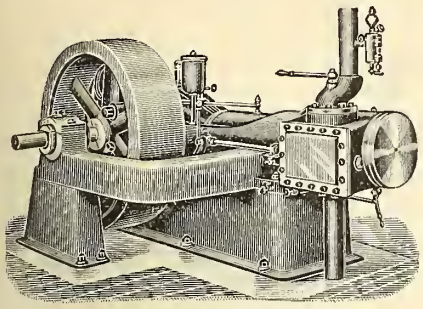

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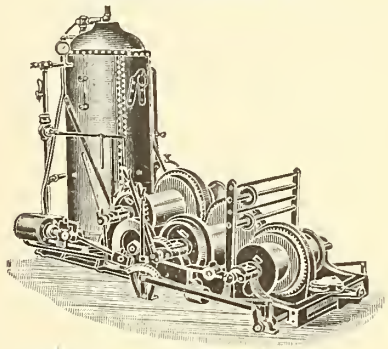

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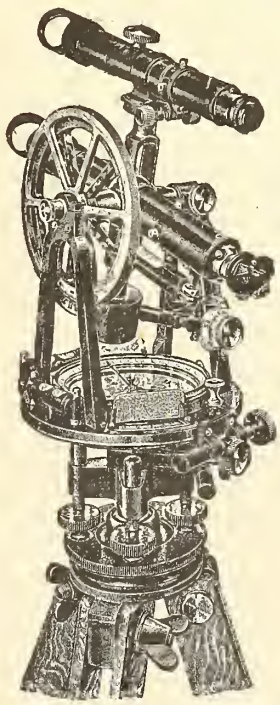

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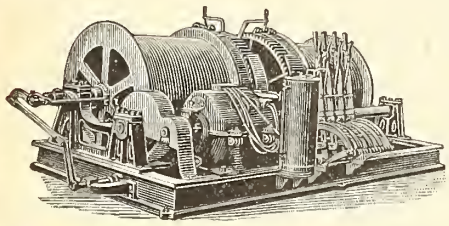

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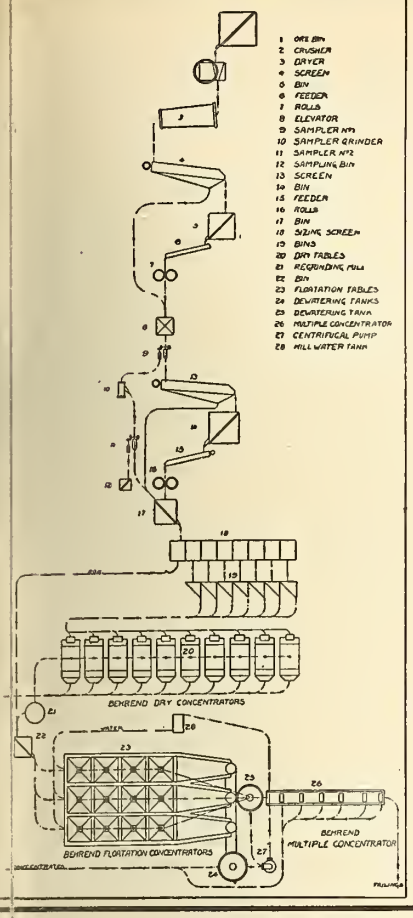

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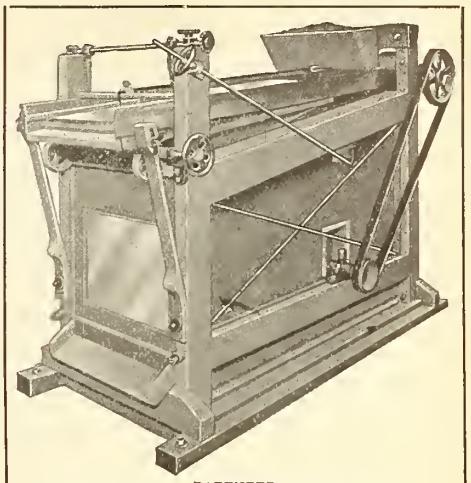

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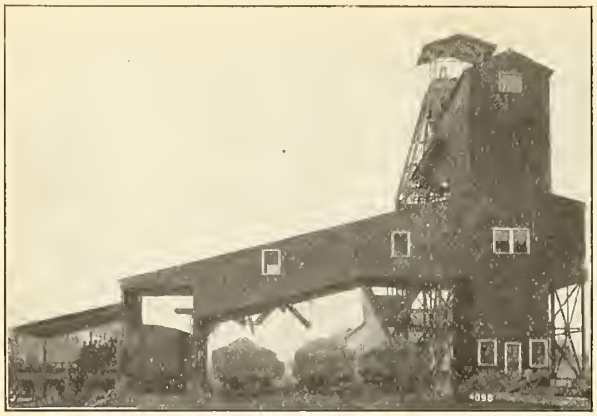

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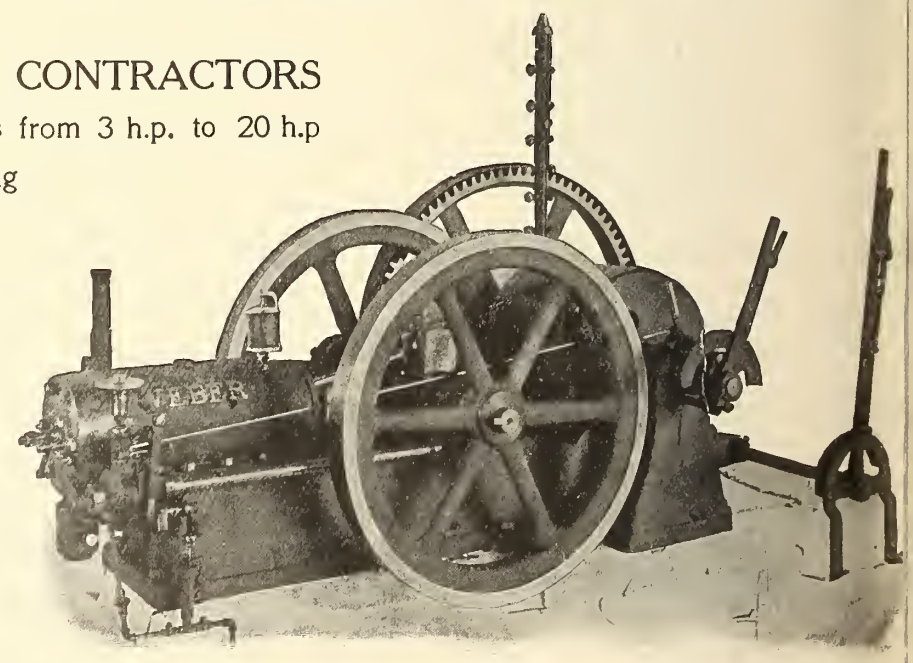

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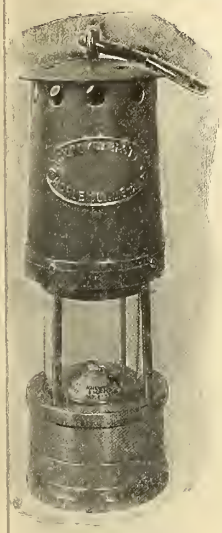

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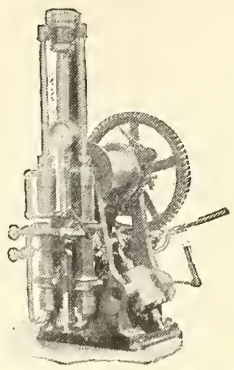

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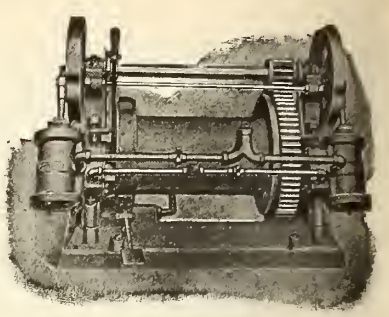

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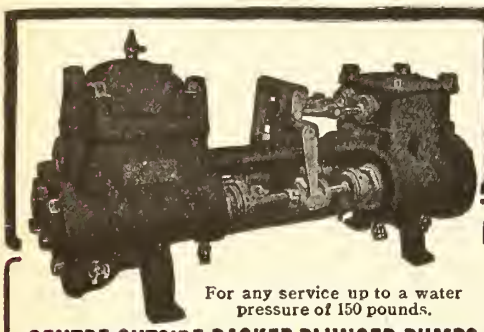

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THE CANADIAN MINING JOURNAL

VOL. XXXII. TORONTO, June 1, 1911 No. 11

The Canadian Mining Journal

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THE FUTURE OF MINING.

The philosophy of industrial economics is being applied to mining in increasing degree. The exhaustion of bonanza deposits and the gradual improvement of mining and metallurgical processes have brought into the category of profitable deposits many ore bodies that were not workable a few years ago. The same process of evolution is effective now and for all future time. It is wise to pause now and then for the purpose of observing just where we are and just how far we may take advantage of the progress of applied science.

The task of summing up the present status of the mining industry is not a slight one. The writer who attempts to indicate the future must be thoroughly informed as to the present. Also, he must be conversant to an extraordinary extent with the past. In the current bulletin of the Institution of Mining and Metallurgy, Mr. A. G. Charlton takes upon himself the duty of outlining the future from an economic standpoint. His paper calls for more than passing notice.

Most important factors in the expansion of mining are the increase of population, the impressive improvement in mining and metallurgical practice, and the immense growth of railroad construction. Of all parts of the British Empire, Canada has gained most pronouncedly in the last decade. In railroad construction she has taken vast strides. Her population has almost doubled. Her mineral production has been multiplied by three. And we now are on the eve of larger and stronger development.

Looking into the future effect of various natural agencies, Mr. Charlton believes that, with the opening of lower grade deposits, the cost of supplies, wage-rates, and salaries, may possibly suffer a general lowering. In this we cannot concur. The history of mining, closely interwoven with the evolution of larger and more efficient mechanical devices, teaches the lesson that cheap labour is not good labour. The general and inevitable tendency is for wages and salaries to go up. The cost of supplies is controlled by so many arbitrary circumstances that generalizations are unsafe.

A second effect, and this Mr. Charlton considers more probable, is that the supply of metals per capita may become gradually less. The price of commodities would thus fall. But we see no force in the conclusion that there would result a proportionate diminution in the number of openings available for mining and metallurgical engineers. In fact, since the price of metals would have risen, the inducements to search for good mining investments would be greater. Not until the available surface of the globe shall have been pros-

pected will Mr. Charlton's argument hold.

Five modern undertakings of world-wide significance are, in Mr. Charlton's opinion, to influence profoundly both the general channels of trade and the mining industry. These are:—The opening of the Panama Canal; the establishment of an "All-Red-Route" through Canada; the completion of the Cape to Cairo Railway; the opening of Asia Minor and Persia by the Euphrates Valley Railway; and the awakening of China to modern methods.

The opening of the Panama Canal and the completion of the Grand Trunk Pacific, not to mention the linking together of the loose ends of the Mackenzie and Mann lines, will be of most vital importance to Canada. Unlike South Africa and Rhodesia, Canada has been primarily an agricultural, pastoral, and lumbering country. Mining is only beginning to take its proper place. With efficient railroad service, mining will sooner or later become not only the chief source of freight and the indirect source of numerous collateral industries, but will on its own merits overshadow all other industries with the exception of agriculture.

Many industrial, economic, and professional phases are touched upon in the paper under discussion. These are too numerous to permit of mention here. It suffices to say that Mr. Charlton, in language that is clear and vigorous rather than elegant, clothes with fresh interest certain truths that are too often overlooked. But we must not omit an expression of approval as regards his strongly worded plea for an Imperial School of Mining and Metallurgical Economics. The suggestion that an Imperial Minister of Mines is needed "to keep the heart of Great Britain in touch with mining affairs all over the Empire" is quite impracticable. Long-distance administrative offices, as witness India, are not to be desired. Canada has had her own sad experience. In matters educational the case is quite different. We cannot have too much of the spirit of free-masonry in the mining profession.

The problem of instructing working-men has been adequately attacked only in one province in Canada, and that province is Nova Scotia. Mr. Charlton emphasizes the opinion that British working-men are under-educated and, hence, man for man not up to the productive standard of their American and German cousins. He advocates the training not only of the labourer, but also of the employer. One means to the desired end is the international collection, co-ordination, and diffusion of geological, mining, and economic data.

The point that most concerns us in Mr. Charlton's paper is one that we have often enough laid stress upon. Advancement can only come with mutual co-operation. Capital is not the main requisite. Professional enterprise, official and private interchange of information, and careful, technical control of investment are the foundations upon which mining will attain the healthiest and largest future.

CEMENT.

The direct and specific charges brought by Sir Sandford Fleming against the promoters of the ce merger must not be ignored. The person whom public believes to have been the prime mover ir whole consolidation is Mr. Max Aitken. Mr. Ai a Canadian born, is now a member of the British liament. His attainments have been widely a tised. In England he represents the typical suc ful Canadian. Thus, if for no other reason tha pediency, the charges must be investigated, and e substantiated or refuted. Of course, there are and better reasons. As a nation we require a thor re-vamping of our business ethics. If Sir Sandf allegations are true, wholly or in part, then our tish cousins have just cause to conclude that Cana are supinely willing to put a premium upon la and dishonesty, provided only that the scale of o tions be large enough.

Canadian newspapers, irrespective of politica our, are now loudly demanding a thorough inve tion. We may here allude to the fact that the adequate summing up of the cement situation app in Mr. J. J. Harpell's book, "Canadian National nomy," recently reviewed in these columns.

The Toronto Globe, May 25, comments edito upon the proposed investigation and calls vigor for immediate action. It quotes, by the way, a torial from the Moncton Transcript. It is instru to note that the Transcript has pirated, almost for word, a paragraph from Mr. Harpell's book.

On the face of things there seems to be ample g for investigation. It will be remembered tha Canadian Cement Company was organized, under inion charter, with power to issue $5,000,000 of cent. bonds, $10,500,000 of 7 per cent. cumulative ferred stock, and $13,500,000 common stock. Wit assistance of the banks the promoters purchased right a number of cement plants, a number suff to assure control of cement prices in Canada Ac ing to Sir Sandford Fleming the amount disburs purchasing eleven plants and in expenses was 592,250 in stock, bonds, and cash But the tot curities received by the holding company aggre $29,998,400. Thus there is the enormous balan $13,406,150 to be accounted for by the prom Moreover, the physical assets of the compan worth probably not more than $10,000,000. The then appears to be that Canadian consumers w called upon to provide dividends on nearly $30 000, on an original investment of one-third that

Light is thrown upon the situation by the re of the promoters, who still hold large blocks of mon stock, to the Dominion Government for the lege of converting the 7 per cent. preferred stock 5 per cent. debenture stock. Obviously by this version some $200,000 of annual dividends w transferred from the holders of preferred to the

common. And this again may be but preliminary a general unloading of common after it will become temporarily enhanced in value.

The labour cost per barrel of cement manufactured in Canada is low, lower indeed than in many countries where selling prices are more reasonable. The Canadian consumer pays as much as $2.50 per barrel. It is interesting, but not consoling, for the Canadian consumer to know that he is paying for motor-cars, English elections, and other picturesque perquisites of the promoter.

* * * *

Sir Sandford Fleming's name is known and honoured throughout the British Empire. The tactless influence of two of the Cement Company's officers in commenting publicly upon his allegations is inexcusable. Sir Sandford's word will be accepted by all until he is proved to be mistaken.

For the Dominion Government to ignore Sir Sandford's charges will be only less disastrous than for it to indulge in the not unfamiliar device of padding a special committee. The knife, and not the poultice, is necessary.

BATHS FOR MINERS.

The coal-miner suffers socially from the peculiar nature of his work. At the end of the shift he resembles a chimney-sweep. If circumstances force him to perform his ablutions in his narrow cottage, he carries dust and dirt into his home, vexing the soul of the housewife beyond measure. In settled districts he has to travel, begrimed and begriming, from the pit mouth to his house. All this is humiliating.

Dr. J. S. Haldane, in a recent number of The Times (London), writes with unusual saneness upon this subject. He expresses the belief that the question is not one of hygiene but of social decency and propriety. Dr. Haldane is a competent authority. It is his opinion that the desirability of providing wash-rooms for the coal-miner does not depend upon any point of health, but that it is entirely a matter of expediency. "The reasons that make changing and thorough washing at the end of a shift desirable are not directly connected with the health of miners, for there is nothing unhealthy about coal dust, and coal mining, with all its risks, is one of the most healthy and wholesome of occupations. The main reason is that a miner who returns home unwashed and in his pit clothes must necessarily bring into his house an amount of coal dust which is apt to soil everything and every person in the house. . . . Washing and changing at the pit-head would save endless discomfort, trouble, and dirt, and could be more quickly and conveniently done than at home. Why it has never become universal at collieries I am quite at a loss to understand."

In the course of his letter, Dr. Haldane speaks warmly of the manliness and intelligence of coal-miners as a class. His words apply equally in Canada. Here, as elsewhere, the coal-miner is usually a fine specimen of self-reliant manhood. Loyal to a degree, he is, perhaps, apt to be led away by the demagogue. But a right appeal to his better instincts rarely fails of response. He is entitled to the best and fairest treatment. It is certain that consideration in small matters, and it is a comparatively small matter to supply soap and running water, would do much to create sympathetic understanding between employer and employee. Some, but by no means all, Canadian collieries make provision in respect of washing. All coal-mining companies should be obliged by custom, if not by legislation, to consider in this respect the comfort of the worker.

A WISE APPOINTMENT.

The announcement that the services of Mr. E. Jacobs have been retained by the B. C. Department of Mines will meet with the warm approval of all Canadian mining men. For many years Mr. Jacobs has devoted himself unremittingly to the cause of clean mining journalism. As editor of the British Columbia Mining Review he did notably good work. As secretary of the Western Branch of the Canadian Mining Institute he has spared no effort to rouse and maintain interest. In these directions Mr. Jacob's efforts have been of inestimable value to British Columbia.

But it is as a general journalist that Mr. Jacobs has done most for the Province. He is the staff correspondent of the CANADIAN MINING JOURNAL. Letters and articles from his pen appear also in several of the best mining publications on both sides of the Atlantic. In the newspapers of British Columbia, notably the Nelson Daily News, there appear frequent contributions from his pen. His annual review of mining in British Columbia is singularly complete, accurate, and timely. In short, upon Mr. Jacobs the public relies for truthful and regular information as to the progress of mining in the Canadian west.

Mr. Jacobs' distinguishing characteristics as a journalist are fearlessness, exactness, and capacity for work. He has the entire confidence of the mining fraternity in British Columbia and elsewhere. His appointment to an official position will aid rather than minimize his usefulness. The Government of British Columbia has acted wisely and well in giving recognition to a man whose chief object is the good of the industry.

THE GEOLOGICAL SURVEY.

On another page will be found a statement of the proposed field work of the Geological Survey during the coming summer. Our readers will notice that the officers of the Survey are well distributed throughout all the mining provinces. The influence of economic considerations is particularly evident. For example, Dr Andrew Lawson, of the University of California, who some years ago spent considerable time in co-

ordinating the geology of the Lake of the Woods and Rainy River regions, is again to devote his energies to these districts. No better choice could have been made. We sincerely hope that Dr. Lawson's revision of the geology of this country will bear immediate fruit. Other specialists, not members of the regular staff, are Dr. Heinrich Ries, Dr. R. A. Daly, and Dr. A. F. Foerst.

It is gratifying to note that the most prominent geologists on the continent are glad to be associated with our Geological Survey. This fact is in itself a constructive compliment to this branch of the Federal Department of Mines.

Incidentally, we learn that Dr. Chas. D. Walcott, secretary of the Smithsonian Institute, has accepted an honorary position as collaborator in geology with special reference to the Cambrian of the Rockies. Thus Dr. Walcott's results will be officially available to the Survey.

On the whole, the Survey appears to be in a fit and vigorous position. Its labours bear more closely than ever upon the industry of mining, and its grip upon public interest is yearly becoming stronger. The establishment of reciprocity in brains between Canada and the United States is quite as important as tariff-tinkering.

OURSELVES.

Modesty is a virtue. Not often do we lose sight of this fact. Circumstances, over which we have occasion to feel pleased, have impelled us to forget for the nonce our inherent diffidence. This issue of the CANADIAN MINING JOURNAL is larger by eight pages than former numbers. The pressure upon our advertising pages has become so great as to necessitate four additional pages. As a consequence we have added four more to our reading matter. This, we hope, will be as gratifying to our readers as to ourselves.

Having divested ourselves for a moment of our garment of modest reticence, it may not be unseemly to say a few words about the JOURNAL as an advertising medium.

Unlike the so-called trade periodicals, the JOURNAL does not appeal solely to one class or profession. It is true that our steadiest support has come from subscribers and advertisers who are entirely or almost entirely identified with the mining industry. But in addition the JOURNAL'S list of subscribers and advertisers is widely inclusive of many diverse interests. Our subscribers are scattered over the wide world. Japan, Corea, Russia, Germany, Central and South America, all appear upon our mailing list. All the countries of Europe are represented. But, after Canada and the United States, Great Britain and the remainder of the British Empire receive the largest share of copies.

The Canadian market for mining machinery, supplies, and specialties, not to mention professional talent, is singularly active. The bulk of our readers are men who are in that market for some commodity has to do with mining, whether it be machinery brains. Hence we feel that, without boasting, we claim to occupy a unique position in that the JOU is the only periodical that can appeal adequatel the large number of persons whose business in li to buy or sell the materials that are necessary to operation of mines.

THE SPRINGHILL STRIKE.

After long years of violence, recrimination futile waste, the Springhill strike is at last en Never in the history of mining in Canada has t been a more acrimonious struggle. The points of ference, and the nature of the dispute, changed every passing year. But each year brought its accretion of bitterness and hostility.

For twenty-two months about 1,200 men have idle. This is but a fraction of the total loss thro out the past. But it is probably the largest single i

Peace has been secured. We are glad to note the U.M.W.A. has not won recognition, because U.M.W.A. does not deserve recognition. The P.W is a far healthier, and sounder organization, and i digenous to Nova Scotia.

PORCUPINE.

In our advertising pages will be found annou ment of a forthcoming book on Porcupine. As forth there, the demand for back numbers of the ADIAN MINING JOURNAL containing articles on Po pine could not be met. Hence the publishers fel pelled to bring out an adequate edition of a book would include most of the published articles, a with some new and appropriate material. Very tunately, also, through the courtesy of the On Bureau of Mines, it has been possible to secure latest official geological map of the district. Thi cellent map is remarkably complete and accurate is in itself an absolute necessity to the prospector miner. It must be noted that the Bureau gives no cial sanction to the material in the book. The ma copyrighted. As an act of courtesy the Bureau permitted us to secure a number sufficient for the ent book. But this implies nothing more than mere fact that the map appears with our book.

The book is so arranged as to give the reader al present available authoritative information that i quired to guide him in learning about Porcupine. or two general articles are included for the benef the untechnical reader. Late claim maps and a directory of companies are useful additions.

We sincerely hope that the volume will serve purpose for which it is designed.

The Yukon navigation season has opened. The steamer from Dawson for Iditarod was booked to on May 30.

Construction of 110 Koppers By-Product Regenerative Coke Ovens for the Algoma Steel Company at Sault Ste. Marie, Ontario, Canada.

By D. M. GRIFFITH.

On March 11th, 1911, the first coke was made in No. 1 battery of the 110 by-product coke ovens, which were constructed by H. Koppers, of Joliet, Illinois, for the Algoma Steel Company at Sault Ste. Marie, Ontario, Canada. Less than a year elapsed from the time excavation was started until the ovens were producing coke; and considering the extreme conditions under which this plant was built, such as severe weather, marshy ground, poor labour conditions, isolation of plant from base of supplies, working from temporary yard level, etc., remarkable progress was made in its construction.

Fig. 1.—Part of the Piling Used for Carrying the Concrete Slab. Photograph taken April 5, or 15 Working Days after Excavation was Started.

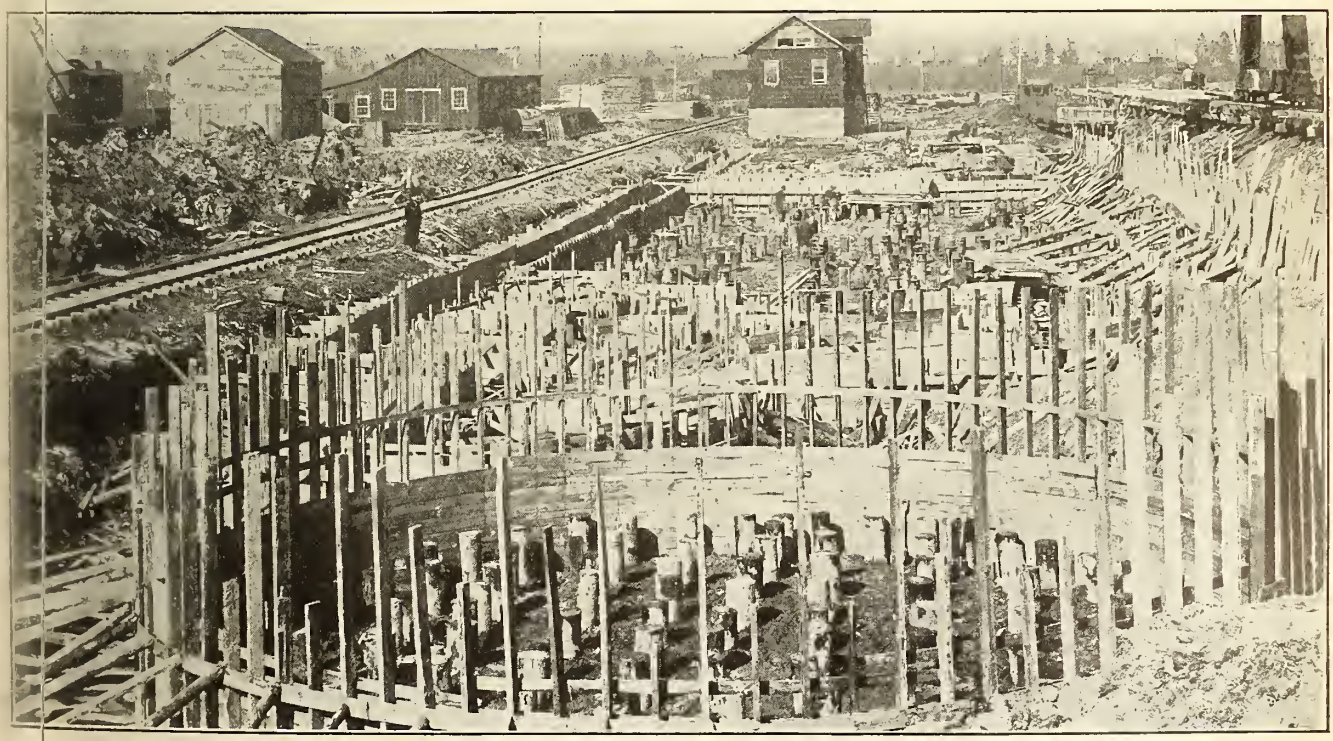
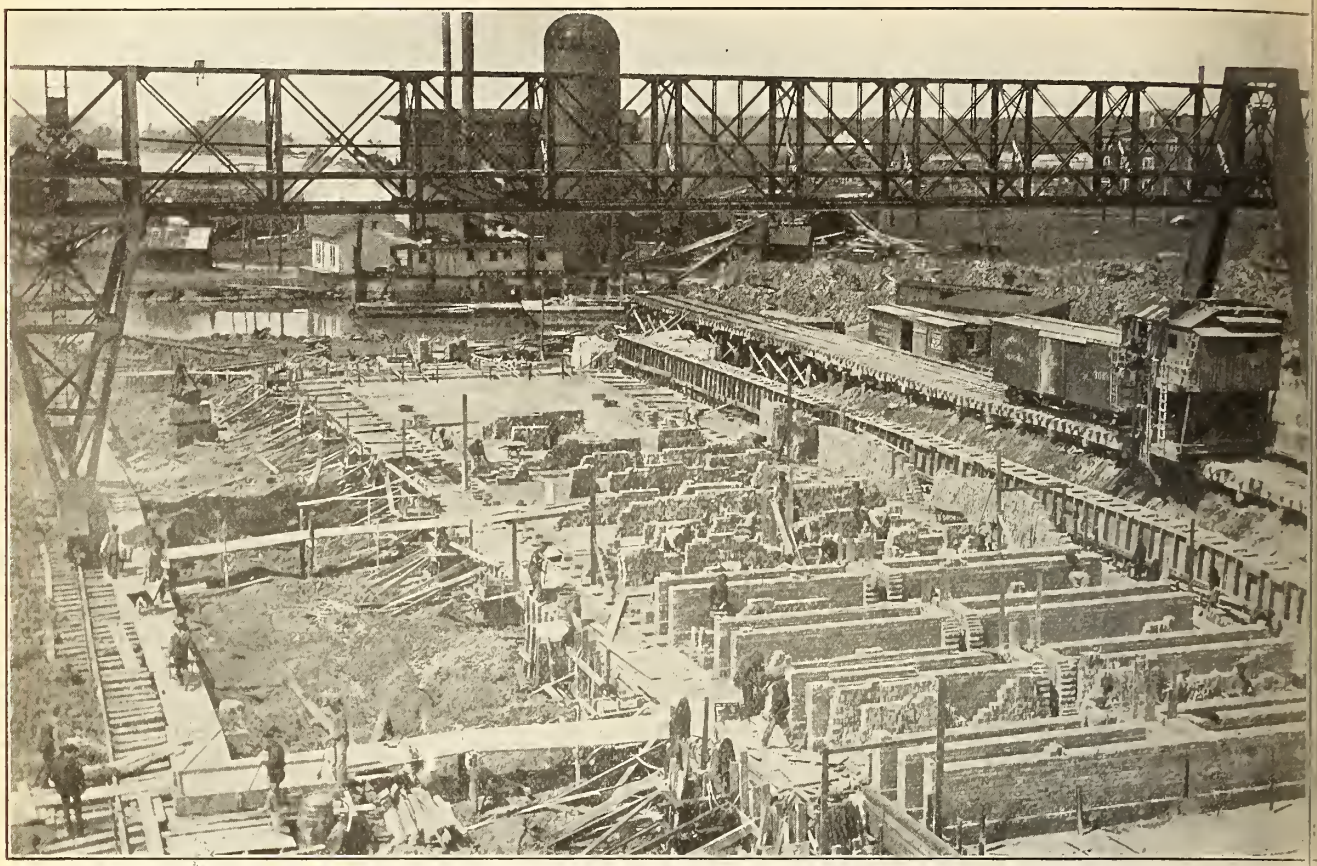


Fig. 2—Progress of Piling and Form Work in 19 Working Days, or up to May 19.



Fig, 3—Oven Foundations and Chimney Flues to Stack, with Brick Work on Regenerator Walls under way.

On account of the marshy ground at the site chosen for the coke plant, it was necessary to support all of the foundations upon piling. The total number of piles required was about 6,020.

To divert the course of a creek which wound around through the coke plant site, two concrete retaining walls were constructed. One of these walls was of sufficient size to support the track for the shea of the travelling coal bridge. This creek now ext the entire length of the coke plant, and empties the slip just beyond the stack end of battery No.

The slip was extended about a half mile, so

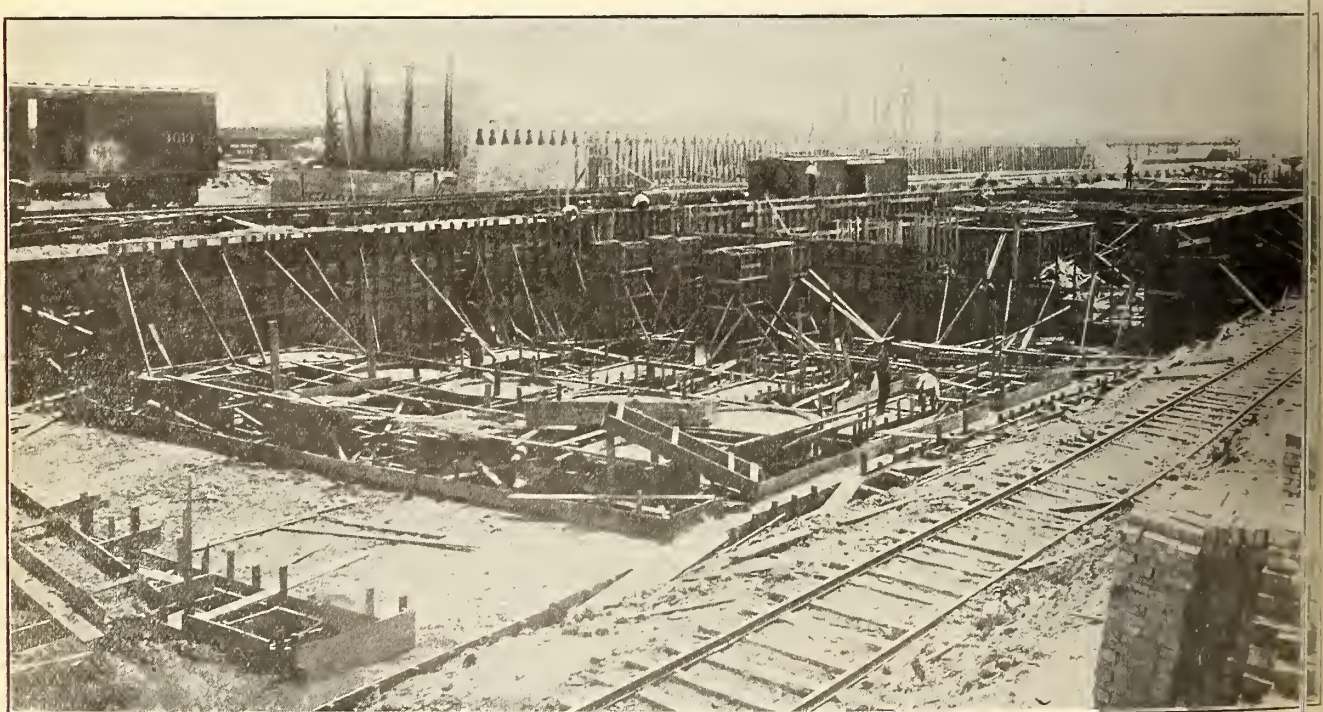


Fig: 4.—Showing the large Amount of Concrete and Form Work completed in 37 Working Days Following the view in Fig.

could be delivered direct to the coke plant by This channel is 90 feet wide and is of sufficient to take care of boats with a carrying capacity 2,000 tons of coal.

conveyed, by electrically operated coal transfer cars, to either the coal storage pile or to the coal hoppers.

The coal is taken from this hopper by a belt, to the coal breaker and crusher building, where it is

Fig. 5.—Showing by Height of the Locomotive the Large Amount of Form Work needed to give a Yard Level 16 Feet above Top of Piles.

Fig. 6.—Progress Made up to October 6, 1910.

connection with this slip, and extending its entire length, has been constructed a very substantial timber dock. This dock supports the track on which the coal unloaders travel, also a coal transfer trestle, by means of which the coal from the boat unloaders is broken up and the iron particles removed by a magnetic separator. The coal is then crushed and conveyed by a belt to mixing bins, from which point it is conveyed by another belt to the 2,000-ton coal storage bin. By means of hand operated gates, which are lo-

cated in the bottom of the coal storage bin, the coal charging car receives the coal from the bin for charging direct into the top of the ovens.

In fig. 1, which is shown on this page, can be seen a part of the piling which is used for carrying the concrete slab, upon which the oven and stack foundations

5, 1910, which was just fifteen working days a the excavation work was started.

Fig. 2 shows the progress made in the construct work on No. 1 battery up to May 7, 1910. In 27 wo ing days, the form work for the voids and chim flues was completed, and the 3-foot thick conc

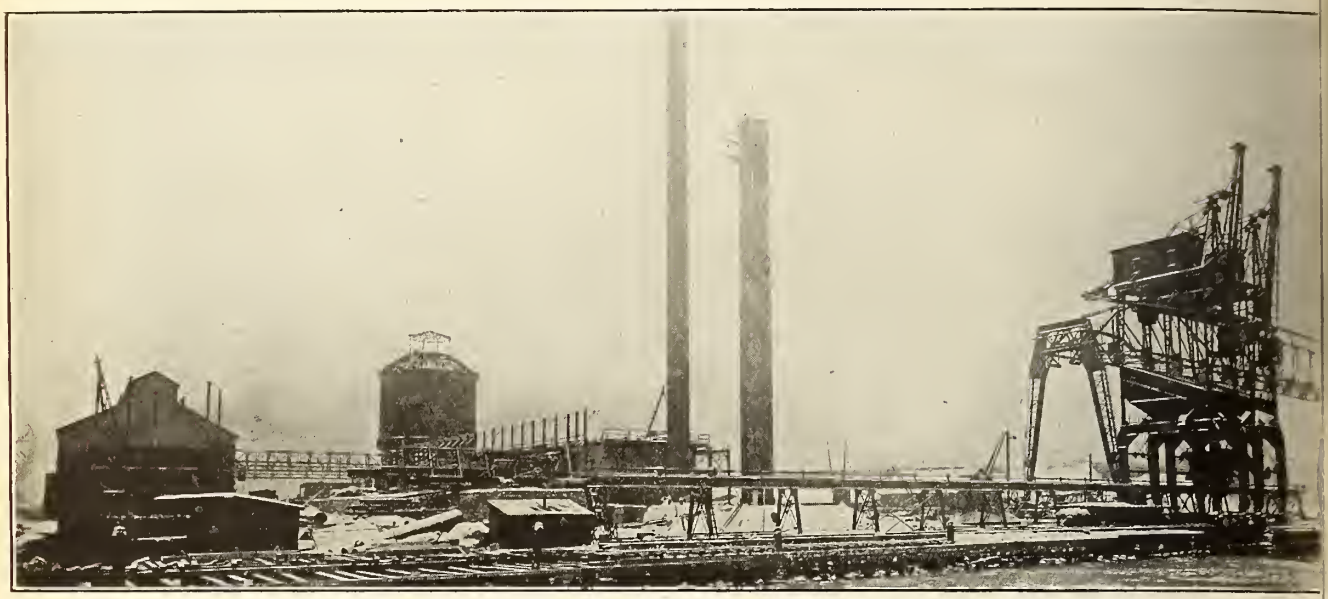


Fig. 7.—View taken December 7, 1910. showing Slip, Coal Unloaders, Coal Transfer Trestle and Storage Bin, By-Product Building and Battery No. 1, with Stack and Gas Holder.

Fig. 8—Temporary Building over Battery No. 2. Brickwork for This Battery Nearly Completed.

are supported. These piles vary in length from 30 feet to 60 feet, and are spaced about 2 feet 9 inches, centre to centre. The steel travelling bridge, in the background, is used for distributing the concrete for the oven and by-product building foundations and the creek retaining walls. This picture was taken on April

slab, which rests on the piles, was laid. Also, the c crete foundations for the entire first battery were p to an elevation of 11 feet above the top of the p s. This left a height of about 5 feet more of concret o be put in, to bring the oven foundations up to he proper level for the starting of the brickwork.

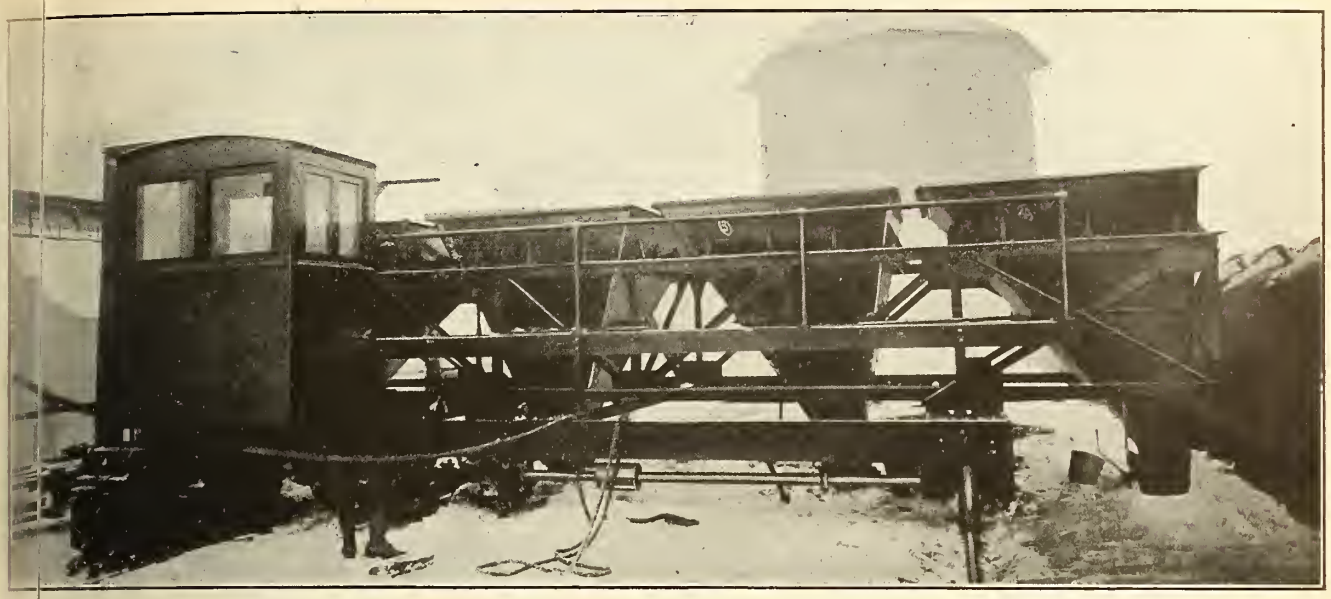


Fig. 9—Electrically Operated Four Hopper Coal Charging Larry.

On April 26th, excavation work was begun for the by-product building and gas holder. In fig. 3, can be seen the progress made in piling and form work, up to May 19th. In nineteen working days all of the excavating and piling for the foundations for the by-product apparatus, building walls, and gas holder was finished, as well as considerable form work for gas holder and building walls.

Fig. 4 shows the progress made in the construction work on the ovens, up to June 8th. This picture was taken just one month later than that shown in fig. 2, and it will be noted that the oven foundations have been finished, and the chimney flues to stack have been constructed and lined with brick; and a good start has been made on the brickwork of the regenerator walls. In the background can be seen the progress which has been made on the slip, up to this date. The channel has been dredged for a distance of about one-third of a mile, and has reached a point a little beyond the centre line of ovens.

In fig. 5 can be seen the excavation and piling for the creek retaining walls, between which will flow the creek, whose course was diverted.

Fig. 6 shows the progress made on by-product building form work and foundations up to July 2nd. It can be seen that a large amount of concrete and form

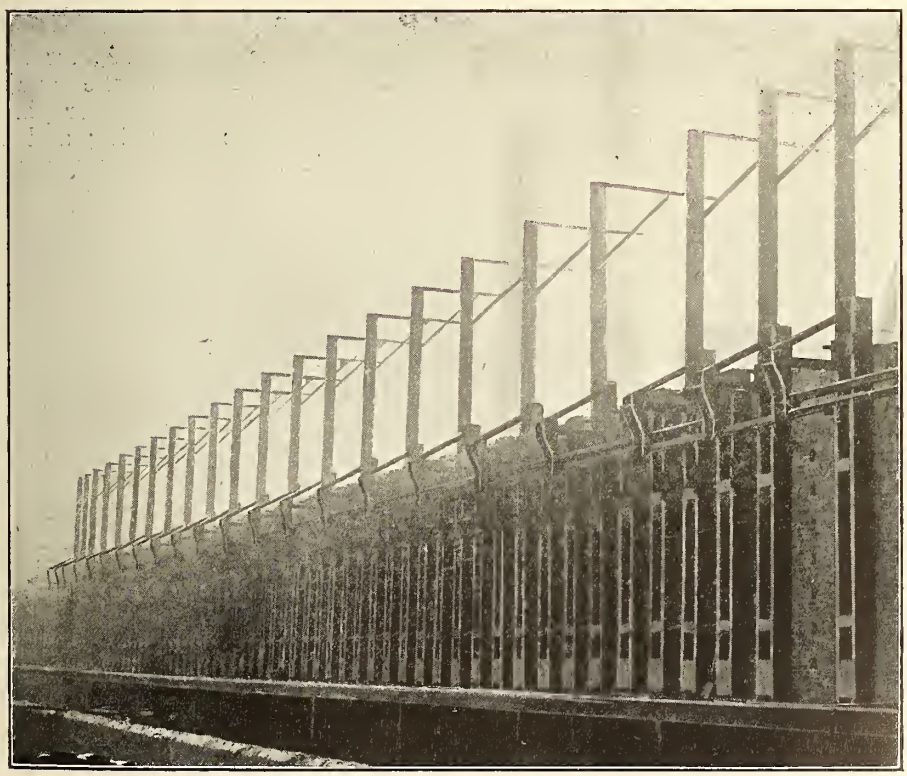


Fig. 10—Progress on Battery No. 2 up to March 1, 1911

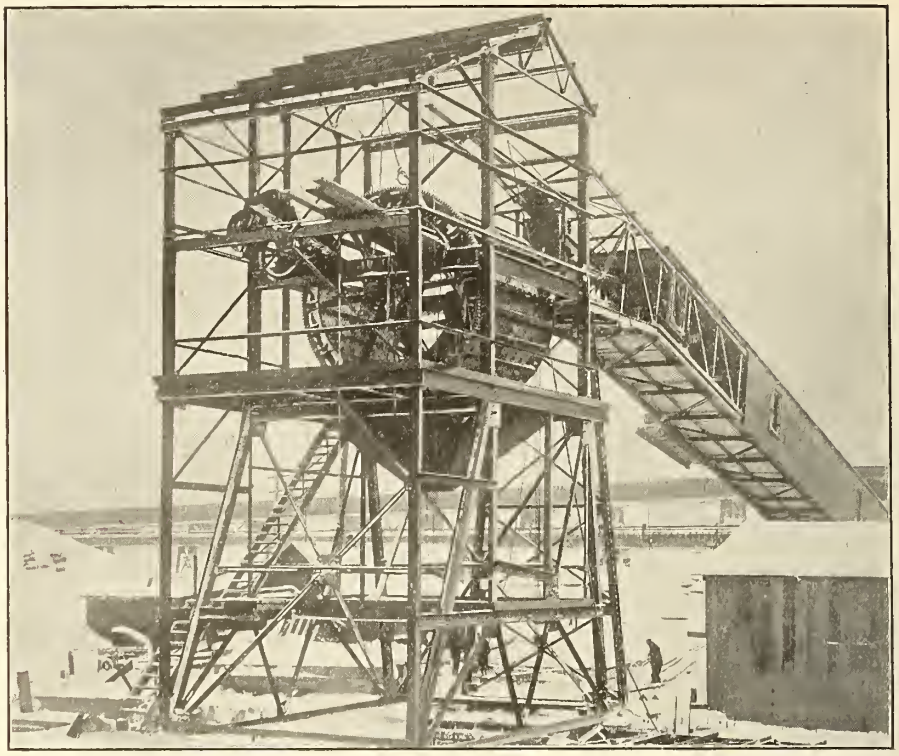


Fig. 11

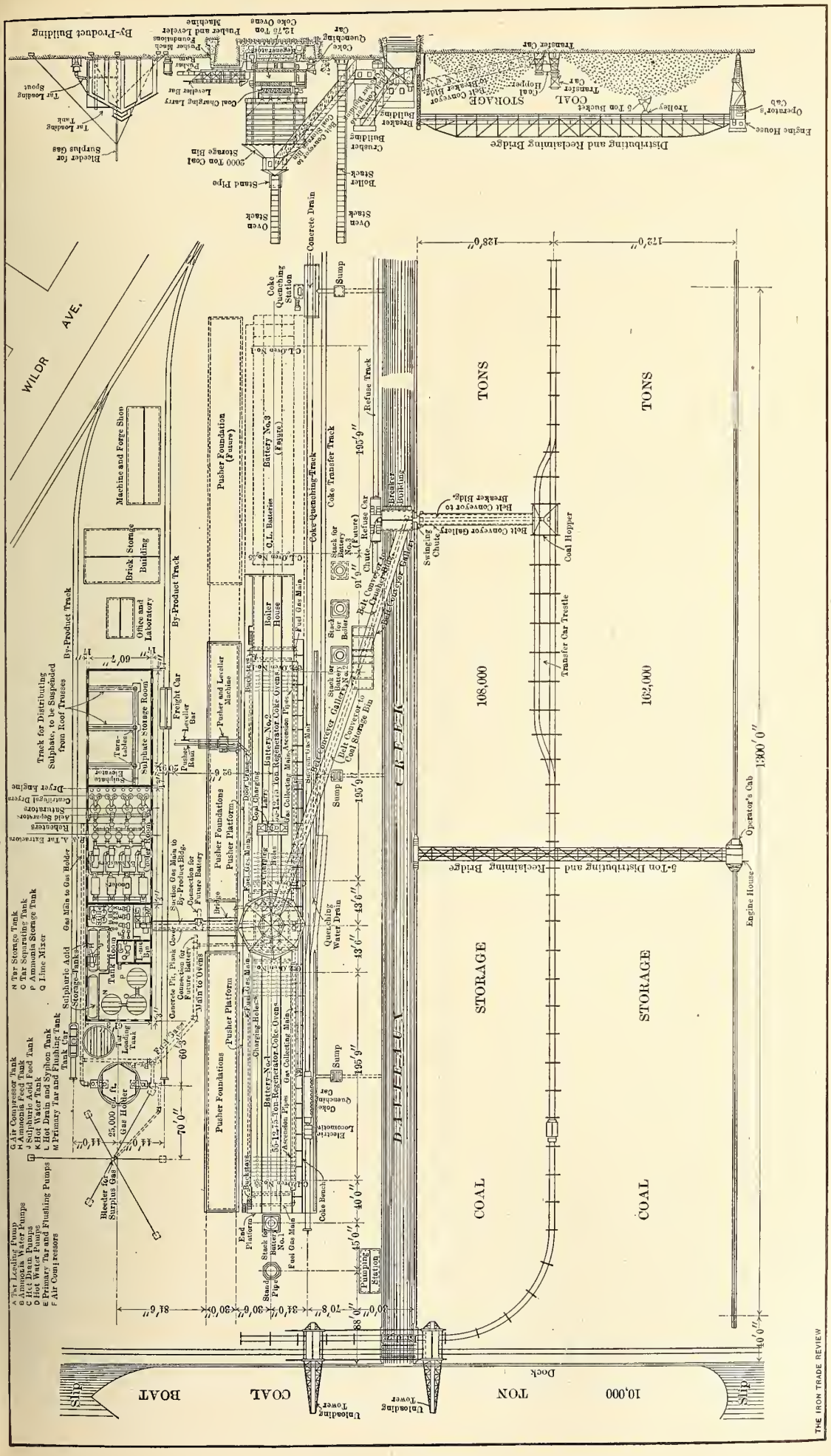
work has been completed during the interval of 37 working days, whieh elapsed between the taking of the photographs, shown in figures 3 and 6.

Fig. 7 shows the amount of eonstruction work that has been done on the ovens and by-product building, up to August 13th. The regenerator walls have been finished; the oven wall brickwork has reaehed a height of about 4 feet above the floor of the ovens, and the concrete pinions and end buek-stays have been erected at eaeh end of the battery. In comparing the height of the form work of the by-produet building, with that of the standard loeomotive, shown in the foreground, one can readily see that a large amount of eonstruetion work was neeessary at this point to bring the foundations to their proper elevation, so that the finish yard level would be 16 feet above top of piles.

Fig. 8 shows the progress made up to October 1910. The brickwork has been completed for batte No. 1. In the foreground is shown a part of the fo work and eonerete for battery No. 2. The steel r trusses and eolumns for the by-product building erected, and work has been started on the purline a building walls.

Figure 9 shows the progress made up to Nov. 1910. The buekstays, eoke and pusher side st benehes, with east iron eover plates, steel stack, a supports for gas collecting and suction mains ha been ereeted. The regenerators are filled with check

Fig. 12



General Arrangement of Koppers By-Product Coke Ovens at the plant of the Algoma Steel Company, Sault Ste. Marie, Ontario.

brick, the regenerator end walls have been bricked in; and the brick walls underneath the benches have been completed.

Fig. 10 shows the slip, coal unloaders, coal transfer trestle, dock, travelling coal bridge. standpipe, pump house, stack for battery No. 1, coal storage bin, by-product building, battery No. 1, and gas holder. This photograph was taken on Dec. 7th, 1910.

Fig. 11 shows the progress made on battery No. 2 up to Dec. 15th, 1910. The foundations for the coke pusher and levelling machine have been finished. The oven brickwork for the entire battery has reached a height of 8 feet above the floor of the regenerators. The large temporary building is used to protect the brickwork and workmen during the severe cold weather, and has been completed with the exception of the side sheeting.

Fig. 14 shows the progress made on a part o coal handling machinery up to Jan. 6, 1911. The framing for the breaker and crusher building, an conveyors from the coal hopper to breaker buil have been erected and work has been started o erection of the breaker machinery.

Fig. 15 shows the electrically operated 4-h steel coal charging larry on top of battery No. 1. car receives its coal from the coal storage bin an a capacity of 12.75 tons, which is sufficient to c one oven. In the background can be seen the 2,00 steel coal storage bin which is located between ba No. 1 and battery No. 2. This photograph was Jan. 10th, 1911.

Fig. 16, the photograph which was taken fro pusher side on March 1, 1911, shows the pro which has been made on battery No. 2. The

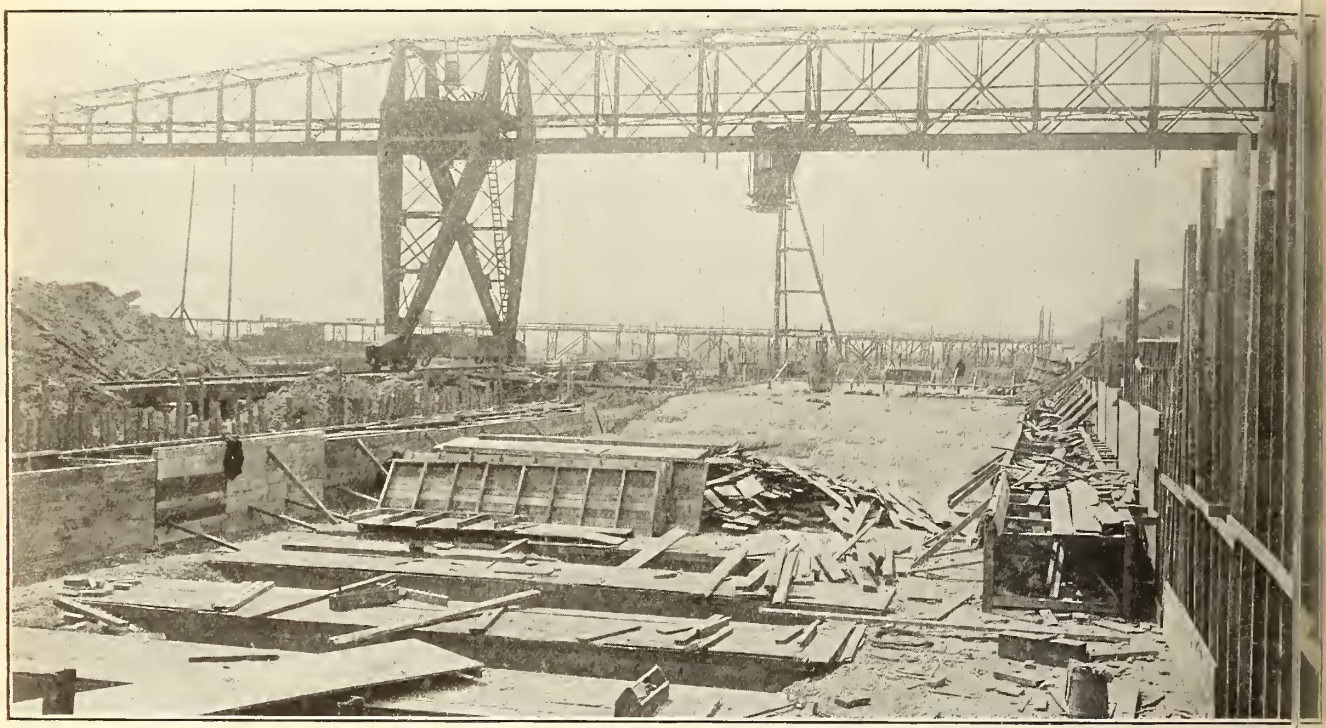


Fig. 12 shows an interior view of the boiler house, which is equipped with three 300 h.p. Babcock & Wilcox boilers. The boiler house is located at the extreme end of battery No. 2. This photograph was taken on Dec. 28th, 1910.

Fig. 13 shows an interior view of the temporary building over battery No. 2, photograph of which was taken on Jan. 16th, 1911. The brickwork here shown is above the roof of the ovens and nearly completes the brickwork for this battery.

work, including the regenerator end walls an checker brick has been finished, and the bucksta structural work on coke and pusher benches hav erected.

Fig. 17 is a general arrangement of the entir plant, showing the present installation of two ba of 55 ovens each; and provision made for a fut stallation of one battery of 55 ovens.

Battery No. 2 will be ready to make coke by 24th.

THE PORCUPINE MINING DISTRICT

Introductory Remarks reprinted from text of Canadian Mining Journal's New Publication.

The first press reports about Porcupine were received with the silent skepticism that is born of experience. The unfortunate history of Larder Lake—a district, incidentally, that has never received fair play—was too fresh in the memory of mining men to permit of enthusiasm being roused. Thus the pioneers of the Porcupine district were left for some time in splendid isolation.

While this was wholesome morally, it was couraging. The nomadic prospector depends u public to pay his shot. He has no desire to op he merely wishes to discover, to make his "s and to have done with it. In Cobalt he did t Porcupine he found the situation much more cated. The investor had a bitter taste in his and did not intend to be guilty of certain indis

marked the birth-throes of Cobalt. Nevertheless, number of ready sales took place. Companies and dicates were organized post-haste, and the pro- ers did not suffer. But in the greater number of s the investor held aloof. The consequence has that the majority of Porcupine flotations have engineered with a view to taking in immediate its. This phase is remunerative to the individual, most costly and unbusinesslike so far as Porcu- is concerned.

obalt, when it was discovered, met with a very l reception from mining men. As soon, however, actual shipments of ore were made, recognition e with surprising rapidity. Then followed a per- during which those whose judgment had been at t sought to vindicate themselves by throwing cold er on the camp. But Cobalt, despite all captious ics, made good.

obalt brought into play much more prospecting mining talent than could well be taken care of. ce it was natural that many individuals should k new fields. New fields were sought and were nd. Porcupine was the first fruit.

its first position Porcupine was between the deep of popular incertitude and the devil of promoters' bast. As to the real character of the ore bodies e was room for scientific discussion. But the at- sphere is now clear, at least geologically. The mpt and effective work of the Ontario Bureau of es was of inestimable value to the camp. The ad- t of substantial foreign interests is to be credited he Bureau's timely activity.

o vigorous was the early prosecution of mining in cupine that the Ontario Government decided to d to the camp a branch line of the Temiskaming Northern Ontario Railway. This line will be fin- d during the coming summer. Naturally it will n much to the district. Only those who worked r way over the summer trail last year can realize severely Porcupine operators were handicapped the lack of transportation facilities. The fact that ns were hired for as much as $25 per day gives e idea of the situation. But by far the worst ob- le was the bad mail and telegraph service. The gent terms imposed upon buyers made it almost ossible to investigate mining claims sufficiently. It readily be imagined that a delay of one or two ks in transmitting a letter from Porcupine to To- to, Montreal, or New York might imply the differ- between success and failure in putting through a ing deal. In any case, the general tendency would o come to a decision that was unwarranted by ex- ng conditions. Now, however, since Porcupine will e all the advantages of modern communication, it ntirely possible to investigate fully any claim. This temper the tone of promotion.

* * * * *

ntario has had a very bad name in gold mining. contributing factors in this bad name are too merous to mention. But the prime fact is that the d mines of the province have never been worked their own merits. There has been far too much ming and promoting, and far too little ready money common-sense. The Lake of the Woods region, instance, had much to recommend it. Probably day money could be made out of several of the properties that have been labelled failures. But the district has lost favour in the eyes of prospectors and operators. This is true of more than one gold-mining section of Ontario.

Except for the Yukon excitement, no such widespread interest has ever been stirred up in Canada by the discovery of gold. Quite apart from any direct profits that may accrue to operators in Porcupine, the advertisement to Canada generally and to Northern Ontario specifically, is of enormous value. Following so closely upon the exploitation of Cobalt, the opening up of Porcupine has kept Northern Ontario continuously in the lime-light. It has strengthened decidedly the belief that there are yet many prizes to be won in the hinterland of Ontario and the adjoining area in Quebec. An illustration of this is afforded by the large amount of staking that just now is being done on the territory surrounding Keekeek Lake, Pontiac County, Quebec. Humanly speaking, it is improbable that attention would have been paid to this remote spot for some time to come had it not been for Porcupine.

Study of the mining situation, in Ontario, brings the conviction that only the fringe of the northern mineral belt has been touched. The summer of 1911 will see more prospecting done than ever before. Succeeding seasons will bring more men and more money to the country. It is absolutely within the range of probabilities that other Porcupines will be discovered. If Porcupine lives up to its promise, then Ontario will have received an unprecedented commercial impetus. Moreover, the wave of development will spread through to Quebec. Farming will follow hard upon the heels of mining. Thousands of square miles of arable land will be thrown open to the farmer and a permanent population will be established.

Considering the large number of bona fide investments that have been made in Porcupine, it behoves mining men to do what in them lies to disseminate right information and to discountenance the wild tales that emanate from all irresponsible sources. In whatever way Porcupine may develop, it now seems that in a few mines money will actually be made. But many more may prove profitable if initial sales and promotions are handled decently. In other words, sane exploitation will give the camp a maximum chance; frenzied speculation will shorten the life of individual mines and will injure the camp permanently.

* * * * *

The demand for back numbers of the CANADIAN MINING JOURNAL containing articles on Porcupine has exhausted all available supplies. As that demand shows no signs of abating the publishers of the JOURNAL decided to issue in pamphlet form several of these articles along with other material. The geological map that goes with this book was secured through special arrangement with the Ontario Bureau of Mines. The map has been copyrighted by the Bureau. It is to be noted that the Bureau assumes no responsibility, direct or indirect, for the matter contained in this book. The publishers, however, wish to express their warm sense of gratitude to the Bureau for the courtesy extended.

It is hoped that the information contained in the succeeding pages will prove a useful guide to professional men and investors.

PROGRESS IN MEXICAN MINING AND METALLURGICAL METHODS DURING THE CENTURY OF INDEPENDENCE

(Continued from last issue.)

The proper proportion of common salt is then added to the torta and thoroughly mixed with the pulp (repaso) by the action of 24 horses, held on lines by the "tortero," round whom they circle, while he himself continually changes his position, so that all parts of the torta are eventually reached. Before 1793 this work was done by hand. The next operation consists in the admixture of "magistral," an impure sulphate of copper obtained by the calcination of copper pyrites containing variable quantities of iron. Lastly, the torta is incorporated, that is, mercury is spread over its surface in a fine spray produced by filtration through porous cloth. After each addition of ingredients, and afterwards every other day, a repaso is given. In from 20 to 30 days, according to the size of the torta and the weather, the chemical action is complete, and the torta is said to be "rendida." The silver and gold has combined with the mercury to fluid amalgam, from which the pulp is washed by a liberal addition of water and stirring in large cylindrical vats. It is now only necessary to filter the excess of mercury off the solid amalgam, distill the latter in the manner described before for the gold amalgam, and melt. The product is very pure. Its fineness is determined in the mint and expressed in thousandths of the gross weight. Impurities are deducted and it should be noted that if gold is present in less proportion than three one-thousandths, it is not only not paid for, but even deducted from the silver as an impurity. Small wonder that Mexican pesos of this period from the gold bearing districts, are subjected, at a good profit, to parting in London and Paris.

The patio process is a purely empirical one and requires great practice on the part of those who carry it out. It would lead us too far were we to attempt a detailed description of all the operations in connection with it, or to mention the various vicissitudes to which a torta may become subject, and the means for diagnosing and correcting them. The only guide for the "azoguero" is that afforded by frequent tentaduras. From time to time improvements, based upon chance discoveries, have been introduced and local modifications, demanded by peculiarities of the ore, have been made, but the history of the process is free from the often absurd nostrums frequently used during the earlier times of Californian panamalgamation. Altogether, Medina's discovery was an admirable one and much more perfect than the mining methods in use at the beginning of the 19th century, which have been described above, for no other process until the advent of cyaniding has been able to oust it.

We have tried to produce an impressionist picture in broad traits of the methods employed in Mexican mining and metallurgy at the beginning of the century, in the years immediately preceding the outbreak of the revolution which ultimately liberated the country from the oppression under which it had been ground for more than two centuries and a half. It was the most productive period of Mexican mining with which the general prosperity of the whole country had naturally kept pace.

Then came the revolution, and with it almost c plete stagnation of the industry. Guanajuato, a city of 100,000 inhabitants, had most to suffer from depredations of the contending parties, and besi other material losses, had to face the almost comp destruction of its principal industry. The popula dwindled down to barely 14,000; work in the mi became paralyzed on account of the impossibility procuring workers, and the necessary fodder for great number of animals required in the operati Unwatering of the mines had to be abandoned an many mines the water rose to the level of the bocam In others, which were not wholly submerged, explo tion was confined to the scrapings of the upper w ings for the ore which had been overlooked in m prosperous times. The production fell to one-qua of what it was in the years immediately preceding revolution. While in the great Valenciana mine extraction in 1808 had a value of $1,523,000, it dw led down in 1823 to only $36,200. In one word, mi was at its lowest possible ebb, and what was e worse, the spirit of enterprise had been crushed the means for recovering the lost position were utt wanting.

The first relief from this apparently hopeless c dition of affairs came from a quarter to which at present day we hardly give sufficient credit for timely help which it afforded, even if it was actu by motives of self interest.

The country, after having shaken off the Spa dominion, was now open to the whole world, and E lish capital was the first to appreciate the opportu for engaging in profitable mining undertakings Mexico. One company acquired the Real del M properties in Pachuca from the Count of Regla. Ot took in "avio," the most important mines in Gu juato, as well as in other parts of the country. Thro ignorance and inexplicable negligence on the par the local representatives their operations were l financial failures, and after spending large sum endeavours to retrieve their fortunes, they had to tire from the field with enormous losses to the sh holders. While we cannot commend these compa for intelligent management, or for signal improvem in the method of working, it is undeniable that bringing large sums of money into the impoveris country, which were mostly expended in the unwa ing of the mines, they gave the first impulse tow a renewal of interest in mining, collected the scatt mining population, and in other ways prepared road over which the original owners afterwards velled towards prosperity.

On the whole, while mining in the years follow again became highly profitable, no improvement importance took place for a long time. Among older members of our Institute there are still many have been eye-witnesses to the crude methods in v before the period of Mexican independence as they l been described above. However, gradually pr chemical methods for determining the nature and ness of ores took the place of the former tentad

mite was substituted for black powder; rock s came into use and the raw cowhide with its con- tants was more and more relegated to the back- nd. (2) This progress is due in great part, to ntelligence, adaptability and perseverance of the nal engineers who received an admirable training he mining schools. But they had to contend st powerful enemies: First, the fact that the coun- was far removed from machinery producing cen- and that the means of transport were insufficient he conditions for industrial independence, namely o fuel and iron, were as yet lacking. Then deep- d habits of indolence and improvidence of the la- ing classes had to be overcome, and we all know time is a necessary condition to effect reforms is respect. And finally, there was the egotistical ide of the monied classes towards mining. The pirit of their fathers had departed and the capi- as diverted from the mining industry to be in- d in undertakings which offered results without ecessity of personal application.

e repeat, the progress made up to the end of the entury was slow, and Mexico stood in danger of surpassed, notwithstanding its enormous mineral h. by other nations either more enterprising or favourably situated with regard to fuel.

en the situation suddenly changed. The discovery made that in the numerous streams descending the central tableland towards both coasts, an mous source of power was contained which could nverted into electric energy and conveyed, with- reat loss, to the important centres of industry.(3)

u are acquainted with the stupendous undertak- n the valley of Necaxa, at least in its effect on in this capital. But its bearing on the develop- of the mining industry can hardly be realized by not directly connected with it. The wonderful ity displayed in such mining centres as Pachuca, ro, Guanajuato, and others, would be impossible, any rate greatly handicapped, if coal had still used for the production of motive power. Not to ion the total insufficiency of the power to be de- from the work of mules and horses. All the ani- at work in the Guanajuato mines and mills dur- its most prosperous period could, during a e month, not supply the energy required for the of a single day. It may therefore be truly said the advent of electricity marks a most important h in the history of mining and that Mexico in con- ence of its unusually favourable hydrographical itions has derived more benefit from the applica- of this agent, which but yesterday was scarcely n, than any other country. Instead of suffering scarcity of fuel we have suddenly attained the ion of possessing unusually cheap mechanical r.

nother discovery which gave an immense impulse Mexican mining was the method of extraction of recious metals from their ores by means of weak ions of potassium cyanide. There has been much roversy over the question as to who was the real verer of the principle underlying this operation. shall not enter into it here. Uncontrovertible, ever, is the fact that since the introduction of the ess by the McArthur-Forrest interests, millions of of ore, which formerly had to be considered as of alue, can be treated profitably, in consequence of h the economic conditions of the mining industry been radically changed and much foreign capi- has been attracted.

Mexico was somewhat slow in adopting this method, possibly on account of the fact that as at first practised, it was more applicable to gold than to silver ores. (4).

In our description of the process we can be much more concise than we were in that of the earlier methods, if for no other reason than that Rayas in 1808 is immeasurably farther from us than, for instance, Pachuca in 1911. Any of the modern reduction works there can be readily visited by those desiring some knowledge of this newest branch of metallurgy of the precious metals. Such a visit will afford convincing evidence of the great importance of this method of ore treatment and will show that, while Mexico entered on the field long after other countries, once the start was made, it has not only kept pace with them but, certainly as regards the treatment of silver ores, is ahead of most.

Briefly, the process is carried out as follows: as in any other wet method of extraction, the ore is finely triturated in stamps, chilean mills and tubemills, cyanide solutions being added from the beginning. The separation of sands from slimes, which a few years ago was considered indispensable to successful cyanide practice, has been superseded in all modern plants of this country by the "all sliming" method in which the sand is all ground as fine as possible or rather as fine as necessary, to obtain the best economic results. The pulp, consisting of finely ground ore and cyanide solution, is then agitated by means of mechanical stirrers or by compressed air, the latter now being made the rule in Pachuca. When the cyanide has completed its chemical action on the gold and silver of the ore, these substances are found in solution as double salts with sodium cyanides. This solution must now be separated from the worthless tailings by means of vacuum or of pressure filters of various construction, of which new forms are almost daily brought out. The clear filtered solutions are then brought into contact with zinc shavings or zinc dust, on which the precious metals are precipitated at the expense of the zinc.

The solutions after having been brought to their original strength by the addition of fresh sodium cyanide, enter again in circulation by being returned to the grinding apparatus. The black precipitate obtained by the operation, consisting chiefly of gold, silver, finely divided zinc, lime, alumina and other impurities, is then washed in filterpresses, dried, melted with suitable fluxes, and finally cast into bars of about 30 kilos, which are exported The product is not of the same purity as that from the patio process, rarely being above 950 fine, but, on the other hand the extraction is above 90 per cent. of the silver and 98 per cent. of the gold, and the process requires only as many days as formerly weeks, and the cost is less than one-fourth.

A description of the mechanical details of the appliances used in the cyanide process would fill volumes and not be pertinent to the purpose of this paper. which is to draw attention to the great and beneficent change in methods since the time when Mexico obtained its independence, especially during the last 30 years, when continued peace and tranquility made it possible to devote all the available energy to the development of the industry.

It must be noted that since the introduction of cyaniding all efforts have been directed towards improvements on mechanical lines, in which certainly wonderful progress has been made. Our knowledge of its

chemistry has, however, not advanced at the same rate and is still very much as it was when McArthur-Forrest first advocated and practised the principle involved, with the important exception, however, that it was found that in the treatment of silver ores, the extremely weak solutions used on gold have hardly any effect, but have to be considerably strengthened, a fact which was not known at that time. Before this was known successful treatment of silver ores by cyanide was considered impracticable.

Various other chemicals in combination with cyanide have been proposed and tried, as they were supposed to accelerate or intensify the action, but the largest number of them have no effect, or are only of use with certain classes of ore. Mention should, however, be made of Clancy's proposal to add to the straight cyanide solution calcium cyanamide, an alkaline sulphocyanide and an alkaline iodide, and passing a low voltage current through the agitated pulp. The process has not as yet been fully tried on our Mexican ores, refractory on account of containing part of the silver in combination with manganese. If successful on these, many ores not amenable to straight cyanide treatment could be profitably worked in this manner. According to the experiments of the inventor even in ordinary ores a saving of cyanide is obtained as the solutions are regenerated at the expense of a less costly substance, and a trifling expenditure of electrical power. If the claims made for this process are substantiated by results on a working scale, new prospects for the industry will doubtless be opened.

We approach the end of our task, which was to indicate in broad lines the difference between the methods is use at the beginning of the century of independence and those now practised. Some of the manifest faults of our sketch are due to the disproportion between the space at our disposal and the great mass of material which imperatively seemed to demand consideration. This caused a constant conflict between the desire for completeness and the necessity for brevity, which perforce made the work fragmentary. We have dwelt more minutely on the early part of the period under consideration than on more recent occurrences. The knowledge of these early times is rapidly being obliterated and in none of the splendid and valuable treatises on old Mexican mining history is it presented in connected form, being generally overlaid by a wealth of statistics and detail, which to the non-technical reader is not calculated to increase clearness.

We are safe in concluding with the statement that especially during the period of peace and security of the last 30 years, the progress has been enormous and in expressing the hope and conviction that under a continuance of these conditions the industry will gain in importance at the rate justified by the large mineral wealth of the country.

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(1) The old system of tentaduras as a guide in the p process was gradually replaced by assays of the amalgam, posed in 1875 or 1876 by Manuel Maria Contreras, M.E. art of making correct tentaduras has well nigh been among the younger generation of engineers.

(2) Many mines may at present be said to be in a stat transition from old to new methods and in others these side by side as, for instance, when electrically moved cars filled by peons carrying the ore and waste from great dista

(3) As early as 1870, the opinion that the industrial fu of the Republic depended upon the utilization of its g water power was advocated by mining and civil engineer the daily press and various pamphlets. At that time, how the long-distance transmission of electrical energy was ha sufficiently developed for practical application.

(4) In 1894 the Arthur-Forrest Company installed a able plant for the treatment of tailings in the State of So which they shifted from one point to another. This was lowed by stationary plants in Guanajuato, El Oro, Pach and other mining centres. In Pachuca the new plants foll each other rapidly. The last mill which has been reform that of Purisima Grande, where centuries ago the syste Bartolome de Medina had originated and where it was tised until very recently.

GEOLOGICAL SURVEY OF CANADA

Proposed Field Work, 1911.

[Editor's Note—The following list includes several specialists from the United States, whose names, marked with an asterisk, are familiar to most of our readers. See editorial.]

D. D. Cairnes.—International geological boundary line between Yukon River and Porcupine River. Co-operation work with the Division of Alaskan Mineral Resources of the United States Geological Survey. A section is needed to the Arctic Ocean and it can be most economically done while the boundary line parties are in the field and have trails opened up. The U. S. G. S. will look after the line from the Porcupine to the Arctic.

R. G. McConnell will continue work in the Portland Canal district and investigate the placer gold on Nace River.

G. Mallock will examine the anthracite district at the headwaters of the Skeena River.

C. H. Clapp will continue his geological investigation of Vancouver Island, with special reference to the Nanaimo sheet.

C. Camsell will examine the peridotite of Tulam in which the Survey has found diamonds, and st the new mineral district of Steamboat and others Yale, B.C.

L. Reinecke will conclude his study of the Bea dell mining district.

J. Drysdale will make a detailed geological inv gation of Franklin Camp, North Fork of the K River.

O. E. LeRoy will be engaged in reconnaissance in several districts in the Kootenay, and will mal detailed examination of the Nelson district.

S. J. Schofield will continue the geological map of East Kootenay.

*R. A. Daly will take charge of work on a geo cal section across the Canadian Pacific Railway in tish Columbia. He will commence this year about loops.

J. A. Allen will continue his work on this sec west of Ice River.

*C. D. Walcott as collaborator in geology with cial reference to the Cambrian of the Rockies

the neighbourhood of the C.P.R. about Field River.

. Leach will work on the coal basins along the Nest Railway.

Dowling will continue his investigations on basins in the vicinity of the G.T.P., Yellowhead

. Lawson, assisted by R. A. Wallace and J. D. , will revise the geology of the Lake of the nd Rainy River.

. Collins will continue the geological investi- of the country north of the Sudbury district.

ohnston will continue his work in the Lake district.

Taylor will continue his work on the surface of western Ontario.

uffer will conclude his study of the Devonian southwestern Ontario.

Foerst will study the Palæosoic rocks of Mani- sland.

ilson will continue his explorations in north- Quebec.

Neill will study the geology of the Monteregian uebec.

nsfield will make detailed studies of several ines north of the Ottawa River.

R. Harvey will continue Mr. Dresser's work in the Eastern Townships, Quebec.

. J. Goldthwait will continue his investigation of the raised beaches in Quebec and the Maritime Provinces.

P. E. Raymond will study the geology of Quebec city and environs.

G. A. Young will examine the oil gas and gypsum district near Moncton, N.B.

W. A. Bell will study the Joggins and other sections on the Bay of Fundy.

E. R. Faribault will continue his mapping of the gold-bearing rocks of Nova Scotia.

*H. Ries and J. Keele will study the clays of New Brunswick, Quebec and the Northwest provinces.

Topographical.

R. H. Chapman and K. Chipman will continue the mapping of Vancouver Island.

S. J. McLean will triangulate the Kootenay-Columbia Valley, as a preliminary for its topographic mapping.

W. H. Boyd will map the Blairmore-Colcman coal district.

A. C. Sheppard will finish the Slocan district.

W. Lawson will make a topographical map of the Moncton, N.B., area.

THE AMALGAMATION OF GOLD IN BANKET ORE

Paper read before the Chemical, Metallurgical and Mining Society of South Africa

By W. R. Dowling, M.I.M.M. (Vice-President).

Amalgamation being the most important source of old recovery on the Witwatersrand gold-field, recent evelopments and present varied opinions upon this bject make the time opportune for a general discuss on and review of the situation.

The author does not propose to discuss the manipulative details of the method of amalgamation: such knowledge is assumed, and the general features and present tendencies of the process with the influencing factors only are dealt with. The decreasing grade of the ore due to the fact that the reduction in working ists has brought into the paying zone ore formerly not payable, and the large scale of operations to-day, necessitates the simplification and reduction of plant and operations to the minimum. The enormous tonnages of ore milled make each item of equipment and operation cost a great deal in the aggregate and the fact that the interest on some particular non-essential item of expenditure does not amount to much per ton crushed is beside the mark, as in many cases the capital may not be available, or, if available, could possibly be employed more profitably otherwise.

As will be shown, the relative importance of the amalgamation recovery and the methods by which it was carried out have been considerably modified by various factors from time to time in the metallurgical history of the Witwatersrand. In the early days the main source of gold recovery was by amalgamation with a small amount of concentration and subsequent pulverization. The ore was crushed relatively fine by stamps, the screens mostly in use being 800 to 1,000 holes per square inch, and the discharge was set high to avoid fine crushing and inside amalgamation. To obtain the maximum recovery it was considered necessary to catch the gold at the earliest possible moment after its release from the ore by crushing. To this end amalgamated copper plates were set inside the mortar boxes, which were made large and roomy and recessed at the back to protect the copper plates. Mercury was fed into the box periodically, and lip and splash plates received the outflow of pulp. Following these plates was the large apron plate, the latter being the only plate in use in most mills to-day. It was usual to cut the apron plate into two or more lengths, and arrange these in steps, mercury wells being placed at each step for the purpose of mixing the pulp and recovering possible floating particles. A large proportion of gold remained in the mortar-box as amalgam on the inside plates and around the dies, and was periodically cleaned up. Some of the gold discharged through the battery screen had already been wetted by mercury, and was also in the form of amalgam, and was caught on the outside plates. At the present time amalgamation tends more and more to be performed by the passage of pulp over a single plain inclined stationary plate, and the above devices of the early millman are likely to be followed into oblivion by the mercury trap, in view of the most efficient mercury trap which the tube-mill circuit affords. Cyanide was the favourite chemical employed for dressing plates, and was liberally used. It might be mentioned in passing that in some mills, many years after the introduction of the cyanide process, cyanide was still in use. The large mortar boxes necessarily reduced the crushing capacity of the stamps, and it was due to the introduction of narrow straight-backed boxes for the purpose of increasing crushing efficiency that inside plates became impracticable. The mercury feed to the mortar boxes, however, continued much later, it being argued by the exponents of this practice that since a particle of am-

algam was larger and heavier than its enclosed gold particle, it was more readily caught. Inside amalgamation and mercury feed to the mortar boxes increased the mercury consumption, and made it impossible to obtain a reliable sample of the ore crushed.

Concentration by means of blanket strakes, buddles, Frue vanners, and other means was practised, and some amalgamable gold was recovered, as well as, no doubt, some rusty gold from the oxidized ore. Evidence of the amalgamable gold reaching the concentration plants is the amalgam recovery made on the small plates attached to the Frue vanners then running, and also on some shaking secondary plates installed at the Ferreira mine.

This had its influence on the crushing of the or amalgamation recovery, since, with a view to th duction of as little slime as possible, the tendenc to crush coarser, thus decreasing the amalgam ery, although the total recovery of the gold co of the ore was considerably improved.

When the treatment of slime was successfully duced by our past presidents, J. R. William Charles Butters, in 1894, an entirely new view treatment was rendered possible. The product slime being no longer detrimental to the subs treatment by cyanide but the reverse, the ore wa crushed finer, thus again increasing the recove amalgamation. The recovery by the latter p

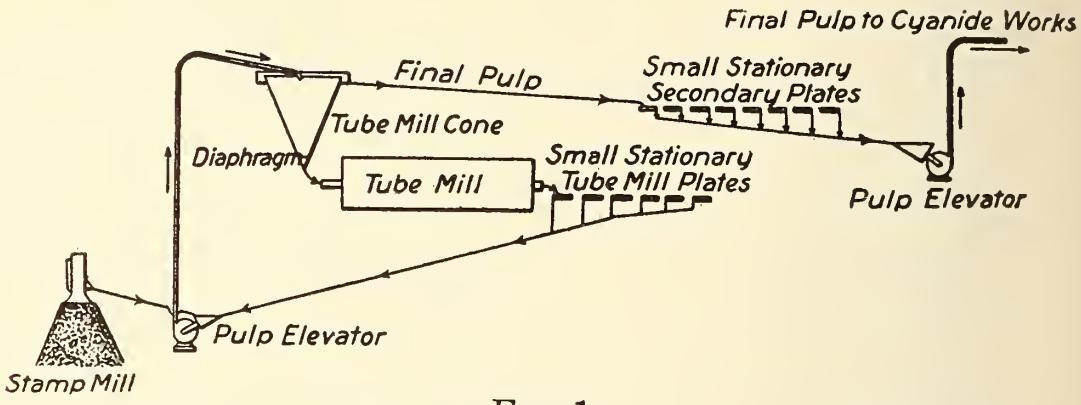


FIG. 1.

A

Information is very meagre and unreliable as to the percentage of recovery by the means outlined above. The assayer in the early days was not considered a necessary official on the mine, the pan in the hands of the mine-captain or millman being thought the more reliable means of determining the value of the ore. In December, 1894, however, J. S. Curtis sets the recovery at over 60 per cent. where a 900-mesh screen was used. It appears, then, that the percentage recovery of the early days on an oxidized and rich ore, by the various amalgamation methods then in use, was not much less than is obtained by the present fine crushing from low-grade pyritic ore by the ordinary straight mill plate and shaking tube-mill plates, as used in most reduction works to-day.

was further improved by the use of lime in th service water, used to accelerate the settlement slime, as it was found that the agglomeration particles into larger aggregates enabled these t into contact with the amalgamated surfaces an an appreciable proportion of their gold conte

The increased recovery of gold obtainable b crushing and the removal of the main objecti this procedure by improvements in sand and treatment were generally recognized before th (1899 to 1902). During this period, when lo vance was debarred, progress in fine crushin made in Australia by the introduction of tub The introduction of tube-mills for finer crush the Transvaal by J. R. Williams in 1904 raised

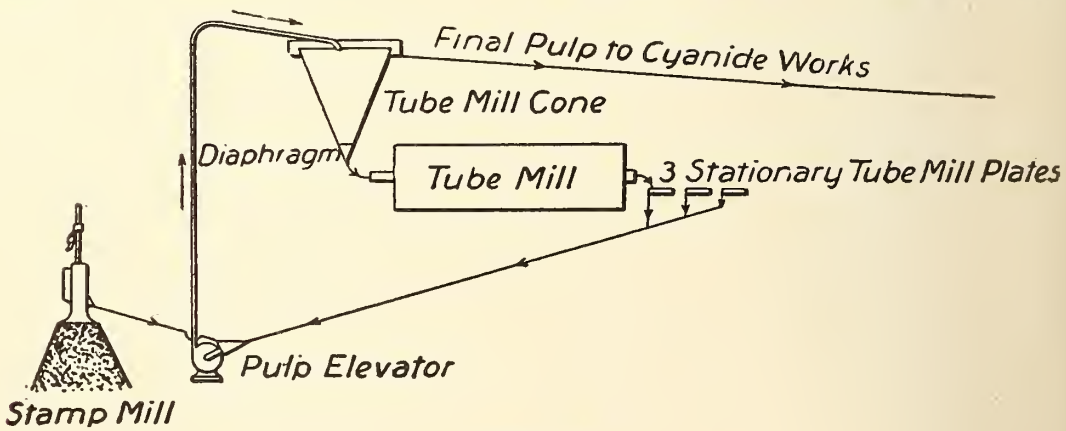


FIG. 2.

B

A most important change in the methods of gold recovery was brought about by the introduction of the cyanide process early in 1890. The cyanide process in the first instance was only applied to leachable sand.

covery of gold by amalgamation to 65-70 per c the contents of the ore, of which some 10 to cent. was by means of the tube-mill plates. The gamation recovery varied somewhat on di

ccording to the re-crushing plant erected, g used, tonnage crushed, and value and nature re.

ng nearer to the present time, it is found that eased use of tube-mills for re-crushing enables e a screen to be used in the stamp-mill that nation of battery pulp becomes an impossi- wing to the scouring action of the coarse pulp e mill plates. This necessarily leads to the of the plates from the stamp-mill in such nd a consideration of the following possible ives represented graphically in the correspond- rams:—

(A) Amalgamation of the tube mill pulp by one set s, and the overflow final pulp by another set, as Randfontein Central and Knight Central.

till crushed or abraded fine enough to overflow the classifiers.

With efficient tube-mill classification, all but the finest gold released by the stamps is brought into the tube-mill circuit and recovered on the plates, together with that released by crushing in the tube-mills. This being the case, the problem narrows itself down to determining whether it is necessary or advisable to amalgamate the final pulp, leaving the crushing plant as an overflow of the tube-mill classifiers. The considerations which enter into this problem are the extra capital outlay and buildings, the capital locked up as amalgam as setting to the plates, the increased area of amalgamated surface to guard, the consumption of mercury, the labour of dressing, and the additional elevation of pulp necessitated by

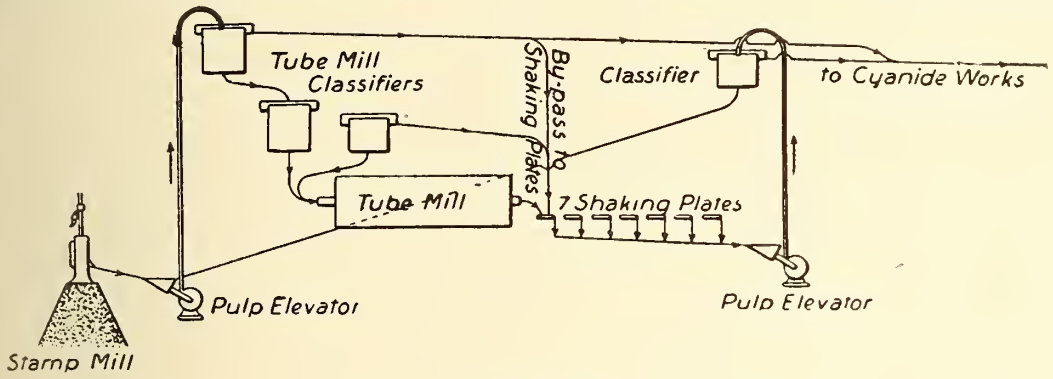


FIG. 3.

C

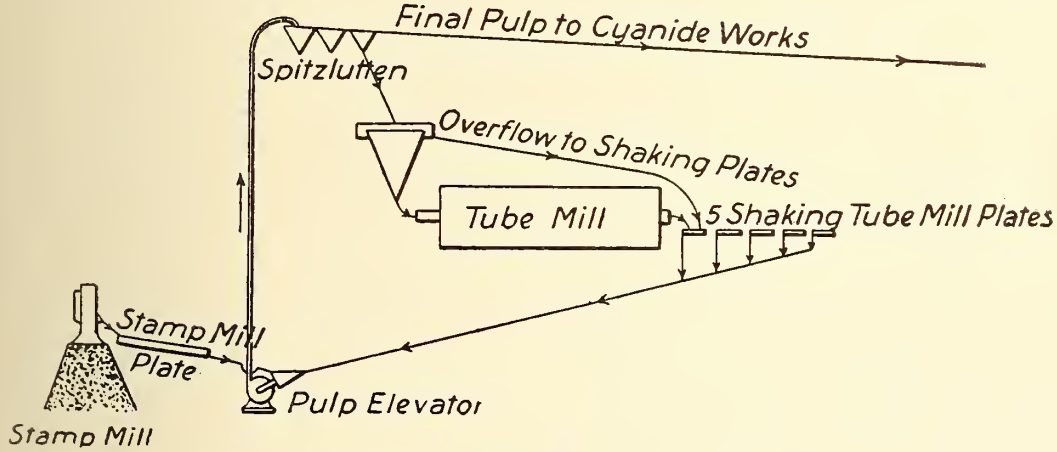


FIG. 4.

D

(B) Amalgamation of the tube-mill pulp only, as Simmer and Jack, Simmer Deep-Jupiter, and ious South Randfontein mills.

(C) Amalgamation of the mixed pulp after re- g of the coarse portion by tube-mills, as at re- erected plants.

the failure of varions efforts to eliminate tube- ates, it may now be accepted that there is gen- agreement amongst metallurgists as to the ad- sability of amalgamating the tube-mill pulp, since se considerable concentration of coarse gold by ssification of both stamp and tube-mill pulp place in the tube-mill circuit. Tube-mill pulp only to be examined for metallic iron from the f shoes and dies and from other sources to il- how heavy particles will persist in the circuit its fall during this amalgamation process. Even if mercury traps are used at the foot of amalgamated plates outside the tube-mill circuit for the pulp overflowing the tube-mill classifiers, it is possible for fairly coarse mercury and amalgam to escape to the cyanide plant.

On reference to the sketches, it will be noted that alternatives (A) and (C) have two elevations of the total pulp, plus the tube-mill pulp, whereas (B) has only one elevation of the total pulp, plus the tube-mill pulp. Alternative (B) therefore does not involve any extra charge for re-elevation, and remains the same as in the usual present-day practice, as represented in sketch (D). Unless increased recovery counterbalances these disadvantages, it is preferable to omit this additional operation. The use of very coarse

battery screening naturally reduces the amount of metallic gold set free in the stamp-mill, and where the bulk of the crushing is done by the tube mills, the quantity of very fine gold which might reach and overflow the tube-mill cones is correspondingly reduced, as such gold is retained on the tube-mill plates before the elevation of the tube-mill pulp. Even where the coarseness of crushing in the stamp-mill does not preclude the use of plates there, their elimination, when conditions permit, is followed by the various advantages above mentioned, and the rendering available as immediate profit the gold on such plates, which would otherwise not be realized until the end of the life of the mine. Plates thus taken out of the stamp-mill may carry from £50 to £300 worth of gold per plate, according to their condition, and in the aggregate this may render some £20,000 worth of gold immediately available in the case of a large mill. The elimination of the final pulp plates, however, can only be considered safe where good tube-mill classification obtains, and an equally efficient cyanide treatment follows. In the cyanide plant clean separation of sand from slime is essential, such as is possible with large diaphragm cones and continuous sand collection, producing on the one hand freely leachable sand, and on the other a large percentage of slime free from coarse

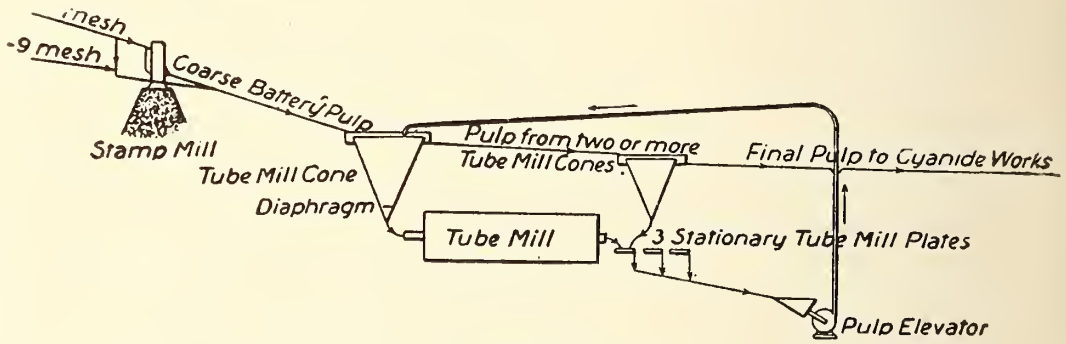


FIG. 5.

sand. With tube-mill classifiers liable to choking of small underflow outlets and consequent overflow of coarse sand and gold to the cyanide plant, and with slimy semi-permeable sand charges, the wisdom of allowing any fine amalgamable gold to escape from the crushing plant is doubtful, in spite of the economies above mentioned. In the case of the Simmer and Jack mill, where there are plates in the tube-mill circuit only, though the cyanide residues remain normal, the amalgam recovery dropped from 64 per cent. to 55 per cent. on a 6¾dwt. ore, owing to the fact that the fine sand and slime overflowing the classifiers are not amalgamated at all. If necessary, and as shown later in the case of the Simmer Deep plant, finer crushing and larger relative tube-mill cone area could be employed to increase the percentage of gold recovery by amalgamation. Whilst the collected sand is slightly enriched by some very fine free gold, there is no difficulty in dissolving this and obtaining a complete recovery. The popular theory that only 85 per cent. of this gold is recovered by cyaniding, instead of 100 per cent. by amalgamation, has not so far been borne out either in the laboratory by residue assays or regular panning of residues. Any fine metallic gold overflowing the tube-mill cones is necessarily smaller and more easily dissolved than the average of partly-encased particles in sand which are dissolved by cyanide. The amount of fine metallic gold overflowi tube-mill cones is much affected by the numbe area of the latter. Where a large ratio of tub to stamps exists, much gold, more often than no not be detected in the final pulp by panning or sand before treatment. This is the case at the mer Deep plant, where, before the removal stamp-mill plates, the total plates in operation bered 82, equivalent to 5,276 square feet, of a mating area, and the amalgamation recovery wa per cent. of the ore value. After the removal the stamp-mill plates and the reduction of those tube-mill circuit to 30 stationary plates, present area of 1,700 square feet, the amalgamation re was 57.7 per cent., and the value of sand and before and after treatment has not increased. total extraction by amalgamation and cyanidin 93.4 per cent. before and 93.5 per cent. after re of the stamp-mill plates. There was slightly crushing of the ore in the latter case, there bein per cent. of -90-mesh (0.006 in.) product in th pulp before removal of the mill plates, and 81 cent. of -90 mesh (0.006 in.) product after the re Where the ratio is lower, as at the Simmer and a trace of very fine gold can be detected by p the final pulp and collected sand, though the value of the sand residue remains normal. The is also enriched, though this may be offset by washing, due to the lower percentage of moist settlement of well-classified slime, containing a percentage of fine (-200 mesh) sand. For in assuming that 1.5 dwt and 1.8 dwt, slimes are t settling to 42.5 and 35 per cent. moisture respec by two 4:1 washes in both cases, of which th wash only is precipitated down to 0.01 dwt. p of solution. With 0.08 dwt. undissolved gold first residue and 0.10 dwt. in the second, the to traction will be 90.4 per cent. (0.144 dwt. tota due) from the 1.5 dwt. slime, and 92.2 per cent dwt. total residue) from the 1.8 dwt. slime. Butters' or other vacuum filters are used, the of the original slime should be immaterial, as viding the dissolving of the gold is satisfactor residue should contain little more than the amount encased. It is to be hoped that detail sults and working costs of the recent work i direction at the Crown mines will before long l before our society.

The author is indebted to F. A. G. Maxw much information on regular work at the Ra tein mines, where plates are eliminated from the mill, and hopes that he will bring forward his as a discussion to this paper. In the meantime,

aid that during 1908, in the four 100-stamp sec-
s of the South Randfontein, when there were am-
gmated plates both in the stamp-mill and the tube-
mi circuit, the average amalgamation recovery was
4.6 per cent., and the total recovery 92.06 per cent.,
wh eas in 1910, when there were plates in the tube-
mi circuit only, the amalgamation recovery was 48.60
per cent. and the total recovery 92.94 per cent.

s mentioned in a note lately presented by the au-
tho to this society, it has generally been considered
nec ssary for the satisfactory amalgamation of the
lar e volumes of thick tube-mill pulp that the plates
sho ld shake. Tracing back the history of this belief
to e pioneer work done by J. R. Williams on the Glen
Dee in 1904, it seems that in order to prevent the
bak ing of sand on the stationary plates installed with
10 er cent. grade, it was found necessary to mount
the plates on shaking vanner frames. Not only has
the shake been subsequently adopted by all the mines
wi out question, but the number of plates has gradu-
all increased from the two originally installed to five
and even six later. When the Knights Deep had five
tu -mills, equivalent in cubic capacity of shell to 3.91
sta lard tube-mills of 22 feet x 5½ feet, sixteen shak-
ing plates 10½ feet x 4¾ feet were in operation. As
the e was no convenient space for more plates when
ano her tube-mill was erected, it was decided to make
the sixteen plates serve. The number has now been
red ced to fourteen. The ratios are:—

Fo r 3.91 tube mills 16 plates=4.09 plates per tube-
mi

Fo r 4.91 tube-mills 16 plates=3.26 plates per tube-
mi

Fo r 4.91 tube-mills 14 plates=2.55 plates per tube-
mi

Th amalgamation recovery was just as efficient with
the smaller ratio as with the larger.

I the course of the experiment mentioned in my
not and after having thoroughly tested the station-
ary five plates system, initiated originally by F. A. G.
Ma well at Randfontein, it was decided on W. A.
Ca ecotts' suggestion to perform the whole amal-
gam ation of the tube-mill pulp on two stationary
pla s per tube-mill. The Simmer East plant has
thr 22 feet x 5½ feet tube-mills. The pulp of each
mil has been regularly run over two plates only since
De mber 19th, 1910. The dressings have been at six
hou intervals and the scrape taken six inches lower
tha formerly. The daily scrapes have been normal,
yie ing the amalgam called for. The two plates of
one of the mills were steamed at the beginning of the
run and again at the end of a month's run to deter-
min whether the yield from this source was affected
in ny way. The previous practice in this plant was
to eam one-third of the total plates each month so
tha each plate ran for three months before steaming.
It as found that one month's run of the two plates
yie ed more amalgam when multiplied by three, than
the average of the three months of five shaking plates
pre ious to starting the non-shaking experiments.
Ho ever, to be on the safe side, it was assumed that
the plates would not accumulate steam amalgam at the
sam rate during the second and third months, and it
was decided to multiply by only two and a half. This
cal lation gave a figure for steam amalgam just about
equ l to the average of the three months of five shak-
ing plates. Adding this to the daily scrape and other
sou ces the recovery is fairly arrived at, and works
out at 21.54 per cent. of the screen value and 34.17
per cent. of the tailing value, compared with 21.80
per cent. and 34.04 per cent. of the previous five-shak-
ing-plate period.

To ensure successful and economical work the ratio of water to solid should be reduced to the minimum, as not only does this decrease the velocity of the stream over the plate, but the cost for re-elevation is also less. The volume of pulp of 400 tons of sand per tube-mill plus 480 tons of water, allows about 10,000 cubic feet of pulp per 24 hours for each of the two plates, or about the same as passes over the plate of a five-stamp battery with a 9-ton duty per stamp, and a 6.5 to 1 ratio of water to ore in the screen pulp. The tube-mill circuit is the only part of the crushing plant where a thick amalgamable pulp is available without the installation and operation of special classifiers for the purpose. Distribution of the stream across the full width of the plate is also of considerable importance, and may be obtained by using the usual box at the head of the plate perforated with about ¾-inch holes along the bottom of the side facing down the plate. These holes should be of such capacity that the pulp attains some head in the box. In the event of any of the holes becoming temporarily choked, a further row of holes an inch or two higher up the front side of the box will serve to carry over the stream, and still maintain a fairly good distribution. The fall given to the stationary plates is 18 per cent. This is the fall arrived at by Mr. Maxwell and since adopted here. With the fall of 18 per cent. it is found that the minimum percentage of water in the sand is 55 per cent., and it appears that should it be desired to reduce the fall, the moisture would have to be increased, fall and water ratio being convertible terms within limits. The point to be reached in water ratio and fall is that just short of banking of the sand on the plate. Even with a low water ratio the rush of pulp over two plates appears to the eye to be too great, but this is not really so. As long as the velocity of the pulp stream is such that particles in suspension may come into contact with the plate and not be carried on mechanically without touching the plate, the gold will be caught. It might be considered that pulp carrying only 55 per cent. of moisture is too thick to allow the gold to sink through and reach the plate. As, however, amalgamation has been proved efficient with this ratio, this does not appear to be the case. In this connection, it might be mentioned that in pan amalgamation the pulp is kept very thick, although in plate amalgamation a fluid pulp was heretofore considered necessary for good recovery. On a stationary plate there appears a tendency for the gold to amalgamate further down the plate than when shaking; there is hence a liability for the scraping to yield less amalgam and the steaming more with stationary plates as compared with shaking plates. In connection with the satisfactory results obtained in the operation of the two stationary plate method, much credit is due to the practical skill and progressive attitude of Mr. A. J. Herald, the Knights Deep mill foreman, and to his assistant, Mr. Peter Wilson.

The removal of plates from the stamp-mill has had the good result of introducing on these fields the separate plate-house. The Homestake mine and the Waihi set the example many years ago, but the Witwatersrand has been very slow in following the lead and accepting the suggestion made before this society in 1903 by H. R. S. Wilkes. The arguments advanced by some millmen that a plate attached to each battery makes for good recovery due to better distribution of the pulp by the stamps over the width of the plate,

and that even vibration assists lack confirmation. It appears to the writer that this method is just one of the many practices taken over from other countries without investigation. Tube-mill plates have now been running long enough to prove that most efficient amalgamation can be performed with a pulp sub-divided from a launder and distributed over the width of the plate from a box pierced with holes. Tube-mill pulp carries heavier particles and contains less water than mill pulp, and is therefore a more difficult pulp to distribute. The advantages of a separate plate-house are increased running time, since stamps need not be stopped for plate dressing, and greater attention to the crushing machinery by the attendants, thus increasing the crushing capacity. Again, better amalgamation should be obtained by the greater attention to the work by specially chosen and trained men. The whole operation is confined to a smaller area and lends itself by closer supervision so that the risk of loss by pilfering may be reduced to a minimum. In connection with the matter of conveying pulp the author considers that sufficient importance is not attached to launders. All launders should be as smooth as possible and free from obstruction at the joints. Of all material used for the lining of launders there does not seem to be anything better than cement. This provides an ideal surface presenting least resistanee to the flow of the pulp and affording very little lodgment for amalgam and still less for gold in unamalgamated pulp. On those mines here where separate plate-houses or combined plate and cyanide extractor houses have been built, the arrangements have not gone far enough or else too far. The erection of zinc-lathes, elevator pumps and tube mills in the same building as the plates and the extractor boxes means the introduction of gangs of men and natives for repairs, other than those engaged on the gold recovery work. If this machinery is placed in the same building because the launders may carry gold, then the whole tube-mill plant, including circuit launders and elevators, should be included. The best plan is to include in the building only sueh machinery as is actually connected with recovery work, so as to limit the men entering the building to those directly engaged in the work. The accumulation of amalgam in the tube-mill launders should be reduced to a minimum and the launders should be closed to protect what does collect. Prior to the introduction of tube-milling amalgam was to be found in the launders to the cyanide plant, and some found its way as coarse particles to the concentrate vats, entailing loss in the residue. Where efficient tube-mill classifiers are installed no amalgam is found to-day reaching the cyanide plant except in an impalpably fine condition, since heavy particles of amalgam pass into and are retained in the tube-mill circuit. There is always a loss of mercury in amalgamation mainly by abrasion, and where this enters the tube-mill amalgamation of the gold liberated by crushing takes place. Where this amalgam does not reach the plates it is found in the launders between the discharge of the tube-mills and the plates. Such impalpably fine mercury or amalgam as enters the cyanide plant dissolves in the same way as gold, and like dissolved lead salts, is either wholly or partially precipitated by soluble sulphides in the working solution, or later in the metallic form by zinc shavings in the boxes.

Where plates are eliminated from the stamp-mill the water ratio may be considerably reduced. The clearing of a long plate set at a fall of 9 per cent. or 10 per cent. by avoidance of any banking of sand from the pulp has been the factor determining water ratio in the past, and this requires six to se parts by weight of water to one of solid using aver battery screening. It has been found that in the sence of mill plates the ratio may be reduced to without serious ill effects provided the mill laun have sufficient grade to carry pulp of this cons ency. A coarse screen with less water will give same result in duty and grading as a finer screen more water, water and screening being convert terms within limits. The reduction of water has c siderable influence on the cost of pulp elevation an running water pumps, the reduction of weight fr 6.5 to 4.5 of water to 1 of solid being equivalent about 27 per cent. The saving in power in a la plant is material when working on the reduced ra and there is likewise a smaller load on the classif and slime collectors. There would, however, be no s ing in the consumption of water as much the sa volumes are exposed to loss by evaporation, seep in dams, and moisture in residues.

Although there is no rule for the area of amal mating plates there is no doubt that the number area of plates in common use is unnecessarily la and when these are placed in a separate plate-ho the total area may be materially redueed. The aut is of opinion that much of the amalgam found at lower end of long battery plates is largely wor down by amalgamators wishing to present a unif bright surface all over the plate. The old practice to install plates about 15 feet long x 5 feet wide battery of 5 stamps, which equals 15 square feet stamp. Where, say, one standard large tube-mill 30 stamps is erected, and assuming that the tube- is equivalent to 30 stamps, five plates of 11 feet feet would probably be erected. The combined p area is then:—

30 stamps=6 plates 15 feet x 5 feet=450 squ feet=15 square feet per stamp.

1 tube-mill=30 stamps—5 plates 11 feet x 5 fe 275 square feet=9 square feet per stamp.

Total for 60 stamps units—725 square feet= square feet per stamp unit.

At the Randfontein Central the total plates erec amount to 9.6 square feet per stamp unit but it is proposed to use only 4.8 square feet per stamp u and there is little doubt that the latter area will quite sufficient. In the Simmer and Jack re-arra ment the plate area is about 2 square feet per sta unit. With the high stamp duties of recent years same plate area is doing nearly double the work it u to do in the past, and is capable of doing a great more. Conversely, in regard to the usual 10 per c fall, where this is increased more crushed mate with smaller water ratio may be amalgamated w equally good results. H. W. McFarren in his rec interesting little book says the fall of plates va from 1½ to 3 inches per foot, and should not be than 2 inches or 2½ inches. A fall of 2 inches foot is equivalent to 16.7 per cent., and 2½ inches 20.8 per cent., whilst the average is 18.75 per c Among the advantages due to reduced area of p are reduced cost of installation and operation. especially a reduced cost of mercury, the consu tion of mercury being in proportion to the area plate. In the Simmer and Jack plant the consumpt of mercury has been reduced to one-sixth of the mer figure. Where a large area is exposed in ama mation a proportionate amount of gold is taken to set the plates, and is not available for realizat until the end of the life of the mine. The gold l

ll-set plates may be taken at 1 ounce per square f plate. A 200 stamp-mill having 40 plates 15 5 feet will thus absorb 3,000 ounces of gold £12,000. The future points to the reduction of area to the point where only the gold too coarse aniding will be caught by amalgamation. This has probably been reached in the Simmer and plant, which has now only 18 stationary plates tube-mill circuit in place of the former 64 bat- plates and 30 shaking tube-mill plates. It will ted that the Simmer East with plates in the -mill have retained two stationary plates per ill, whereas the Simmer and Jack and the Sim- eep-Jupiter joint plants without plates in the -mill have each retained three plates per tube- The additional plate in the last two cases is a re of safety to deal with the richer pulp and to not less than two plates per tube-mill in action dressing operations. Diagram (E) shows a ed arrangement of crushing and amalgamating with three stationary plates only per tube-mill and no plates in the stamp-mill, and with safety cones for the common streams of pulp overflowing the tube-mill classifiers.

The author trusts that the foregoing account of some considerations affecting the methods of gold recovery responsible for some £20,000,000 per annum, two-thirds of the Rand's total output, may be of interest to members, including those who have visited the plants where the changes described have been effected, and he trusts during the course of his reply to the discussion to furnish future comparative details of future results.

In conclusion, the author wishes to thank Mr. G. A. Chalkley, the manager of the Knights Deep, and Mr. C. D. Leslie, the superintending engineer of the Consolidated Goldfields of South Africa, for access to information of the various mines of the group, and for permission to read this paper before the Society.

COAL-DUST EXPLOSIONS

(Abstract of Miners' Circular No. 3, U. S. Bureau of Mines.)

By George S. Rice.

as after a series of great disasters that the Fed- overnment took up the inquiry into the causes h explosions and established the testing station at P tsburg, Pa., which is now part of the Bureau of Mine. The very first work was to prove to mine oper ors and miners that coal dust would explode even f no gas were mixed in the air with it. The dust was laced in a great tube 100 feet long and 6 feet in d meter, that had a cannon embedded in one end. This annon was loaded with black powder, as a drill hole ould be, tamped with clay, and discharged. In ever instance when pure dry bituminous dust was used here was a dust explosion. Each succeeding experi ent went further to show how very dangerous coal ust may be.

Fi damp carries its own warning — the "cap" in th safety lamp—but coal dust, though visible, does not tract attention unless present in large quanti- ties. Fire damp rarely spreads through wide areas in a ine, and except in notable and very exceptional cases is controllable by means of the ventilating cur- rent.

If y mischance a large body of fire damp is ignited, t e rce of the explosion is terrific, but the effect is loca ed unless dry coal dust is present, or unless (as rare happens) the explosible mixture of air and gas exte ls through a large part of the mine. But dust accu ulates everywhere in a mine that is dry, and the last from the ignition and combustion of coal dust ay traverse miles of rooms and entries and even wre structures at the entrance of the mine.

Ga (methane) commonly enters mine workings by mu ous small blowers or feeders from the coal seam, the oof, or the floor. In most mines the quantities that nter are so small that if the ventilating current is su icient and is properly controlled, the gas is dil- ted by the air and carried harmlessly away. Only some of the mines in foreign countries and a few of hos in the anthracite region of this country are sub- t o great bursts of gas into the workings. When such occur they must be met by special methods.

As will be explained later, even small quantities of dry coal dust, easily overlooked, may be responsible for an explosion in a mine that in other respects may be considered a model mine. A chain is no stronger than its weakest link. Hence a mine in which every precaution is taken except one may be subject to a fearful disaster like that of Courrieres, France, in which nearly 1,100 men lost their lives.

Only a few years ago many persons believed that coal dust would not explode unless there was some gas (methane) in the air with it, but those who have seen the tests of the past two years in the explosives gallery of the Bureau of Mines station at Pittsburg can have no doubt that a cloud of bituminous coal dust can explode when no methane or other inflammable gas is present.

Explosions in bituminous mines happen more often during late fall and winter than during late spring and summer because the mines get dry in winter. Cold air holds less moisture than warm air. The natural warmth of a mine raises the temperature of the air that enters cold in winter. As this air gets warmer it can absorb more water; it therefore dries the walls, roof, floor, and any dust present by taking up the moisture and carrying it out of the mine.

The aim of this circular is to present the facts about coal dust in brief form and simple language, with a view to explaining to all engaged in coal mining—miner and operator alike—the dangers of coal dust and the means of lessening the risk of terrible explosions.

Origin, Distribution, and Properties of Coal Dust. How Coal Dust is made at the Face.

It is almost impossible to prevent dust being made in the working places of coal mines, for most coals break to pieces easily. The dust thus formed is apt to be dry because coal seams generally carry little water.

Even if some water soaks down from above and appears in the workings, it gathers here and there in hollows, or "swamps," and, as a rule, the larger part of a mine that is not sprinkled, or made wet in some other way, is dry during fall and winter.

Dust is made at the face in undercutting the coal, either by hand or with machines. Breaking down the coal after it is undercut makes more dust. If the coal is shot down, dust is made by the shattering action of the blast. In breaking lumps with sledges or picks, and even in shovelling up the coal, some dust is made. If the coal is "shot off the solid," it is badly broken, and much fine, dangerous dust is produced.

Methods of Lessening Dust at the Face.

Since coal is easily broken the making of dust at the face can not be stopped altogether. It is clear, however, that there are several ways of lessening the amount of fine coal and dust. The coal should always be undercut or sheared. If it can not be wedged down and blasting is needed, each shot hole should be placed in the right spot and should contain only enough explosive to do the work. Care should be taken in breaking lumps.

All fine coal, cuttings, or "bug dust" should be loaded into cars and sent out of the working places before shots are fired. There are two reasons why this should be done: (1) To keep the coal dust from being ignited by a shot; (2) to prevent the fine coal and dust being blown into the gob (from which they can not be removed) and becoming dangerous there.

In Germany a method of mining coal by forcing water under high pressure into the face through drill holes has been tried recently. This method serves to saturate the coal with water, as well as to break it down, and is said to greatly lessen the amount of dry dust made at the face. Although it is best suited to long-wall mining, the method can, perhaps, be used in wide rooms in some coal seams.

How Coal Dust is Scattered Along Entries.

Coal dust is scattered along haulage roads in several ways. Many cars have open joints or loose-fitting gates, and fine coal sifts through the openings. Larger pieces of coal are shaken off the cars by jolts in running over the mine tracks or by bumps in switching and making up trips. These lumps fall on the roads and are ground to pieces.

The air passing over the cars moves very fast because the cars reduce the space through which it has to pass. Dust lying on the cars is picked up by the current and scattered along the entries; much of the dust falls to the floor, but some of the finest and lightest collects on timbers and on projections from the ribs and roof. The latter is the most dangerous kind of dust, for unless it is dampened any shock may throw clouds of it into the air, where it may be ignited by a flame or an electric arc.

Methods of Lessening Dust in Entries.

The use of tight cars without gates will keep much fine coal from dropping along roads. Such cars are used in most coal mines in Europe and also in a few mines in this country, notably in Alabama. To keep lumps from falling off, coal should not be piled higher than the sides of the cars. If the cars are tight and properly loaded much of the dust that now gathers along the haulage roads will be done away with.

A good way to keep air currents from brushing fine dust from the tops of loads is to put strong sprays of water at the entrances to partings or sidings, so that the dust will be washed into the body of the car. This method is used in some mines in Wales.

Combustion and Explosion.

When a piece of coal burns, the carbon and the o burnable substances in the coal unite with the oxy of the air to form gases and water vapor. This u is called combustion. It is accompanied by flame heat, and the resulting hot gases and vapor tend stantly to take up many times the space filled by piece of coal and the oxygen needed to burn it.

A small piece of coal burns quicker than a l piece, and if a piece of coal of some kinds is s enough it will burn in a flash. If many particl such coal are suspended in the air, as in a dust cl so that each particle has some oxygen near it, burning of one particle may fire others and the f may spread through the dust cloud in an instant this happens, the hot gases and vapor from the b ing dust cloud suddenly take up more room and outward in all directions; in other words, the mix of coal dust and air explodes.

Coal Dust in Explosions.

The fact that dry pure dust from bituminous lignite, or asphalt explodes when ignited in the ai been proved beyond doubt by the tests at Pittsb Opinions differ as to the exact way in which the f of the explosion spreads. Some persons think gases given off by the particles of dust ignite burn; others think that each bit of coal dust b completely.

Dry coal dust in air will explode whether an flammable gas is present or not; but the presence very small proportion, less than 1 per cent., of met helps greatly to start an explosion. Fire dam mixture of air and 5.5 to 11 per cent. of methane plodes with great violence when ignited. Bu though a fire-damp explosion may be violent, it is able that such an explosion never extends all thr a mine unless the flame is supported by burning dust. Certainly, the strength of most great min plosions has been derived from coal dust and not gas.

The shock to the air from an explosion travels a of the flame itself, so it has happened that m caught by an explosion have felt the shock in tim throw themselves down or into some opening b the flame swept by. This shock, or advance wav an explosion stirs up much dust, but generally a this dust is not consumed in the flame, because is not enough oxygen present. So some of the is only charred or coked, and part of this while hot or half-pasty condition sticks to the ribs and or to props and caps.

Quantity of Dust Needed to Spread an Explosi

In certain tests at the mining experiment st at Pittsburg the bituminous coal dust used w fine that it passed through a 200-mesh sieve (one 200 openings in the length of an inch), and fl easily on a strong air current. This dust spre explosion when there was only 0.32 ounce of it pended in each cubic foot of air, or 1 pound i cubic feet of air.

It can be shown that to burn completely 0.12 ou the dust used at Pittsburg will take all the oxyg a cubic foot of air; to burn a pound of it will ta the oxygen in 133 cubic feet of air.

Fine Coal and Coal Dust.

Experiments made by the Bureau of Mines in that fine dust will ignite and spread an exp more readily than coarse dust. But if the flam shock are strong, coal of certain kinds in piece enough to pass through a 20-mesh screen (one

penings to the inch) helps to spread an explosion, n though there is no finer dust mixed with it. For reason all bits of coal that pass through a 20-mesh en may be called dust, and such particles of bi- inous or lignitic coals must be considered danger- in a mine, if they are dry, abundant, and not ed with large quantities of rock or shale dust, ch does not burn.

Differences in Coal Dust.

ests at the Pittsburg station have shown that there great differences among the dusts of different s of coal. Some ignite and spread an explosion h more easily than others. For example, in none he tests by the Bureau of Mines has anthracite dust made to spread an explosion. It is possible that er some conditions anthracite dust may ignite when ended in the air, but there seems to be little dan- of this under ordinary mining conditions. More- , in the long history of the Pennsylvania anthra- mines, some of which are very gaseous, there have r been any explosions so widespread as some that e taken place in bituminous coal mines.

ituminous coal and lignite contain much larger portions of volatile matter (matter that becomes ous on heating) than anthracite, and the larger portions of volatile matter in these coals probably much to do with the greater explosibility of their s. But some semibituminous coals, like those of New River and Pocahontas fields in West Vir- a, contain a smaller proportion of volatile matter bituminous coals and yet give dusts that make use explosions when strongly heated. So it seems something besides the fineness of the dust or the position of the coal fixes the ease with which the will spread an explosion. This other feature ap- s to be the structure of the coal; that is, the way hich the coal is bound together. Experiments be- made at Pittsburg bear out this view. It is found dusts which have about the same composition do ignite with the same ease, and the resulting ex- ions do not have the same strength.

Effect of Stone Dust.

has been proved by experiments at Pittsburg and urope that if stone dust, clay, sand, or any other erial that will not burn is mixed with coal dust, eps the coal dust from igniting easily. The more e is of such material in the mixture, the more diffi- it is to set fire to the coal dust; and when the ture contains more unburnable dust than coal dust, e seems to be little or no danger of the coal dust ading an explosion. But the unburnable material t be fine and it must be well mixed with the coal to have its full effect. If the material is coarse lumps, like pieces of rock, and the dry coal dust attered around or over these lumps, or if, when e is much shale or clay dust on the floor, the pure coal dust has gathered on the ribs, timbers, or , any disturbance of the mine air may stir up gh coal dust to feed and extend an explosion.

Explosiveness of Dusts.

s already stated, experiments at Pittsburg and where have shown that a mixture of air and the or bituminous coal or lignite may be explosive, though the air contains no inflammable gas other that from the dust. The records of mine explo- confirm the results of these experiments, for e have been explosions in shallow mines in Iowa hich gas (methane) has never been found. More- , an explosion, once started in a dry, dusty mine, travel through miles of entries and headings, even when there is not a trace of inflammable gas in the mine air. It is true, however, that the presence of even a small percentage of such gas greatly increases the chance of a dust explosion.

There have been many instances of explosions of coal dust in and about coal bins when the dust was raised into the air and set on fire. Similar explosions have happened in coal-crushing rooms. During the past year (1910) there were explosions of this kind at a plant in St. Louis, Mo., and at a cement plant in Colorado. In the latter explosion nine men were burned so badly by the flaming dust that they died.

It must not be thought that coal dust is the only kind of dust that will explode when no inflammable gas is present at the moment of explosion. Dusts of other substances containing carbon will do the same thing. Among such substances are flour, starch, and sugar. Many flour mills have been blown to pieces by dust explosions. The destruction of the big flour mills at Minneapolis in 1878 is a terrible example of ruin and loss of life caused by exploding flour dust.

Causes of Coal Dust Explosions.

air may be ignited and start an explosion in a coal

The more common means by which coal dust in the mine are as follows: The flame from a shot or the accidental ignition of an explosive in the open; an explosion of a small body of fire damp; and, more rarely, an electric arc of glowing wire or even the flame of an open lamp.

Shots or Blasts.

The long flame from a shot of black powder has been the commonest cause of coal-dust explosions in mines in this country. Blown-out shots have started many, and it is a common belief that the flame of black powder must come from a blown-ont shot to start a dust explosion. This belief is not supported by the facts, for explosions have started from shots that were not blown out, nor even overcharged. It is certain, also, that if the air at the face contains even a small percentage of gas (methane), the flame from even a properly placed and charged shot of black powder may start a dust explosion. The danger is greatest when several shots in the same working place are fired at the same time. The dust made by a shot, and any gas distilled from the coal by the heat, may be set on fire by the flame of the next shot.

Dynamite is fully as dangerous as black powder. It is quicker than powder, but gives a long hot flame, and many explosions have been traced to its use. Miners have been known to put two explosives, like black powder and dynamite, in the same hole. Such a combination is more dangerous than either explosive used alone. If the quicker-burning explosive is placed at the outer end of the charge it may blow out the stemming; if it is placed at the bottom of the hole it may blow the slower explosive while still burning into the dust raised by the shot.

Danger from Tamping with Coal Dust.

The chance of a shot of some long-flame explosive like black powder or dynamite starting a dust explosion is fearfully increased if the shot is tamped with coal dust or fine coal. Sometimes miners wet the dust or machine cuttings used for stemming in the belief that they can thus keep it from being ignited. There is little ground for this belief. If the shot is blown out, its heat instantly drives off the water, and then sets fire to the cuttings. Experiments at Pittsburg have shown that if coal-dust stemming is wet it gives a flame only a little shorter than if dry. When 2.5 pounds of black powder and 2.6 pounds of coal-dust

stemming were used in a eannon the flame with dry stemming was 64 feet long and with wet stemming 50 feet long. With heavier charges the flames would probably have been longer.

Sometimes miners use pieces of eoal of nut size for stemming in the belief that they lessen the danger in this way. It is clear, however, that ramming or tamping sueh pieees will erush them, and that the shot will break the pieces still finer and perhaps ignite them.

Fire Damp.

Explosions of fire damp have ranged next to the use of long-flame explosives as a eause of dust explosions. Methane is given off more or less from nearly all eoals, although most eoal mines in the United States do not make enough methane to be ealled gaseous. A great many of them make a little methane, but so little that the return air currents earry under 0.5 per eent., a quantity too small to be deteeted with a good safety lamp. But if a mine is dry and dusty, and long-flame explosives like blaek powder are used, the presenee of a small percentage of methane greatly inereases the chanee of an extensive dust explosion. Moreover, in those mines in whieh methane eomes from the eoal seam, the pereentage in the mine air is usually larger at the working faees; and it is "at the face" that many explosions start.

If methane eomes from the floor or from the roof, it is likely to eolleet in the gob, or where there have been falls of roof, or in plaees where the air eurrents do not eireulate. In a well-ventilated mine any body of fire damp is likely to be small, and if it is ignited there is little ehanee of the explosion spreading far unless dry eoal dust is at hand. Therefore, if a mine makes any methane at all, great eare should be taken to keep down the eoal dust in all the workings.

Electric Arcs and Glowing Wires.

That an electrie are or a glowing wire eould ignite eoal dust in the air was not thought possible a few years ago, but since then several mine explosions have been laid to these eauses. Of eourse, it must take a combination of unusual conditions to start an explosion in this way, but sueh a eombination may happen now and then. All that is neeessary is to have an are from a grounding or an overeharged hot wire surrounded by a thiek eloud of inflammable dust. If a trip of ears runs away on a dusty road and breaks the trolley or feed wires, the wreeking of the trip stirs up the air and raises dust, and if this dust is easily set on fire, the forming of an are by the broken wires may start a flame. Laboratory experiments at Pittsburg have shown that a small white hot live wire ean set fire to a eloud of dust.

Many people have believed that an open flame eould not ignite floating eoal dust unless a shoek, as from a blown-out shot, aeeompanied the flame. Yet floating eoal dust has eaught fire about bins and dusty tipples. Usually there has been little damage done beeause the dust was not eonfined, but a bad explosion in the eoal-grinding room of a eement plant in New Jersey is believed to have started from the flame of an open lamp. In mines, because the space is confined in rooms and entries, there is mueh greater chanee of the burning dust eausing an explosive wave. This possibility was shown in a recent eoal-mine explosion that started near the mouth of a dusty drift. This drift was an intake, so the air eould not have eontained any gas. A trip of ears jumped the track and knocked out some timbers, thus making a dense dust eloud that was probably fired by the flame of a trip-rider's lamp. The explosion travelled a long distance into the mine a gained strength as it travelled.

An ineipient dust explosion, started by the flame an open lamp, was seen at a mine in Yorkshire, En land. The dust that ignited was raised by a passi trip of cars. The flame followed the trip some d tanee and then ran baek.

MOISTURE IN MINE AIR.

Moisture Needed to Render Coal Dust Inert.

Experiments at the Pittsburg station and the amination of eoal mines after explosions have in eated that if the eoal dust in any part of a mine is damp that every sample of it that may be gather stieks together when pressed in the hand, there is l tle or no danger of a dust explosion starting in th part of the mine. To be so damp as this, the du must hold moisture to the extent of at least one-thi its own weight. The added moisture tends to ke the dust from taking fire in two ways: (1) The mo dust must be dried before it will flame, and the dryi takes heat, so more heat or a larger flame is needed ignite wet dust than dry dust; (2) moistened du settles to the floor and paeks there or stieks to t walls and roof. In ease of a shoek to the mine air dust eloud ean form to spread a flame.

Mine Air in Summer and in Winter.

As has been stated, eoal seams are generally d Even in the wet mines water eomes in only at certa points. Sueh water may be eonsidered as more or l aeeidental, and in most mines not artificially moi ened the working plaees and roads are dry except summer time.

All mining men have notieed that in summer t intake airways of mines become moist and even w They have notieed, too, that as the summer advan this moisture ereeps in farther, until finally in m mines the dampness extends through all the workin On the other hand, they have seen that when cold weather eomes in the fall the intake airways begin dry up, and after a while the roadways that ha been damp or wet get dusty unless they are sprinkl or watered in some way.

Another faet that has been widely notieed is t relation between explosions and the time of the ye In summer the bituminous and lignite mines in t eountry are practieally free from terrible explosion these begin when eold weather eomes. The records State mine inspectors show that there is ground for l lieving that dust explosions in eoal mines have be mueh more eommon in winter than in summer. D explosions may happen in the summer onee in a whi and in distriets where the air is dry, as in the Roc Mountain eoal fields, there is nearly as much like hood of their happening in summer as in winter, unl speeial measures are taken to keep the dust in su eondition that it will not spread a flame.

Mines are drier in winter than in summer becau the outside air in winter is eolder than the mine a ean hold little water. When this eold air enters t mine it takes heat from the mine walls. As it g warmer it can hold more water, and it takes th water from the floor, roof, ribs, and dust and th dries the mine. In summer the outside air is warm than the mine and its water-holding power is hig On entering the mine the air is eooled, it can ho less moisture, and some of the moisture is left drops of water on the walls and roof, or makes t floor wet.

Relative Humidity.

hen air contains all the water in the form of vapor an hold it is said to be saturated. Water vapor not be seen, but air that is saturated with water apr can carry more water as fog or mist.

elative humidity means the quantity of water va- in the air compared with the quantity the air ld hold if saturated, and this relation is expressed a percentage. When the air at any place is sa- ted with water vapor the relative humidity is 100 cent.; when the air is half saturated the relative idity is 50 per cent.

he amount of water vapor needed to saturate air ends chiefly on temperature. Warm air can carry uch more water than cold air. Tables showing the ntity of water vapor needed to saturate air at dif- nt temperatures, called psychrometric (or dew t) tables, are given in Weather Bulletin 235, pub- d by the United States Weather Bureau, Wash- on, D.C.

Moisture Carried by Ventilating Currents.

o get an idea of the way which the change from er to summer affects mine air, assume that in er the temperature outside a mine is 0 deg. F. and relative humidity is 70 per cent. By reckoning the figures given in dew-point tables, it can be n that under these conditions each 100,000 cubic of air carries into the mine a little over half a n of water. Therefore, an intake of 100,000 cu- eet of air per minute would carry into the mine t 750 gallons of water a day. In summer, with a erature of 80 deg. F. and a relative humidity of er cent. outside the mine, a current of 100,000 cu- feet per minute would carry into the mine 13.1 ns of water per minute, or 19,000 gallons every ours—that is, 23 times as much as under the as- d winter conditions.

e average temperature of most coal mines in this try is between 55 deg. and 70 deg. F., except near ntakes. The winter temperature of a mine differs a few degrees from the summer temperature, be- the temperature of the ground changes very and the intake air takes the temperature of the s of the mine.

peculiar fact, noted by the mining engineers of ureau of Mines and by others, is that the relative dity of the main return air current of the mine rly always over 90 per cent., no matter what the ive humidity of the outside air may be. The ge relative humidity in the returns of coal s, as shown by many measurements made under irection of this bureau, is 90.5 per cent. A lower ive humidity in the returns is found in those y Mountain regions where the air outside the s is dry nearly all the time.

Prevention of Coal-Dust Explosions.

e chance of a coal-dust explosion can be much re- d by care in using explosives. It can be reduced more by using what are known as permissible ex- ves—explosives that have passed certain tests by ureau of Mines. If these explosives are always under the conditions prescribed by the bureau, is little danger of their igniting dust.

e pressure of a small or large body of methane, nflammation of which is an important cause in ing dust explosions, can be prevented by thor- ventilation. Many mine operators are satisfied y send large volumes of air into a mine. At some s more air enters than is really needed, but not enough reaches the working places to sweep the face or to keep the gob free from inflammable gas.

Leaky stoppings, overcasts, and doors are responsible for the loss of air. A bad error in most coal mines in this country is the use of a single ventilating door in places where double or triple doors would prevent part of the loss of the ventilating current.

It is evident that although the making of dust in coal mines can not be stopped, there are ways of keeping down the quantity of dust. It is also clear that although any bituminous coal or lignite mine that is dry is liable to have a dust explosion, the chances of such an explosion can be greatly lessened. To entirely prevent dust explosions is more difficult, but they can be prevented by carrying out measures to keep the dust from igniting and to keep it in such condition that it can not spread an explosion.

Methods of Keeping Coal Dust from Being Dangerous

There are two ways of keeping coal dust from being dangerous. One is to wet it; the other is to mix or cover it with rock or shale dust, clay, or sand. If the coal dust is wet enough it will not ignite; if there is enough unburnable dust mixed with it, a flame will not spread.

Applying Shale Dust.

The stone-dust treatment for coal dust has been tested at some foreign experiment stations, and is now being systematically tried at the Altofts Colliery in England. The dust, finely crushed shale, is thrown on the ribs and timbers of the passageways and scattered in a thick layer on the floor. It is renewed from time to time, whenever coal dust begins to show on top of it. In addition, quantities of the rock dust are placed on narrow boards fastened to the posts of the timber sets, or on horizontal planks over the roadways, or on easily overturned swinging shelves made of boards or canvas. The dust is distributed in this way that it may be thrown into the air in a thick cloud by the shock of an explosion and thus smother the flame. This method of using shale dust is called the "shale-dust curtain."

Many foreign experts think the application of rock or shale dust a good method to use in those mines in which the roof may be injured by wetting.

A fine example of how well rock dust may be distributed by natural means is to be seen in the northern Illinois longwall field, where the bits of shale that constantly fall from the roof and the pack walls keep the coal dust covered up. Explosions have never happened in this longwall district, though mining has been going on there for over 40 years.

The rock-dust method of making coal dust harmless promises to be of value in the Rocky Mountain coal fields where water is scarce. Certain mine operators in Colorado and New Mexico, following suggestions made by the mining engineers of the Bureau of Mines, are now experimenting with adobe dust and sand as a substitute for rock dust or wetting.

Wetting the Coal Dust.

The first-mentioned method of rendering coal dust harmless, that of moistening or wetting it, has been tested at the Pittsburg station, and used in many mines in Pennsylvania, West Virginia, and Alabama. It has proved thoroughly successful when properly carried out. A number of ways of wetting down the dust have been tried. These are by the use of water cars, hose and nozzle, fixed nozzles for sprinkling or spraying water, steam jets, and combinations of steam jets and water sprays.

Another method, the application of a salt that absorbs moisture from the air (calcium chloride), is being tried in a number of mines in West Virginia, and promises to be of value under special conditions.

Dust can be wet down and kept moist by the systematic use of any one of these methods. The great trouble at many mines, including some in which there have been dust explosions, has been that the method adopted was not thoroughly carried out.

Water Cars.

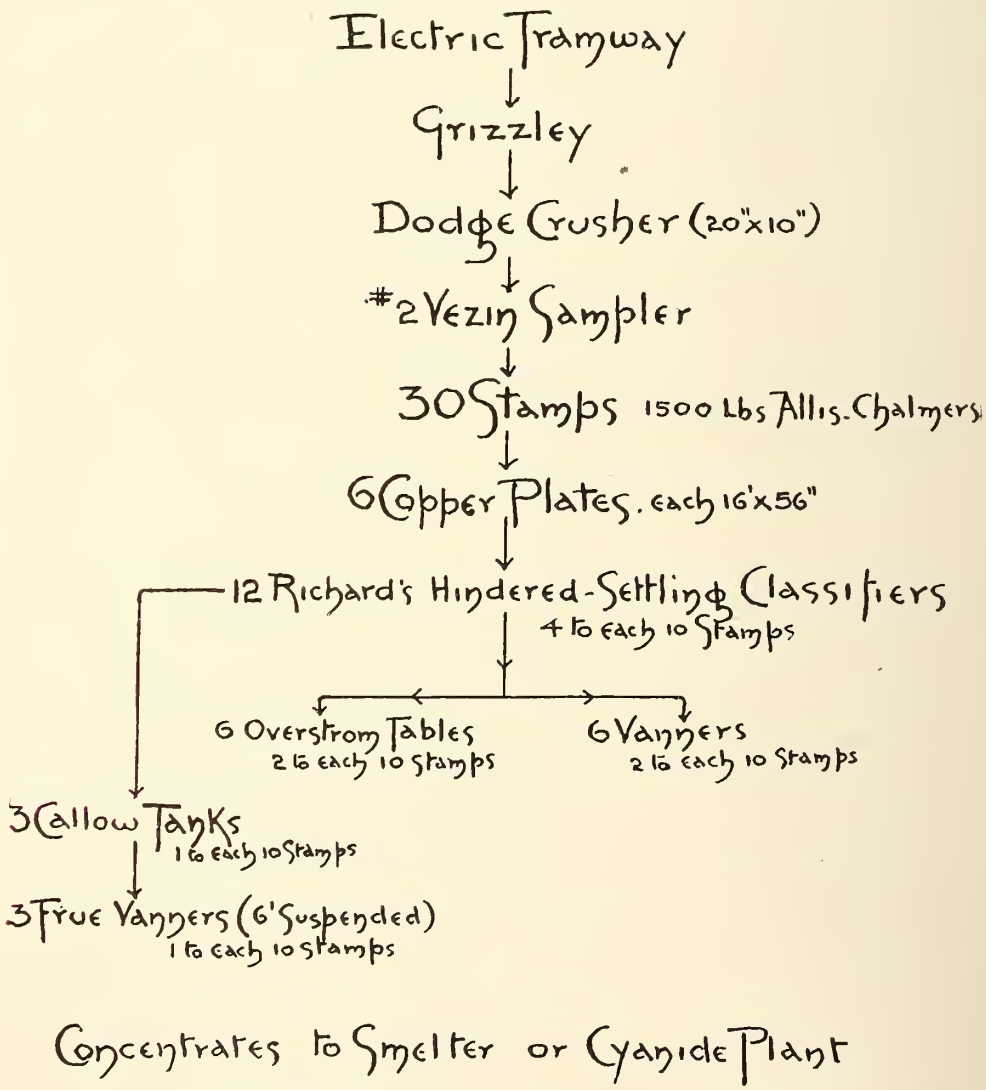
It is difficult to wet dry coal dust by throwing water on it. Perfectly dry coal dust will float a long time on water, and pouring water on such dust is like pouring water on a duck's back. Water dribbled on a dry road runs off and is lost in the loose rocks underneath the road or stands in little puddles till it drys up. For these reasons the use of water cars is not successful unless the roads are watered daily. Also, the sprinkling must be done by a force pump on the water car or by compressed air acting on the surface of the water in the car tank, so that the roof, timbers, and ribs can be wet as well as the floor. Pouring water from a bucket or dribbling it along the middle of the roadway from a valve in the tank is not a remedy and is of little value.

Hose and Nozzle.

Systematic washing down by hose and nozzle is excellent way of laying dust. The water lines shou be run along all the haulage ways up to the worki faces and should have plenty of taps for attaching hose. The washing down should be done often enou to keep the dust so damp that it will take up the n water thrown on it. To make fine dry coal dust damp that it can be molded in the hand, 33 per ce of water must be added; to make it muddy, at least per cent. must be added. The mixture would the fore contain 25 and 35 per cent. respectively, of add moisture.

The hose and nozzle method of laying dust is p ticularly suited for watering a place previous to ing a shot—a precaution that is required in so European countries. The hose may be used to sprin the ribs and roof near the track and also the gob; p vided, of course, that such sprinkling does not ca the roof to slack and fall nor the gob to take spontaneously, in which case the rock-dust met should be used.

(To be continued.)



FLOW SHEET, HOLLINGER MINING COMPANY'S MILL.

THE HOLLINGER MILL.

Before the fire at the Hollinger it was proposed to meet the whole requirements of the mill with 30 stamps. Since the fire has obliterated every trace of human activity the suggestion is to go on as be But various influences, healthy influences, are at w Therefore, it may well be believed that we shall s 100-stamp-mill at work instead of a thirty.

Personal and General

J. E. McAllister was, on May 9, at Greenwood, presented with an address by the officials and employees of the British Columbia Copper Company on the occasion of his retirement from the position of general manager of the company. Accompanying the address was a valuable service of silver, presented to Mr. and Mrs. McAllister as a souvenir of their long residence in Greenwood (since 1903) and the esteem in which they are held. The same evening the citizens of Greenwood and vicinity tendered Mr. McAllister a complimentary valedictory banquet. It is understood that Mr. McAllister intends joining a firm of consulting engineers with headquarters in New York.

Mr. John B. Hobson, well known as having for years been actively engaged in placer gold hydraulic mining on a large scale near Quesnel Forks, Cariboo district, lately returned to British Columbia after having spent several weeks in California. He will shortly proceed to Quesnel Forks to there operate his Cresta Blanca hydraulic mine.

Mr. A. J. McMillan, liquidator of the Le Roi Mining Company, recently left Rossland, B.C., on a business trip to New York.

Mr. J. L. Parker, of Vancouver, B.C., lately paid another visit to Sheep Creek, Nelson mining division, going thence to southwestern Alberta.

Mr. A. H. Gracey has returned to British Columbia from a trip to Arizona. Lately he accompanied some other mining engineers to Camborne, Lardeau district of British Columbia, to assist them in their examination of the Eva and Oyster-Criterion gold properties. For several years Mr. Gracey was manager of the Eva mine and 10-stamp mill.

Mr. C. Hussey, business manager for Messrs. Finch & Campbell, of Spokane, Washington, U.S.A., has been spending a week or two at the Standard silver-lead mine, near Silverton, Slocan, in connection with the purchase of material and plant for an aerial tramway, water system, compressor plant, and concentrating mill for the Standard mine.

Mr. Ernest Levy, of Rossland, B.C., manager of the Le Roi No. 2, Limited, has gone on a trip to England.

Mr. F. Burbidge, of the Coeur d'Alene mining district, Idaho, U.S.A., has been on a brief visit to the Slocan district, examining mining property.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay—Dominion Coal Output.

The ice conditions during the last half of April were a great hindrance to shipping, and indications were that the drift ice might give trouble throughout May. Towards the end of April, however, there was a succession of westerly winds which drove the ice down the coast, and by the beginning of May the coast was clear. Shipping commenced at the International Piers in Sydney Harbour on the 4th of May, and during the first fortnight of May the Dominion Coal Company's daily output will have averaged over 14,000 tons. The output for the month should be about 330,000 tons.

The amount of coal stored at the mines during the winter was unusually large. At the mines over 300,000 tons was banked and at the Steel works a stock of 120,000 tons was ain d n. During the past winter the mines probably worked nor gularly than they have ever done in the slack sea- on e old days of idle winters and feverish summers have d ut assed away, and the Glace Bay mines work as steadily he ye round as any bituminous collieries in operation. There re fe places where a miner can obtain steadier work the ar r nd than at Glace Bay at the present time.

The oundations are being put in for a new electric water- io tin engine to replace the present electric hoist at the n ern ional Water Shaft, which is the main drainage sta- ion fe the Harbour Seam mines. The new hoist will be fit- ed wi a Siemen's Ilgner fly-wheel equalizer, by which the tor l- energy of a rapidly revolving and heavy fly-wheel ll d to equalize the fluctuating load of the hoist. This e e s largely used in Germany and in European mines, and lso in he United States, but there is probably not one yet stalle in Canada.

The ominion Coal Company's mines are now large users f elec ic power, the current from the main transmission line ing ed to drive the screening machinery, ventilating fans, ps nd auxiliary haulages underground, and for lighting co eries. The first electrically-driven air-compressor in is pa of the country is now being erected at No. 12 Col- o far none of the coal-hoisting engines have been tri but it is more than probable that the near future will see one or more of these installed in Cape Breton. The shallow cover in the Glace Bay field affords an ideal opportunity for the transmission of electric current to underground pumps and haulages through the medium of boreholes.

Construction work has commenced on the new loading pier at Sydney, and the railway tracks are being laid. Work on the excavation of the foundations for the new wash-plant has also been started. The erection of the coal-handling plant at No. 2 Colliery will commence some time in May. The foundations are completed.

The Albion Mine Fire.

Mr. C. J. Coll's letter in your issue of May 1st demurs to references made in this correspondence on one or two occasions to the mine fire which took place at Stellarton in March, 1910, as "credit-claiming reports," and states that "there has been neither warrant nor occasion for the 'full meed of credit' given and so unctuously taken." Mr. Coll is mistaken in supposing that your correspondent or any other person in Cape Breton wishes to claim credit unduly. Reference to the correspondence will show that no attempt of this kind has been made, any more than to quote the official report of Mr. Thomas Blackwood, the Deputy Mine Inspector, as printed in the Nova Scotia Mines Report. Mr. Blackwood was one of the persons engaged in fighting this fire, and had every opportunity of forming a proper opinion of the usefulness of the rescue apparatus used, and it is Mr. Blackwood's report and not your correspondent's opinion that Mr. Coll objects to. Although he accompanied the trained men with the apparatus to Stellarton, your correspondent acting under instructions, did not go into the mine, and would not presume to give an opinion from hearsay only. No good could arise from attempting to answer Mr. Coll's letter in detail, and your correspondent can only refer your readers to the full text of Mr. Blackwood's report, at the same time disclaiming any unprofessional desire to claim undeserved credit for either the Cape Breton men or the apparatus which they used.

Mr. Coll believes that the uses of rescue apparatus or smoke helmets are strictly limited. So they are, and no person has urged this point more than your correspondent, but there are times when oxygen breathing apparatus has proved invaluable.

If Mr. Coll wishes to emphasize the folly of glorifying breathing apparatus to the exclusion of reasonable precautions, or of regarding it as a panacea for mine disasters and fires, and wishes to set forth the strictly limited uses of such apparatus, he will have the sympathy of all practical men. No multiplication of Rescue Stations or provision of modern apparatus will offset laxity or bad conditions of mining, and the use of breathing apparatus by untrained men is mere suicide. But when Mr. Coll says that the services of the Cape Breton men "were not required," many persons who know the circumstances under which these men worked in fighting the fire at the Albion mine will think that he is just a little unfair to them.

BRITISH COLUMBIA.

The spring season, which is more favourable to mining operations than the winter, is generally later in the mining districts of the Province than was expected it would be. Cold weather has retarded the melting of the snow, so that the commencement of hydraulicking in the placer-gold mining districts has been delayed two or three weeks, while in some parts where lode mining is the principal industry, hauling ore has had, of necessity, to await hardening of roads.

Much activity is noticeable in connection with newer camps, though still early for important work to be undertaken. Newspaper stories of Steamboat Mountain camp, for instance, suggest that many will go in to prospect in this new field. Again, many are preparing for an active season in the Portland Canal district, and others in country tributary to Skeena River. Development of coal lands on Graham Island, of the Queen Charlotte group, is promised; an increase in production of coal in Nicola Valley district is being prepared for; and coal mining operations in the vicinity of both Granite Creek (Tulameen) and Princeton (Similkameen) will be continued. Sheep Creek gold mines are likely to have done on them development on a larger scale than in the past, while the erection of new stamp mills, for the Mother Lode and Nugget mines, for which it has been announced that provision has been made, will enable a much larger recovery of gold to be made this year than in the past. In other parts of Nelson mining division than Sheep Creek—about Salmo, Ymir, and Nelson City, especially—the outlook is good for more mining and larger production than last year. In East Kootenay both lode and placer mining should be fairly active. Rossland and Boundary mines may be unfavourably affected by continued idleness at the Crow's Nest coal mines, if an agreement between operators and the miners' union be not soon made, and work be resumed at the several collieries, but there is still hope that some mutually acceptable understanding will be arrived at and long, protracted idleness be thereby avoided. Notwithstanding that there are some discouraging features in the situation, there is on the whole good reason to look for a continuance of operations on a scale that will result in last year's excellent record of progress being well maintained.

Slocan.—Melting snow has made wagon roads and trails too soft to allow of ore being hauled or packed to the railway or steamer shipping places, consequently few Slocan district mines shipped ore during the month of April. Similar conditions will largely prevail in May, so production will, from records of quantities of ore and concentrate received at the smeltery from the Slocan, appear to have been small. In several mines, though, development has been continued all through the winter, with generally satisfactory results. The most marked progress made has been in connection with three mines in Four-mile Creek camp, namely, the Standard, Van-Roi, and Hewitt-Lorna Doone group. Latterly further development at the Standard has been to some extent discontinued and the shipment of ore stopped, pending completion of an aerial tramway from the mine 7,900 feet down to the mill-site on Slocan Lake, immediately north of Silverton. The carrying capacity of this tramway will be about 20 tons an hour, with forty 850-pound buckets on the ropeway. Construction is being advanced, with towers in course of erection, an and steel materials arriving from the manufacturing Machinery for the Standard Silver Lead Mining Com concentrating mill is also being received; meanwhile the sary grading and log-cribbing has been done and framin timbers for the mill building got well forward. The mi have a crushing and grinding capacity of 200 tons a da for the time it will not be necessary to keep this part plant running continuously, since jigs and other concent machinery being installed are for treatment of only 10 per diem. Further, about 30 per cent. of the ore produ the Standard mine is of first-class grade and is shipped to the smeltery, while second-class ore after having crushed will be passed over a picking belt, so that all or grade suitable for smelting without previous concentratio be sorted out before the remainder shall be fed to th It is expected that the mill will be completed and in ope by October 1, while the water system for power purpose the aerial tramway, will both be in working order s weeks earlier. The Van-Roi Mining Company's mill, after delays extending over several months, caused by delivery of machinery, commenced concentration of ore March 15. During the month of April the quantity put through the mill was 3,273 dry tons, the product of was about 190 tons of silver-lead and 230 tons of silv concentrate. The former product, which averages abo per cent. lead, is shipped to Trail, B.C., and the latter, aging 44 per cent. zinc, to Bartlesville, Oklahoma, U.S.A importance of this mine is indicated by the following —during four calendar years, 1907-1910, the aggregate o roll payments made in connection with the operation Van-Roi mine and mill (heretofore the company has ated the Wakefield mill under lease) was $300,843. development work in the mine is chiefly opening on level extensions of the same shoots of ore as were worl levels above. The largest of those shoots, though n stoped out, has yielded from stopes between Nos. 4 levels approximately 60,000 tons of ore. No. 5 has a opened several shoots of ore proved in higher levels large and of a good grade. Two veins are being c known as the Main and Beryl veins, respectively. The c for the mine, in which much development work has bee and large quantities of ore blocked out, is so favourab a long and profitable run of the mill is confidently ex The Wakefield mill is to be used to concentrate ore fr Hewitt-Lorna Doone mines, owned and operated by t verton Mines, Ltd. For several years the developm these mines had been in progress until now there is mu available and easily accessible for extraction. The Wa mill plant is being overhauled, and to its equipment f duction of lead and zinc concentrates is being added Vacuum Process plant, for treating the zinc middling This mill will be running in June, and thereafter wil expected, add materially to the total of mineral pro from the Four-mile section of Slocan district. Other properties tributary to Slocan Lake that are being are the Mollie Hughes and Sweetgrass, near New I Buffalo, above Four-mile Creek; Eastmont and Enterpr Ten-mile Creek; Arlington, Ottawa, Meteor, Black Prin Hampton, on or about Springer Creek; and several ot various parts of the district.

Coast.—Reports are persistent to the effect that ore grade has been found in the Britannia mine, Howe Much development work has been done on this big p during recent years, but although large bodies of or been opened, the great bulk of the ore has been of grade that, with copper at a low price, there would ha little profit in extracting and smelting the ore. Howe velopment work has been persistently continued, and t centrating mill operated in a comparatively small wa some time the expenditure on mine and mill totalle

00 per month. Latterly the amount has not been so large, if the reports above alluded to prove well founded, a n to the earlier scale of operations will be made. Texada Isl d mines are expected to maintain production this year on a irly large scale. The Marble Bay mine has worked a sho of bornite ore, containing also good value in gold and silv, down to a depth of about 1,200 feet. The Cornell mine, in e same vicinity, is being further developed by the Tyee Co er Company, and it is expected a considerable quantity of e will be sent to the company's smeltery on Vancouver Isl d this year. Farther north, the Hidden Creek Copper Compar's mine, on Observatory Inlet, is stated to be developing mo encouragingly. Reports place the estimated quantity of ore found by underground prospecting, partly by extending the workings and partly by diamond-drilling, at a far larger total than when the property was taken under a working bond and option of purchase by the Granby Company, which, it is understood, will shortly make another payment on purchase account. Mr. James Cronin, formerly manager of the St. Eugene mine, East Kootenay, is among those returning to the Skeena district to do further exploration work on new properties situated in that part of the province. Both Portland Canal camp and Moresby Island of Queen Charlotte group, are expected to make an improved showing this year. Lode mining in Atlin district, some of which was done in 1910, will again have attention. The rich gold ore taken last year from narrow veins on the Northern Partnership group, gave such good returns that it is probable more work will be done on this property this year. Other lode claims in Atlin district will also be developed.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax, N.S., May 28.—The long and bitterly-fought strie at the Springhill coal mines was ended yesterday afternoo when the men adopted the report of the Settlement Commitee. The points of agreement under which the strike is brought to an end, as adopted at the meeting of the miners in Springhill, are as follows:—

() The men to be taken back as soon as places can be found for hem, the company saying it hopes to find employment in 45 ays for a majority of the men.

() The schedules of the mechanics are to remain, with no reductions of the rates before the strike.

() The Longley Board's fine, that is, the docking system, is t govern.

() Coal cutters are to get ten per cent. less than the rate pai before the strike, fair consideration to be allowed to enable a man to earn an average wage where changing conditions m al make that necessary. When the men went out J. R. Cowns, the former manager, announced a reduction of fifteen per ent.

() The usual clause that any employee may appeal to his employer against an alleged grievance, with an ultimate appea to President Plummer.

The Longley Board of Conciliation refused to say that the Uned Mine Workers ought to be recognized; it refused to recmmend an increase in wages or to compel the company to adt a fixed schedule as to prices.

The men rejected the report of the Longley Board, and wrk to enforce their demands for an increase in pay, and for he removal of what they said were grievances. They now ret n without the removal of any of the grievances, without recgnition of the United Mine Workers, and at ten per cent. less wages for coal cutting.

Some 1,200 men have been idle for twenty-two months, and the loss to the miners is estimated at $500,000. The strike has been costly to the United Mine Workers. It is known that whe President White did not force a settlement, his sentime and that of the present United Mine Workers' executive wa strongly in its favour. P

Sidney, N.S., May 16.—An interesting statement regarding the earnings of coal companies in Nova Scotia was made by Geeral Manager Cantley, of "Scotia," at a reception on the company's new ore carrier.

Mr. Cantley said that much was written by persons entirely ignrant of the subject as to the "fabulous returns received by Nova Scotian coal mines, but when it was realized that the "Sotia" company made a profit of less than 25 cents per ton on all the coal it mined last year, it would be seen what the foundation there was in these assertions.

The Dominion Company made a somewhat higher profit, but there were many companies in the province which earned even less than this. For the amount of the capital and the risk involved, Mr. Cantley said he considered that Nova Scotian coal mines yielded the poorest return of any industry he knew of.

ONTARIO.

Cobalt.—The sale of the Cobalt Central properties at Cobalt, which was to have taken place to-day, has been postponed until June 17.

Cobalt.—A contract has been signed whereby the low grade ore of the Crown Reserve Mining Company will be treated in the mill of the Nova Scotia Cobalt at Peterson Lake. Arrangements, including the building of a long aerial tramway, will be commenced at once, and there will be no more time lost in making the bargain operative. The contract is on a flat rate per ton treated, with a certain extraction guaranteed. The bullion will be returned to the Crown Reserve for shipment.

At the Crown Reserve ready for immediate shipment is 350,000 tons of low grade on the dump, estimated by Mr. Cohen in the last annual report to be worth $250,000. This is being added to from development work very materially every day. In addition the lower levels of the Crown Reserve promise to furnish a very large percentage and tonnage of low grade ore, and either a mill of their own or a custom concentrator was urgently needed. By the new arrangements the assets in the big dump will be more quickly available than if the construction of a concentrator were attempted.

Cobalt, May 18.—The sixteenth mill to be erected in the district, that of the Cobalt Lake Mining Company, is progressing rapidly, and the management hopes to see the stamps dropping in August.

The first drills were set up to make the excavations on March 27: to-day all the foundations are in, and half of the framing has been done. The whole of the plant is either on the ground or in transit. The mill will be of 20 stamps, and will embody most of the features used in connection with water concentration in the Cobalt camp. A very large percentage of the extraction is expected to be made on the six jigs above the stamps.

Elk Lake.—A five-stamp mill, a compressor and a couple of boilers are now being installed at the Thelma Gold Mines, in Bryce Township, midway between Elk Lake and Earlton, on the T. & N. O. Dr. Bell, of McGill University, is now on the property, making examination. Montreal and French capital is largely interested in the enterprise.

Gowganda.—It is announced from Gowganda that both the Millerett and the Miller Lake-O'Brien will make several ship-

ments from the camp this summer in spite of the deplorable condition of the waggon road.

BRITISH COLUMBIA.

Nelson, May 16.—The Windermere Mining, Milling and Development Company, with offices at Moyie, has been incorporated for the purpose of pushing development work on the Estella property, under bond to them, and all other mineralized claims from the base of the mountain to the Estella mine.

Nelson.—Ymir is situated 18 miles south of the city of Nelson, and about seven and a half miles north of Salmo, the Sheep Creek distributing point, on the Salmon River, in the very heart of a great mining district which contains nearly all, if not all, the precious metals sought after. Wild Horse, Bear, Porcupine and Hidden Creeks flow from an easterly direction and empty into the Salmon at or quite close to the town of Ymir. These creeks range from 10 to 17 miles in length, with abundance of timber, and numerous branches. It is over these creeks the now famous Sheep Creek gold belt extends, and beyond the question of a doubt by those familiar with the various ores and formations of the district these same gold producers of to-day, now found on Sheep Creek, will within the next year or two be found on or quite near the summits of the creeks just mentioned, which the quartzite belt, with its mammoth quartz and other dykes, traverses, and which in another month will be free from snow and available for prospecting. It is quite possible some strikes will be made this summer, for rich ores used to be brought to town from the heads of these creeks in the early days, to which no attention was paid owing to the narrowness of the veins. In future more attention will be given these, as on Sheep Cr These, with the veins already discovered in the vicinity in the district at large, will sooner or later be made kn abroad, the result of which can only be surmised.

YUKON.

Dawson, May 13.—The Yukon will be open for the seas navigation next Thursday, when a flotilla of six steamers eight barges will start from Lake Lebarge for Dawson, F banks and Iditarod, carrying 800 tons of freight.

Every steamer will be crowded with passengers rushin the various camps, largely on the lower Yukon.

Many now at White Horse will walk across Lake Leb on the ice to catch the steamers.

The American boundary survey expedition, comprising men and 150 horses, will catch the steamer Canadian at Yu Crossing next week, come to Dawson, and transfer here to steamer St. Michael, which will take them to the mouth of Porcupine River, where they will transfer to the steamer I for Rampart House.

The first steamer from Dawson for Iditarod will sail May It will be the packet Sarah. The Sarah will return imm ately from Dikeman, bringing the first Iditarod gold and sengers this year for Seattle. It is due here on the re trip June 5.

The first steamer from Fairbanks this year will be Schwarks, expected about the 24th.

A fleet of small boats with passengers for Dawson has pa Big Salmon.

The mails are now moving in canoes and launches.

MINING NEWS OF THE WORLD.

GERMANY.

Germany is endeavouring by every means at her command to create an oversea market for her coals. Germany is the only country on the Continent of Europe which can, and does, raise more coal than is required for her inland consumption. Charters for carrying German coal to French, Italian, Egyptian and even South American ports were at one time of rare occurrence; now they are almost familiar. German coal agents, backed by scientifically organized efforts, have succeeded in forcing coal into markets at one time held exclusively by British coal exporters. What she is doing can be best illustrated by the statement that no fewer than 58 vessels cleared from Rotterdam last month with cargoes of German coal for Mediterranean and other ports. A notable increase in Germany's coal export trade will undoubtedly be shown this year when the statistics are available. The labour disturbances in British coalfields have been a powerful factor in favour of Germany's efforts to find markets for her surplus coals.

GREAT BRITAIN.

At the House of Commons, May 1st, Mr. Masterman, M.P., Under-Secretary for Home Affairs, received a deputation from various societies of colliery examiners for the discussion of provisions in the Coal Mines Bill affecting the duties and status of firemen and deputies.

Among other matters the deputation asked that firemen and deputies should have an opportunity of appealing to some tribunal in cases of arbitrary dismissal; that the eyesight test should be of a practical character; that men now satisfactorily performing the work should not be prejudiced by the introduction of the examination system, and that in the provision that firemen and deputies should, where practicable, devote their whole time to those duties, the qualifying words "where practicable" should be struck out.

On this last point, Mr. Masterman asked if the adoption of the suggestion would not destroy the whole deputy syste it now existed in Northumberland.

Mr. Coulthead: That is so.

Mr. Masterman: The words "where practicable" were i duced to meet the case of Northumberland.

Mr. Williams and other members of the deputation conte against combining the duties with extraneous work.

Mr. Masterman said that if the amendment suggested made they would have to rearrange the mines in Northu land, and many deputies might be displaced. He sugg that the point was met by the provision that districts sh not be too large. If there were other duties to perform districts must be smaller accordingly. He promised, how that the various suggestions made should be carefully sidered.

SOUTH AFRICA.

Johannesburg.—At the end of December the reef-bearing of the East Rand Proprietary was 3,417 claims, of which or 7.8 per cent., had been exhausted. The company has mitted its calculations as to minerals underlying townships bewaarplaatsen in the vicinity of its claims, but up t present no notification has been received from the Union ernment in connection with the matter. The total profi the year figured at £1,269,935, out of which two dividen 20 per cent. were paid amounting to £962,358. Profits ta sorbed £108,930, and the sum of £160,553 was appropriate the redemption of capital expenditure. The total of the ter came to £864,932, the principal items being:—

Excess development and shaft-sinking	£43
Machinery, plant, building	31
Reduction plant	10

There were crushed 2,126,334 tons during the year of an age assay value of 7 dwts. per ton, yielding 691,860 o equal to 6.5 dwts per ton. The value was £2,900,883, o

per ton, while the cost of production was £1,651,527, or verage of 15s. 6.4d. per ton. The rate of profit was 11s. er ton. Compared with the previous year there was an in- e of 1d. per ton in working cost. This contrasts with a f 2s.2d. shown by the other great Rand consolidation, the n Mines.

e ore reserves increased by 1¾ million tons, the payable gegate being 10,274,000 tons, which is below the figure mplated by Sir George Farrar in his speech of a year ago. ng payable and unpayable ore together, the reserves in- ed by 2,578,516 tons. It is thus evident that the propor- of payable ore has diminished, the value of the entire tity has dropped 1s. 3d. per ton. It is, of course, the pay- ore that is the true criterion. The footage driven, risen sunk was 110.084 feet. In this important particular the Rand Proprietary leaves its rival, the Crown Mines, very hind, the total of the Eckstein amalgamation being 58,750

Whereas the Crown Mines opened up 2,366,000 tons, the Rand exposd just over six million tons. It is worth no- g that the Crown Mines' reserves are just 1 dwt. higher those of the Farrar organization, but this margin is likely lesseued as the proportion of reserve in the western part e Crown Mines is reduced. The actual value will be tem- rily affected by development done in the water rights sec- of the Crown, exploited by arrangement with the Govern- . In the East Rand the total development is about 121

hannesburg—The gold output for April of the mines on Witwatersrand amounted to 638,421 ounces of fine gold, from the outside districts 29,293 fine ounces, total 667,714 es, valued at £2,836,267, as against 676,065 ounces, valued 2,871,740 in March. This is a decrease of 8,351 ounces, or 73, on the month. The daily average for April was 22,257 ounces, against 21,809 ounces for the previous month, and breaks the record of 21,815 ounces created last February.

UNITED STATES.

Bisbee, Ariz., May 15.—The much-talked-of merger of the Calumet & Arizona and the Superior & Pittsburg has at last been formally made, and hereafter these two great Bisbee properties will be one.

Miami, Ariz., May 17.—During April the Old Dominion of Globe concentrated 11,085 tons of ore, smelted 29,275 tons of charge (ore, flux, etc., mixed), and produced 2,515,000 pounds of copper.

Spokane, Wash, May 10.—Nine dividend-paying mines in Shoshone county, Idaho, in the heart of the Cœur d'Alene district, earned net profits amounting to $2,500,000 in 1910, or $500,000 more than in 1909, according to a statement compiled from official reports by John Dolan, county assessor, who also says that more than $5,000,000 was paid by the operating companies for extracting the ore, the major portion being for labour.

The gross earnings of the Bunker Hill & Sullivan mine, heading the list, amounted to $3,514,431, the Federal company's properties at Mace and Wardner each being near the $2,000,000 mark.

The chief dividend payers are the Bunker Hill & Sullivan, the Federal Company's properties at Wardner and Mace, the Hercules and the Hecla. The new producers are the Caledonia, with net profits of $165,597, the Stewart with $21,788, and the Success with $10,049. Bunker Hill and Sullivan heads the list with $971,263, or about $400,000 more than in 1909. The Hecla's profits are placed at $216,909; the Federal's Wardner property earned a net profit of $285,303, while the Mace property shows a gain of $493,439, as compared with 1909. The Morning mine, also owned by the Federal Company, lost $40,000, though it handled 333,900 tons of ore.

COMPANY NOTES

DOMINION STEEL-COAL COMPANY.

Abstract of President Plummer's Report.

ur directors have filled the vacancies caused on the board e Steel Corporation by the appointment as directors of the Horable R. Dandurand and of Sir William Mackenzie of Toronto.

al Earnings—In considering the statement of earnings you directors would remind you that the period covered by the report includes four months in which the strike existed, that even when ended it was many months before the disor- ganization which it caused ceased to be felt, and that an extra winter period—December, 1910, to March, 1911—is included, during which earnings are necessarily small. The net result, under these conditions, is in your directors' opinion reason- ably satisfactory.

e Coal Company's plant is in very good condition, and you directors look for an increased production in the current financial year.

Dominion Iron & Steel Company.

siness of the year.—The expectations of your directors that the new coke ovens would be ready last autumn were not fulfilled, and the additions to the plant generally have been much delayed by various causes, among them difficulty in ob- taining suitable labour. For the ten months just closed we have, therefore, only maintained the proportionate output of the previous year, the figures are as follows:

	Tons.
Pig iron	205,865
Steel ingots	250,462
Rails	109,534
Wire rods	68,602
Billets and blooms sold	28,040

In the new year beginning 1st April, 1911, the plant now in operation should produce 290,000 tons of pig iron, an increase of about 50,000 tons, with a corresponding increase in finished products.

The bounties on pig iron and steel ingots received during the year were $316,045.21, being $228,365.97 less than in the previous twelve months, and they ceased altogether on 31st December last. The bounty on wire rods for the ten months amounted to $459,817.50.

Property Extensions:—To increase the annual production of your plant, to which we must look for such a reduction of costs and increase in earnings as will compensate us for the lapsing of the bounties, and to meet the demands of our customers, your directors have authorized the erection of another blast furnace, which will make six in all. The erections will be gone on with as soon as possible.

The new work on hand at the date of our last meeting, or since arranged for, which should all be completed within 18 months, will increase the capacity of the plant from 250,000 tons per annum of finished steel to over 400,000 tons, and your directors have no reason to doubt that the effect of this increase in the lessening of costs and the enlargement of earnings will be satisfactory to the shareholders.

The Bounties.

Bounty on Wire Rods.—Under the proposed reciprocity trade agreement with the United States, wire rods will enter free into both countries, and the confident expectation of your directors that on the lapse of the bounty on wire rods a duty

would be imposed has therefore become impossible of fulfilment. Application was at once made to the Government for an extension of the bounty for a term, during which preparation could be made to market in other forms the material now sold as wire rods, but no reply has yet been given.

While they would not minimize the loss which the company must suffer if the bounty is not extended, your directors have every confidence that the effect will be ultimately overcome when the plant is completed.

Vacancies on the Board.

Vacancies on the board.—Your directors filled the vacancies on the board caused by the death of the Hon. L. J. Forget and Mr. H. F. Dimock, by the appointment thereto of Mr. E. R. Wood, of Toronto, and Mr. Mark Workman, of Montreal. At the annual meeting you will be asked to elect, in addition, the Hon. R. Dandurand, of Montreal, and Sir William Mackenzie, of Toronto, who have joined the board of the Dominion Steel Corporation, Limited.

LA ROSE IN APRIL.

During the month of April La Rose produced 289,895 ounces of silver of gross value of $155,548. Net profit for the month was $101,325, as compared with $95,878 after March.

For the first four months of the current year La Rose produced 1,200,931 ounces of silver of gross value of $630,386, and net of $424,279. This is at the rate of $1,275,000 per annum, or more than twice the amount required for the pre 8 per cent., or 40 cents per share dividends on the 1,49 shares outstanding.

STEEL OFFICIALS.

The officials of the Dominion Steel Corporation have elected as follows for the ensuing year:

Steel Corporation.

Mr. J. H. Plummer, president; Sir Wm. C. Van Horne, president; Mr. C. S. Cameron, secretary and treasurer; Mr A. Doig, assistant secretary and assistant treasurer; Exec Committee—The President, the Vice-President, Mr. Wm. Master, Mr. J. R. Wilson, Sir Henry M. Pellatt, Mr. Fre Nicholls.

Dominion Coal Company.

Mr. J. H. Plummer, president; Mr. J. R. Wilson, vice-p dent; Mr. C. S. Cameron, secretary and treasurer; Mr. W Doig, assistant secretary and assistant treasurer; Exec Committee—The President, the Vice-President, Sir Wm. Horne, Mr. Wm. McMaster, Hon. Robert Mackay, Mr. J Wanklyn.

Dominion Iron & Steel Company.

Mr. J. H. Plummer, president; Mr. Wm. McMaster, President; Mr. C. S. Cameron, secretary and treasurer; Mr A. Doig, assistant secretary and assistant treasurer; Exec Committee—The President, the Vice-President, Hon. R Mackay, Sir Wm. Van Horne, Mr. J. R. Wilson, Mr. Caverhill.

STATISTICS AND RETURNS

COBALT ORE SHIPMENTS.

Shipments from the Cobalt camp for the week ending May 12, in pounds:

Nipissing	130,380
La Rose	59,530
Temiskaming	58,760
Hudson Bay	64,360
McKinley-Darragh	62,340
Right of Way	60,200
Buffalo	54,850
Coniagas	64,710
Kerr Lake	60,034
Total	615,164

Following are the shipments from the Cobalt camp for the week ending May 19, and those from Jan. 1, 1911, to date:

	May 19. Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger	.....	55,200
Bailey	.....	40,000
Barber	.....	6,000
Beaver	62,615	657,858
Buffalo	.....	1,061,830
Chambers-Ferland	62,900	511,800
City of Cobalt	.....	427,780
Cobalt Lake	61,420	1,749,270
Cobalt Townsite	.....	351,840
Colonial	.....	42,000
Coniagas	61,000	1,651,890
Crown Reserve	.....	946,960
Hargraves	.....	41,100
Hudson Bay	.....	310,480
Kerr Lake	60,082	1,141,980
King Edward	.....	40,000
La Rose	146,630	2,360,780
McKinley-Darragh	109,130	2,251,550
Nipissing	66,070	2,379,74
O'Brien	.....	543,77
Peterson Lake (Little Nip.)	.....	58,48
Provincial	.....	40,51
Right-of-Way	.....	378,46
Silver Cliff	.....	106,68
Standard Cobalt	.....	44,81
Temiskaming	64,910	775,30
Trethewey	.....	528,63
Wettlaufer	.....	117,23

The shipments for the week were 694,757 pounds, or tons.

The shipments from Jan. 1 to May 19 were 18,621,885 or 9,310 tons.

Following are the shipments from the Cobalt camp fo week ending May 26, and those from January 1, 1911, to

	May 26. Ore in lbs.	Since J Ore i
Badger	.....	55,20
Bailey	.....	40,00
Barber	.....	6,00
Beaver	58,850	716,70
Buffalo	107,120	1,168,95
Chambers-Ferland	.....	511,80
City of Cobalt	66,000	493,78
Cobalt Lake	.....	1,749,27
Cobalt Townsite	80,880	432,72
Colonial	.....	42,00
Coniagas	.....	1,651,89
Crown Reserve	50,090	997,05
Hargraves	.....	41,10
Hudson Bay	64,370	374,85
Kerr Lake	60,000	1,201,98
King Edward	.....	40,00
La Rose	275,680	2,636,46
McKinley	246,340	2,497,89

ipissing	205,640	2,585,380
'Brien	.....	543,770
eterson Lake (Little Nip.)	.....	58,430
rovincial	.....	40,510
ight of Way	73,320	451,788
Ilver Cliff	.....	106,680
tandard	58,000	102,813
emiskaming	.....	775,302
rethewey	.....	528,630
Vettlaufer	.....	117,232

he shipments for the week were 1,146,290 pounds, or 573 tons.

shipments from Jan. 1 to May 26 were 19,768,175 pounds, or 884 tons.

B. C. ORE SHIPMENTS.

following are the returns of the ore production and ment for the past week, and for the year to date:

Boundary Shipments.

ranby	16,455	424,120
Iother Lode	6,972	121,305
awhide	5,115	68,646
ack Pot	643	12,208
thelstan	125	739
Napoleon	250	743
one Star	345	738
ther mines	.....	30,173
Total	29,905	658,672

Rossland Shipments.

entre Star	3,770	73,849
e Roi No. 2	796	10,048
e Roi No. 2, milled	300	5,700
ickel Plate	28	309
ther mines	.....	4,731
Total	4,894	94,637

Slocan-Kootenay Shipments.

ullivan	983	13,229
t. Eugene, milled	420	12,636
ueen, milled	420	7,770
ichmond-Eureka	40	1,000
ranite-Poorman, milled	250	4,750
ugget, milled	110	2,090
ilcox, milled	75	1,425
nob Hill	251	1,002
an Roi, milled	800	5,849
ther mines	.....	5,999
Total	3,349	55,650

e total shipments for the week, including estimated mill- were 38,148 tons, and for the year to date, 808,959 tons.

Granby Smelter Receipts.

Grand Forks, B.C.

ranby	16,455	424,120

B. C. Copper Company's Receipts.

Greenwood, B.C.

Mother Lode	6,972	121,305
Rawhide	5,115	68,646
Jack Pot	643	12,208
Athelstan	125	739
Napoleon	250	743
Lone Star	345	738
Other mines	.....	406
Total	13,450	204,785

Consolidated Company's Receipts.

Trail, B.C.

Centre Star	3,770	73,849
Sullivan	983	13,229
Le Roi No. 2	796	10,048
Richmond-Eureka	40	1,000
St. Eugene	223	2,628
Nickel Plate	28	309
Knob Hill	251	1,002
Other mines	.....	42,005
Total	6,001	143,710

The total receipts at the smelters for the week, including concentrates, were 35,906 tons, and for the year to date, 772,615 tons.

LE ROI NO. 2.

Le Roi No. 2.—Josie mine report for April—Shipped 2,350 tons of ore and 154 tons of concentrates. The receipts from smelter are $33,857 (£6,981), being payment for 2,133 tons shipped, and $3,055 (£630), being payment for 108 tons concentrates shipped—in all $36,912 (£7,611). Estimated costs for corresponding period—Development, $10,000; ore production, $9,000; milling, $1,500. Total, $20,500 (£4,227). Other expenditure, $2,000. Holywell drift, 500 feet level—Advance, 83 feet, of which 64 feet averaged 1 ounce 7 dwts, gold and 3⅛ per cent. copper over 9 inches. Annie drift, 1,300 foot level —Advance, 126 feet.

TORONTO MARKETS.

May 27.—(Quotations from Canada Metal Co., Toronto).
Spelter, 5.50 cents per pound.
Lead, 3.65 cents per pound.
Antimony, 8 to 9 cents per pound.
Tin, 44 cents per pound.
Copper, casting, 12¾ cents pr pound.
Electrolytic, 12¾ cents per pound.
Ingot brass, 8 to 12 cents per pound.

May 27.—Pig Iron—(Quotations from Drummond, McCall Co., Toronto):—
Summerle No. 1, $22.50 (f.o.b. Toronto.)
Summerlee No. 2, $22.00 (f.o.b. Toronto.)
Midland No. 1, $19.00 (f.o.b. Toronto.)
Midland No. 2, $19.00 (f.o.b. Toronto).
Hamilton No. 1, $18.00 (f.o.b. Hamilton.)
Hamilton No. 2, $17.50 (f.o.b. Hamilton.)
Clarence, $19.00 (f.o.b. Toronto).
Cleveland, $19.00 (f.o.b. Toronto).

GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.

Coke.

May 24—Connellsville Coke:—
Foundry coke, prompt, $1.90 to $2.00 per ton.
Furnace Coke, prompt, $1.50 to $1.55 per ton.

May 24—Tin, Straits, 44.40 cents.
Copper, Prime Lake, 12.37½ cents.
Electrolytic copper, 12.20 cents.
Copper wire, 13.75 cents.
Lead, 4.47½ cents.
Spelter, 5.50 cents.
Sheet zinc (f.o.b. smelter)), 7.25 cents.
Antimony (Cookson's), 9.50 cents.
Aluminium, 20.00 to 20.50 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $42.50 per ounce.
Platinum, hard, $44.50 per ounce.
Bismuth, $2.00 to $2.10 per lb.
Quicksilver, $46.50 per 75-lb. flask.

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous.

	May 27, 1911. Bid.	Ask.
Dominion Steel Corporation	.56⅜	.57
Nova Scotia Steel	.98¾	.99
Crow's Nest Pass	.....	.68
Granby	.33¾	.34
Consolidated Mining & Smelting	.35	.45
Amalgamated Asbestos	.09	.19
Black Lake Asbestos	.....	.15

Cobalt Stocks.

Bailey	.05	.15¼
Beaver Consolidated	.44	.44¼
Buffalo	2.00	2.30
Chambers-Ferland	.13	.13½
City of Cobalt	.16	.17
Cobalt Central	.03	.05
Cobalt Lake	.21¾	.22
Coniagas	6.75	7.00
Crown Reserve	3.18	3.25
Foster	.05⅛	.06
Gifford	.03	.05
Great Northern	.19	.19¼
Green Meehan	.03⅞	.04¼
Hargraves	.18	.18¾
Hudson Bay	85.00	105.00
Kerr Lake	6.00	6.75
La Rose	4.30	4.50
Little Nipissing	.04	.04½
McKinley	1.73	1.73½
Nancy Helen	.02¼	.04
Nipissing	10.55	10.65
Nova Scotia	.12½	.15
Ophir	.12	.14½
Otisse	.01¼	.02
Peterson Lake	.11	.11¼
Right of Way	.10	.13
Rochester	.05⅝	.06
Silver Leaf	.03¾	.04½
Silver Queen	.04	.08
Temiskaming	.70¼	.70½
Trethewey	.95	1.05
Wettlaufer	1.08	1.10

Porcupine Stocks.

Foley	1.44	1.
Porc. Northern	.66	.
Detroit and New Ontario	.50	.
Rea	5.97	6.
Apex	.16	.
Porc. Canada	1.12	1.
Porc. Central	.73	.
Dobie	3.25	3.
Dome Extension	.59	.
Hollinger	12.76	12.
Monita	.24	.
Preston	.34	.
Pearl Lake	.56	.
Imperial	.15	.
Porc. Tisdale	.10¾	.
Swastika	.63	.
United	.05	.
Vipond	.62½	.
Standard	.18	.

New York Curb.

Brit. Col. Copper	5⅛
Butte Coalition	19
Chino Copper	..
Davis-Daly Copper	1⅜
Ely Consolidated	7/16
Giroux Mining	6⅝
Goldfield Consolidated	5⅞
Greene-Canadian	7
Harcuvar Copper	..
Inspiration Copper	9⅝
Miami Copper	20½
New Baltic Copper	7
Nevada Con. Copper	19
Ohio Copper	1 6/16
Rawhide Coalition	.7
Ray Central	1⅝
Ray Consolidated	..
Union Mines	7/16
Yukon Gold	3 15/16

Silver Prices.

	New York. cents.	Lond per
May 9	53¼	24
" 10	53⅛	24
" 11	53⅜	24
" 12	53½	24
" 13	53½	24
" 15	53½	24
" 16	53½	24
" 17	53¼	24
" 18	53⅜	24
" 19	53⅛	24
" 20	53⅜	24
" 22	53⅜	24
" 23	53⅜	24
" 24	53⅜	24

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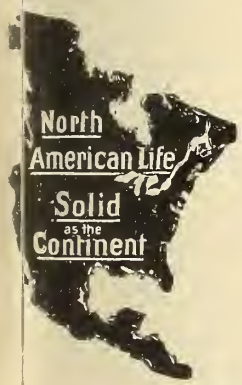

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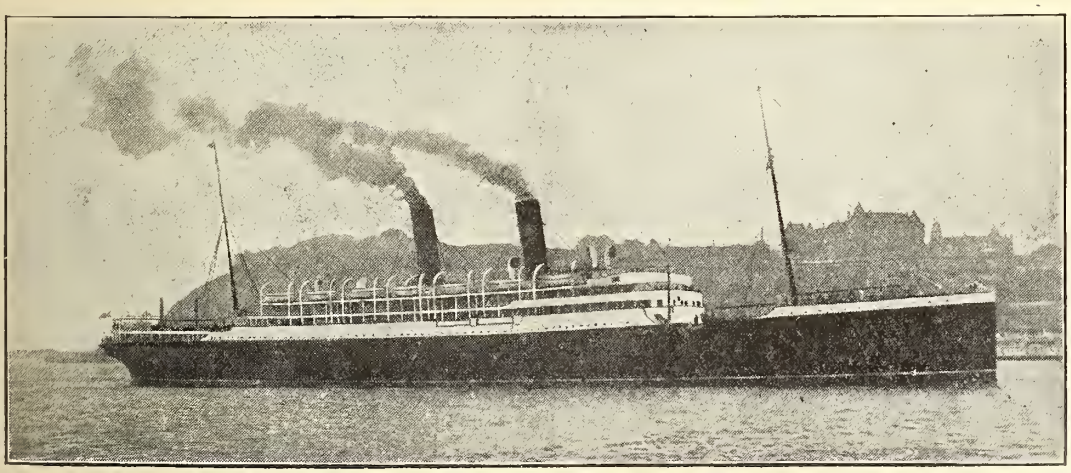

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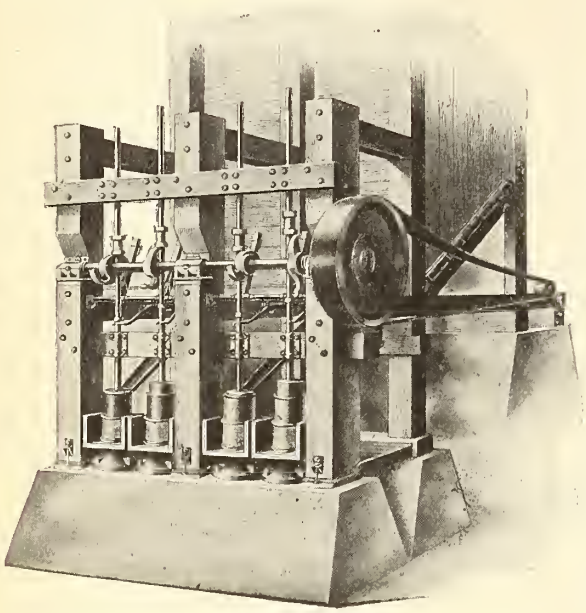

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The Nissen Stamp Mil

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1107. Joint Report on the Bituminous or Oil Shales of New Brunswick and Nova Scotia. Also on the Oil Shale Industry of Scotl Part I, Economics, Part II, Geology by R. W. Ells.

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1077. Memoir No. 7, Geology of St. Bruno Mountain, Quebec, with maps, by J. A. Dresser.

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1059. A Geological Reconnaissance of the region traversed by the National Transcontinental railway between Lake Nipigon Clay Lake, Ontario. Accompanied by two maps covering the region, by W. H. Collins.
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1091. Memoir No. 1, Geology of the Nipigon Basin, Ontario, by A. W. G. Wilson.

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1115. Memoir No. 8. The Edmonton Coal Field, Alberta, with maps, by D. B. Dowling.

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1139. Memoir 11-T Triangulation and Spirit Levelling of Vancouver Island, 1909, by R. H. Chapman.

YUKON and NORTH WEST TERRITORIES

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1080. Report on a part of the North West Territories drained by the Winisk and Attawapiskat Rivers, by Wm. McInnes.
1006. Report on a traverse through the southern part of the North West Territories from Lac Seul to Cat Lake in 1902, A. W. G. Wilson.

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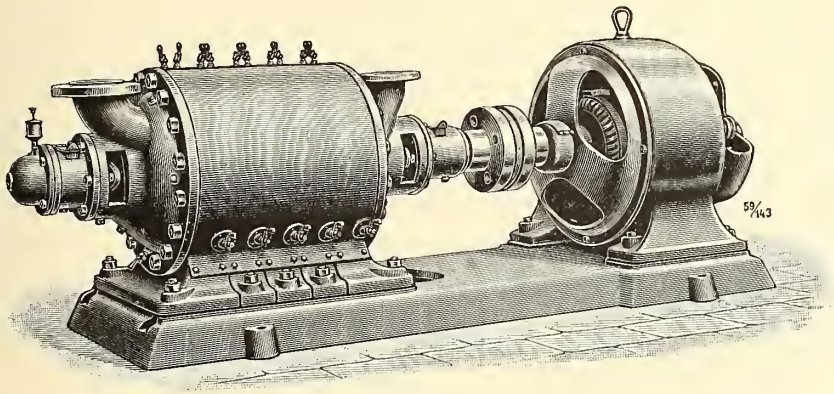

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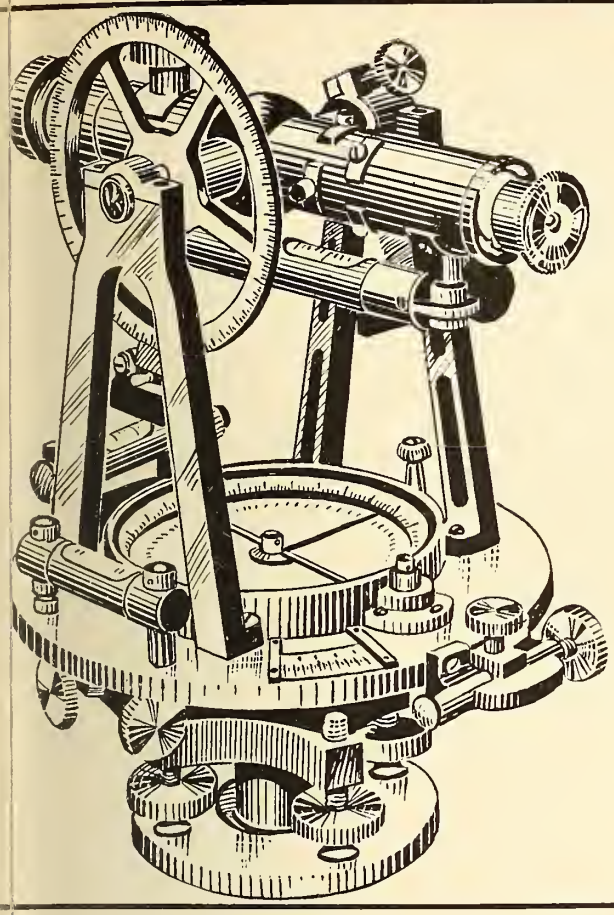

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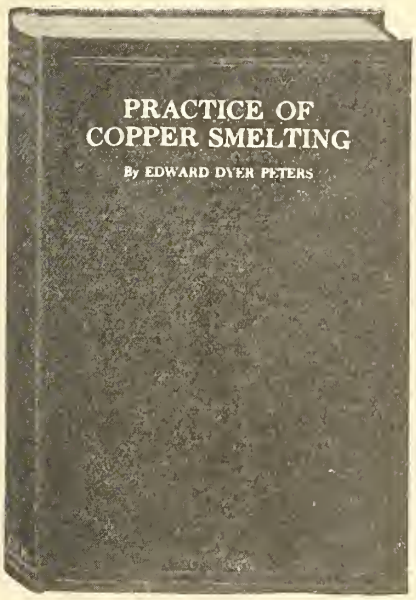

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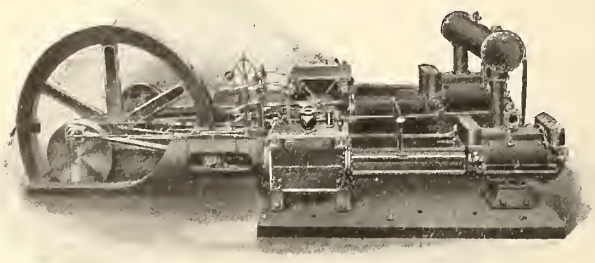

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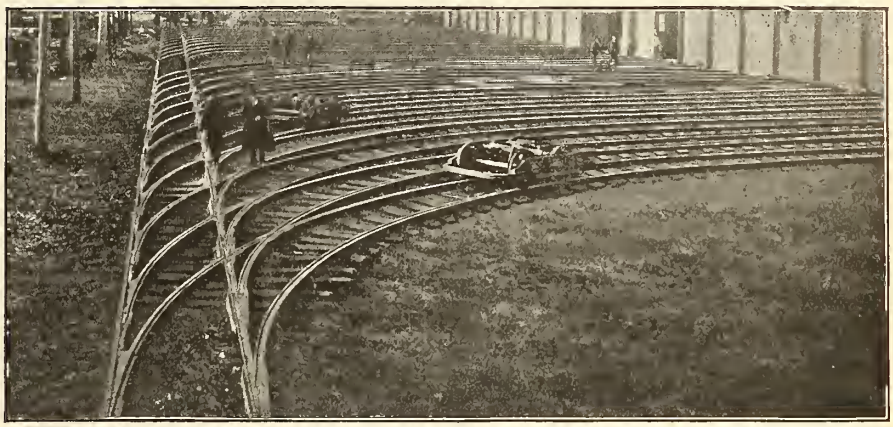

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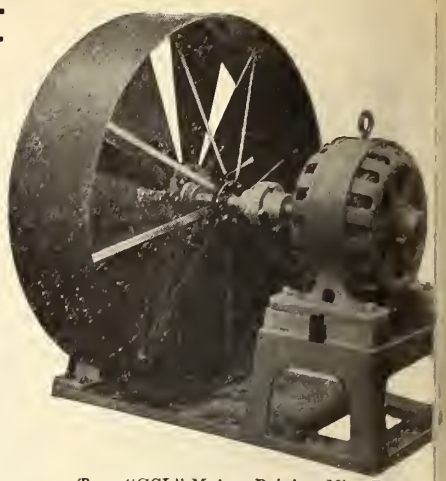

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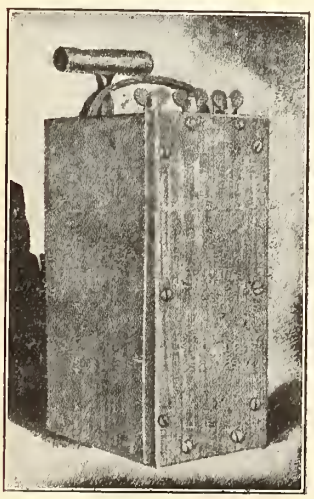

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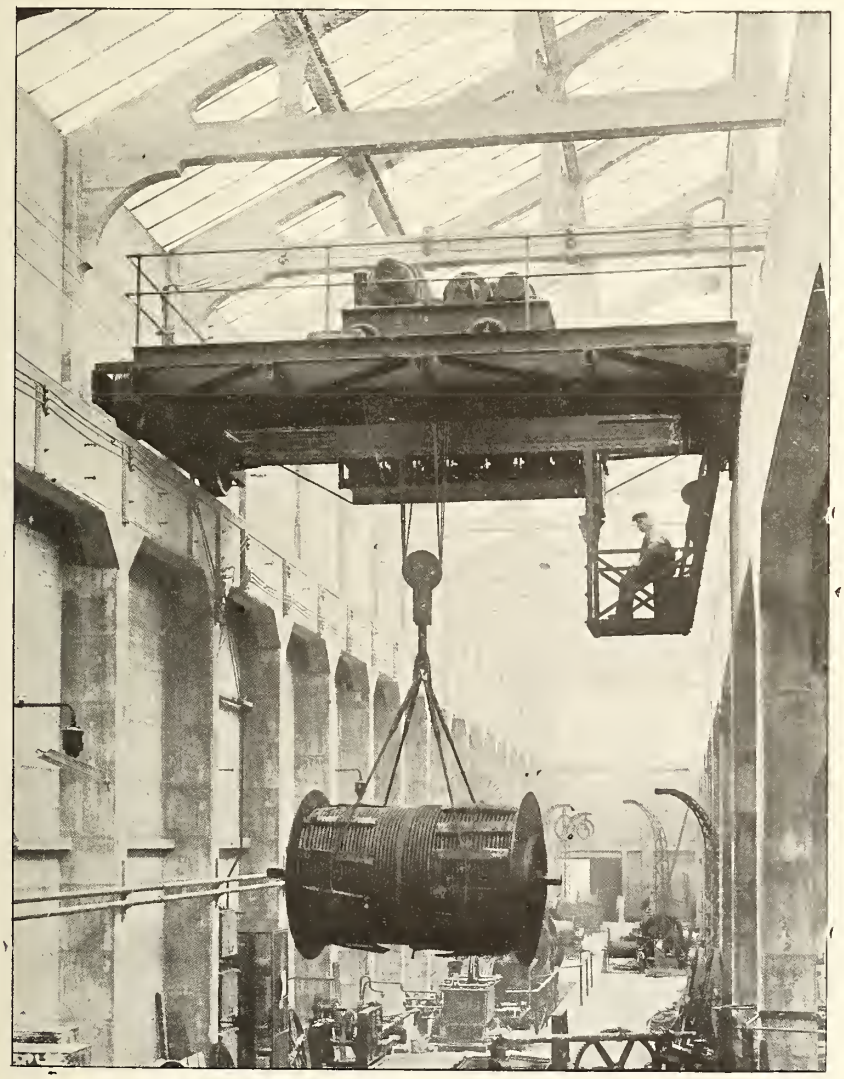

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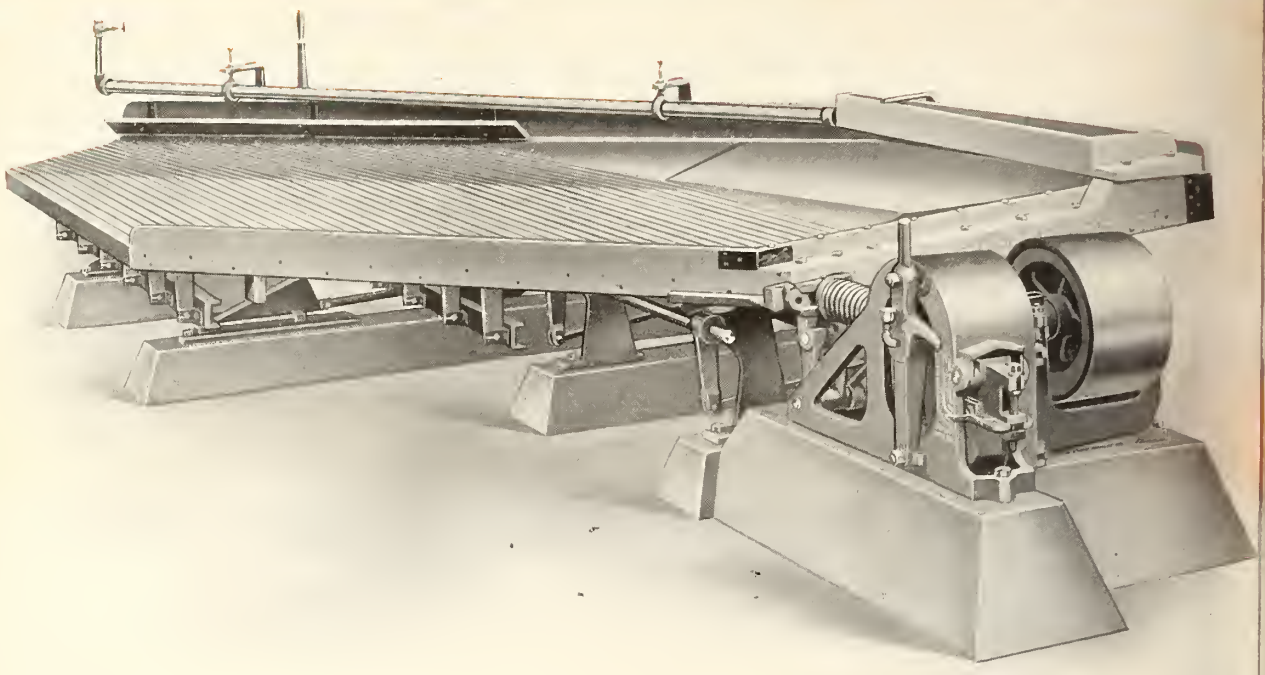

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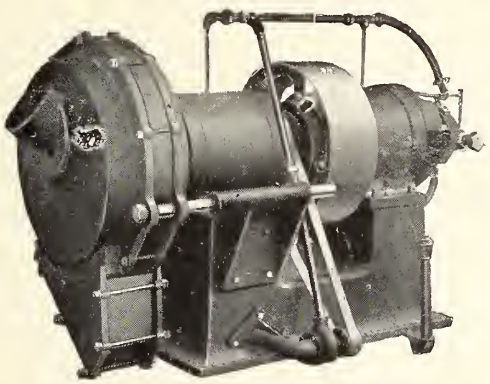

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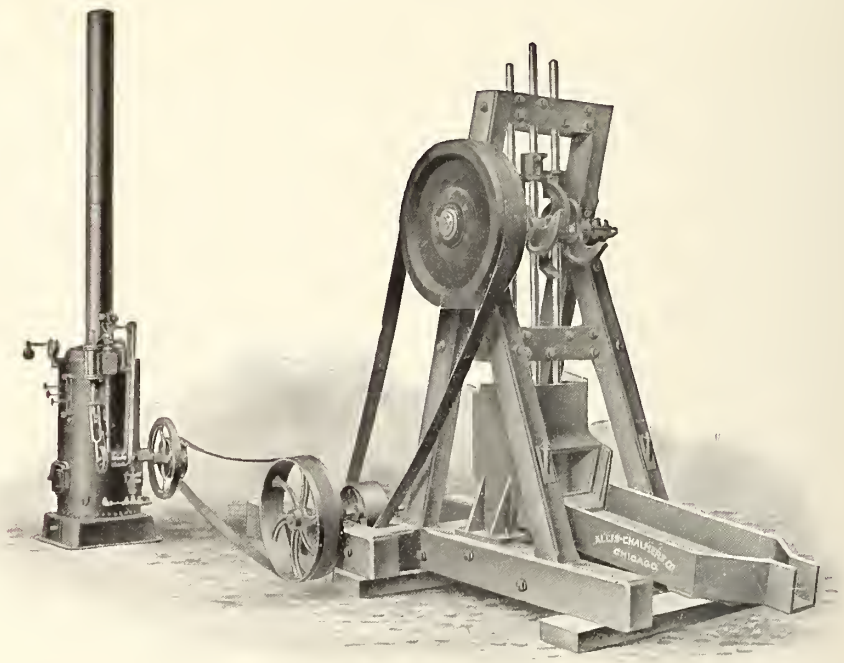

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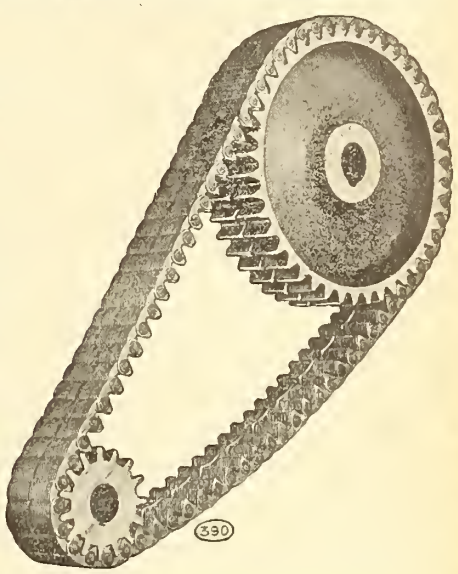

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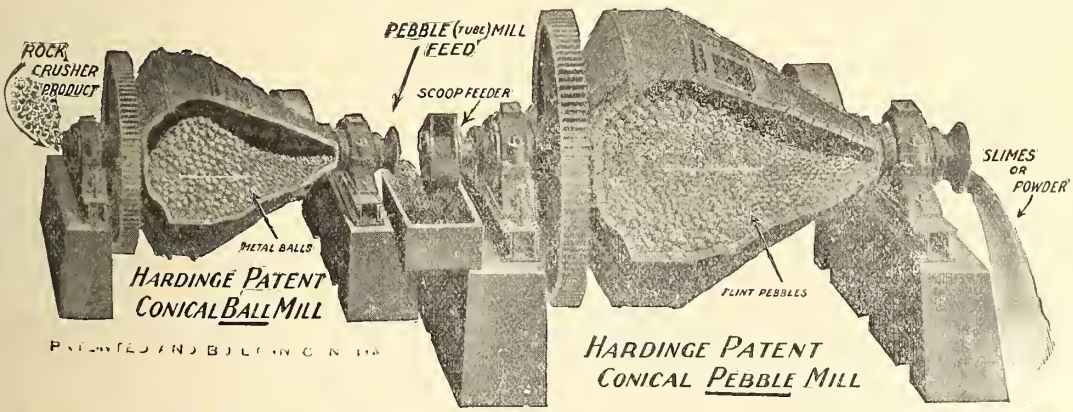

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raising, or upper hole drilling for any purpose will cost you least per foot of hole, or per cubic foot of ground removed, if your drills are

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Mine Managers who have conducted severe tests with Sullivan Stopers and with other makes, will tell you that this is so. They will tell you, too, that **great speed, high power economy,** and **remarkable freedom** from **breakage** and **wear** are factors in accomplishing this result.

Runners will tell you that the "DA21" works more **smoothly** and with **less jar** and **vibration** than other tools; also that it is easy to clean and care for because it contains **no screw joints,** and every part can be reached by loosening three nuts.

We want to tell you more about **what** this drill is doing and **how** it is able to do it.
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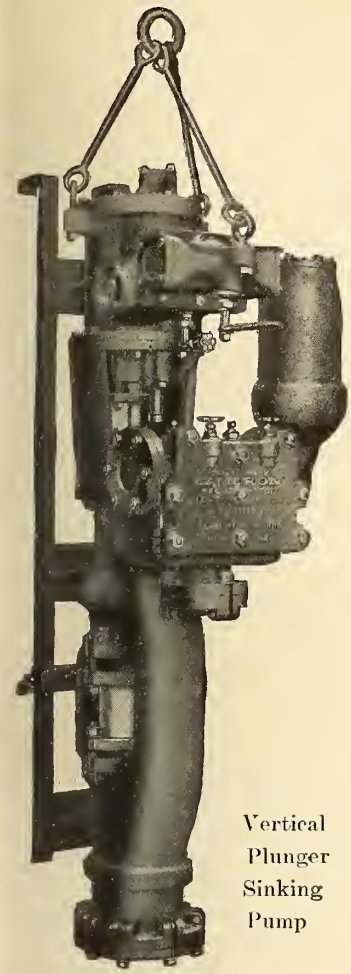

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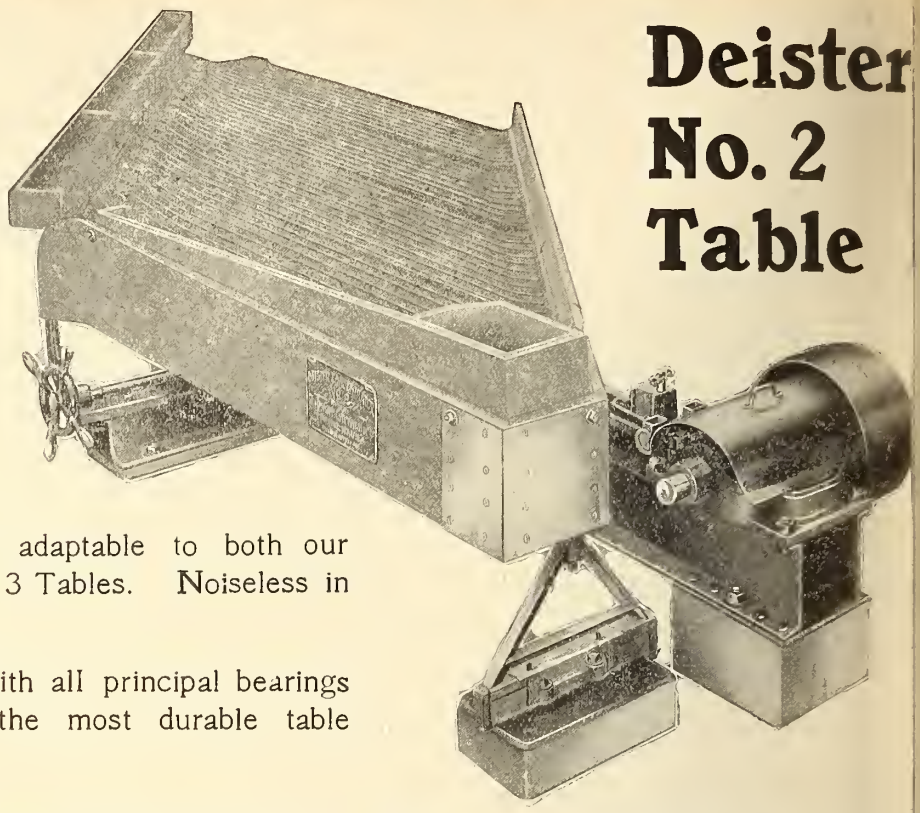
Table for slimes and feeds of 80 mesh and finer.



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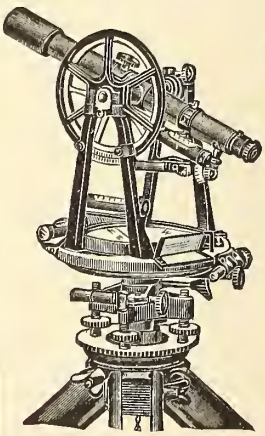

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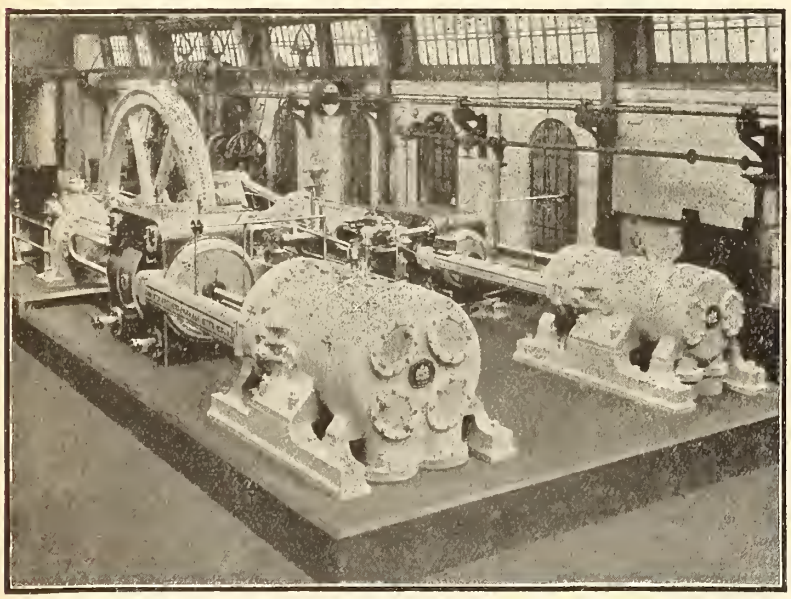

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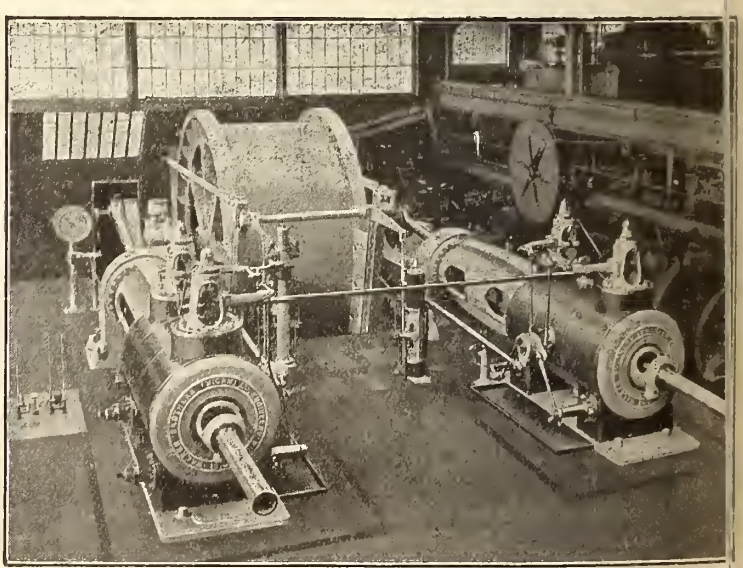

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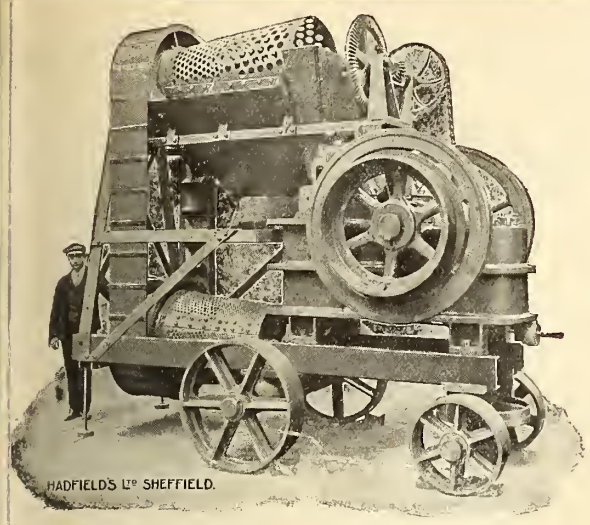

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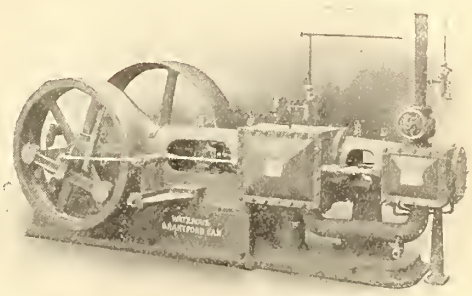

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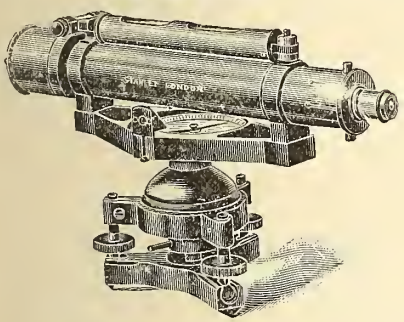

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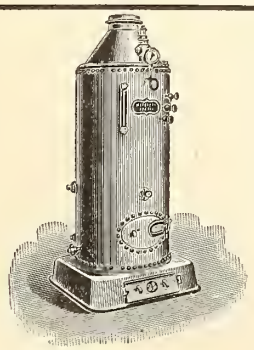

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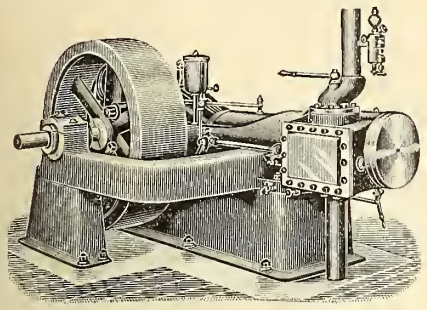

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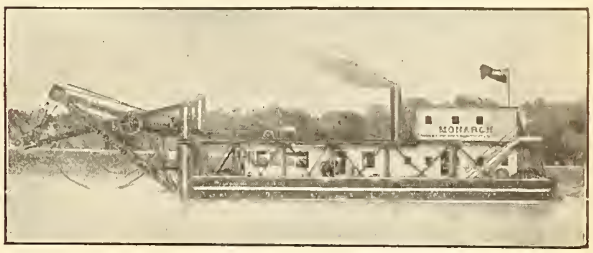

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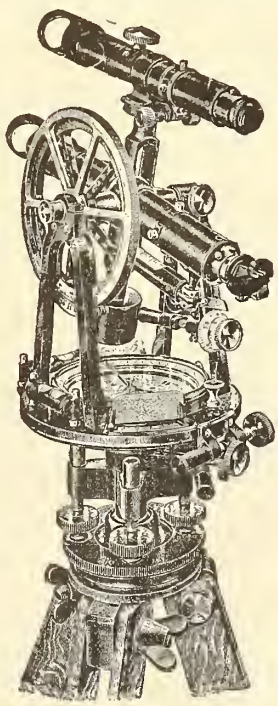

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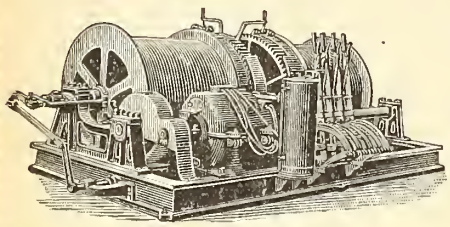

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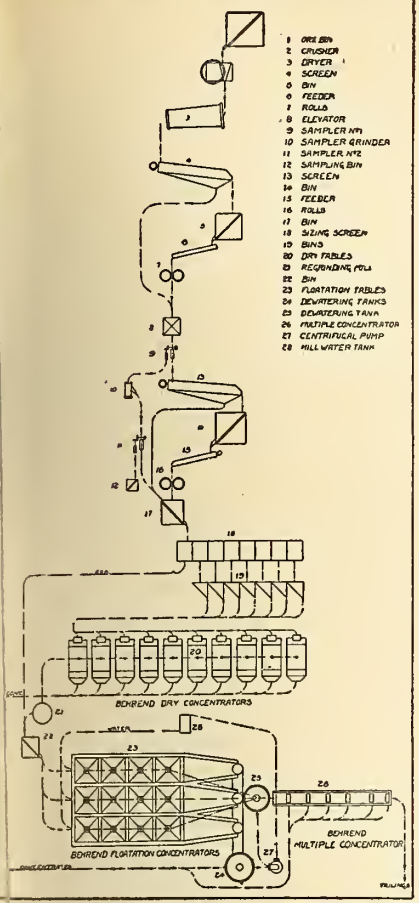

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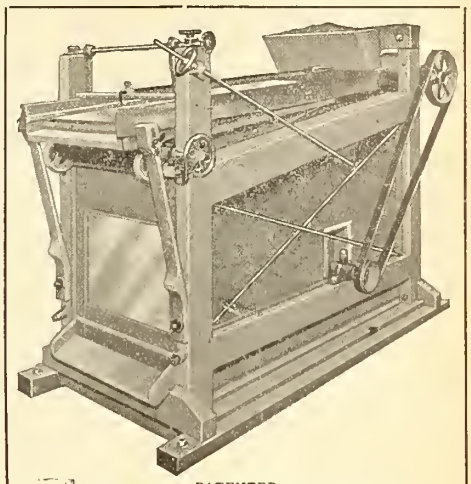

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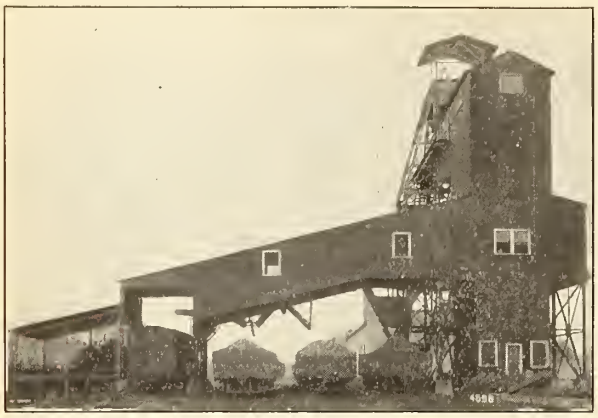

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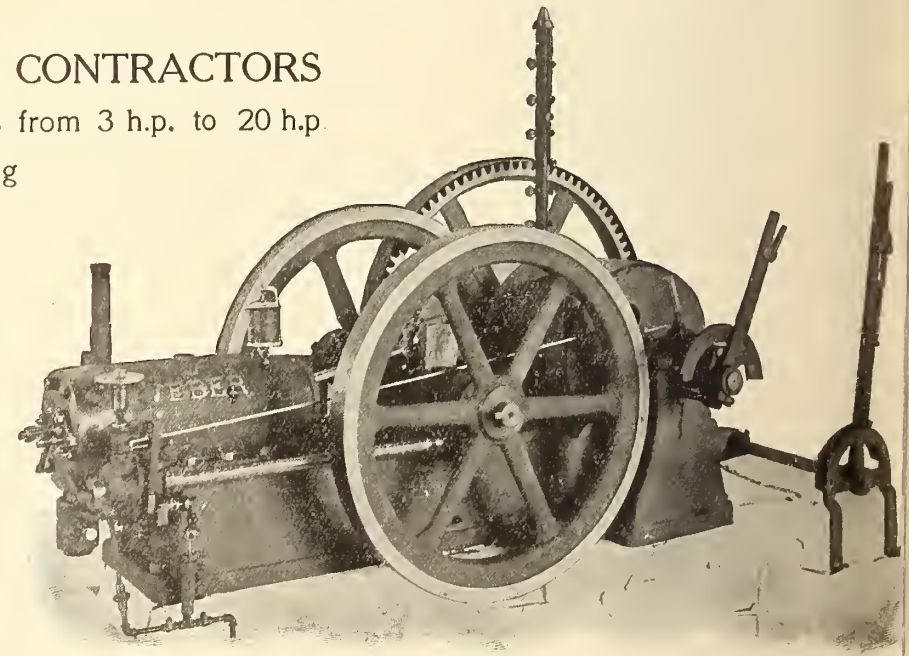

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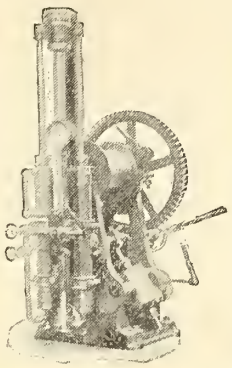

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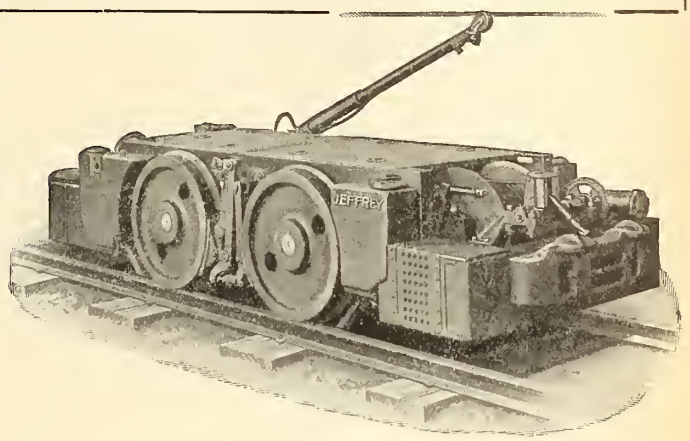

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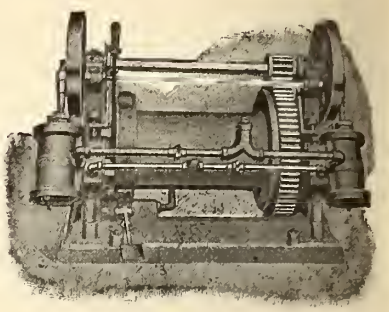

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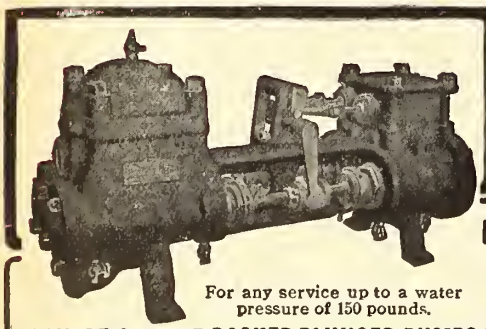

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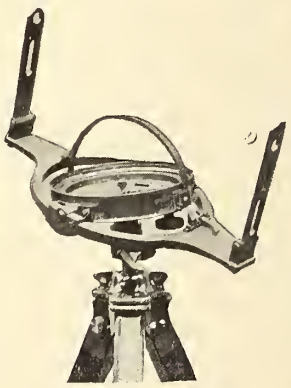

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THE CANADIAN MINING JOURNAL

VOL. XXXII. TORONTO, June 15, 1911 No. 12

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LONG LIVE THE KING!

The Coronation of King George and of his consort Queen Mary will have taken place in a few days. From all parts of the Empire British citizens have flocked to London to see the imposing pageant. From Canada alone, hundreds of official representatives and many private persons are now eagerly awaiting the day in London. But not in London will all loyalty be concentrated. Throughout Canada, as throughout all the Imperial domains, there is evident the warm throb of an Empire's devotion.

To Canadians the event is fraught with deep significance. The fates have ordained that of all Great Britain's self-governing children Canada should now be the strongest and most assertive. We have thrown off the swaddling clothes of infancy and are becoming conscious, perhaps too conscious, of waxing strength and growing bulk. But no diminution is apparent in the whole-heartedness with which we acclaim the accession of our titular head to the Imperial throne. Not even does the proposed readjustment of international trade relations dim the lustre of the occasion. But the fact that Canada has so large a voice in the Imperial Conference and the fact that weighty matters affecting the whole Empire are now under discussion at a time when the eyes of all civilized nations are turned towards London, make the present momentous.

It is not to be doubted that our cautious and astute Premier will refuse to commit his country to any fantastic antipodean scheme. Commerce and sentiment rule the world. Sentiment is apt to hold the reins when excitement runs high. Hence the danger at such a time as this.

But there is also the danger of failing to read the real meaning of a nation's existence. Commerce is not everything. We are perhaps quite as much swayed by considerations that have nothing to do with worldly gain, as by those that have. And, first and foremost, we neither wish nor intend to beg commercial or other favours of any nation on the face of the earth. A nation young, vigorous, and neither morbidly modest nor vauntingly vain, we desire above all to retain our identity, to work out our own destiny, and to live in harmony with our neighbours.

Yet, like the unassuming porcupine, an animal that goes its own way without molestation, we must prepare ourselves for self-defence. On the Atlantic and on the Pacific we possess vast coal resources. What the capture of these by a hostile power would mean may be left to the imagination. In this and other respects we are a standing temptation to any probable rival of Great Britain. Hence the tremendous import of the deliberations in London.

The pomp and circumstance that mark the Coronation are not idle display. The whole huge ceremonial will be not alone an opportunity for the exchange of courtesies between Great Britain and her sister nations—it will be a majestic demonstration of the fact that in power, in prestige, and in dignity Great Britain has gained ground. And it is peculiarly inspiring to think that from what were "colonies" and now are "Dominions" comes the moral and material support that the Mother Country needs.

There is another side, however. To Great Britain we owe the most profound debt that nation can owe to nation. Without Great Britain in the background our treaty-making, our plans for defence, and, indeed, our commercial development were a farce. To her navy, and to her gold, must be attributed a surprising proportion of our prosperity. The debt of obligation is still ours. This is sentiment, but it is sentiment that can be utilized as an impelling force in regulating, first, our commerce with the Empire, and. second, our commerce with other nations.

* * * * *

The King is soon to visit Canada. The welcome that he will receive here, unbounded as it may be, will express but feebly the desire of every true Canadian to be true to Canada and to the Empire.

A MODERN INSTANCE.

As an illustration both of the urgent need of revision of the regulations under which the Department of the Interior, Ottawa, administers Federal lands, and also of the anomalous situations that may arise, we shall recite here an actual instance that took place a few weeks ago.

Two men made application for a coal mining location in the west covering 5,160 acres. All the requirements of the regulations were fulfilled as regards staking, making proper application, and making the necessary deposits of $5 each. The stakers had then thirty days from the date of staking wherein to put in their application. After that application had been considered favourably by the Department at Ottawa, a process covering two months, they were given another thirty days in which to make payment of the annual rental of $1 per acre, a total of $5,120.

Being unable to raise the money, the men went to the place and, on the morning when their claims would have been cancelled for non-payment of the rental, they restaked the claims. Thus they succeeded by a very simple evasion of the law, in postponing payment of the rental for another three months.

This process might go on indefinitely. For obvious reasons it would be neither practicable nor seemly for anyone else to attempt to jump the claims. For equally obvious reasons it is not well that the regulations encourage this kind of evasion.

It has been suggested that the immediate payment of one years' lease—$1 per acre—be required, and that provision be made to return this money in case lands prove not available. No doubt this would more business-like. It might, of course, become a h ship to the prospector. But, as under present co tions the prospector is legally obliged to pay this a age tax and as only by acting contrary to the s of the regulations can he avoid payment, it is illog to continue the system that now obtains.

The loss of time, the sickening delay, the misun standings that arise in trying to control from Ott coal lands in the far west, are no longer tolerable. the Minister of the Interior a knowledge of mining vestment, or even a sense of humour, he would vo tarily forego the privilege of breeding confusion, st and all the ills that are engendered by long-dist maladministration.

PROSPECTING FOR GOLD.

In our issue of April 15, 1911, we referred editor at some length to a paper read by Mr. W. H. Pres the subject of prospecting in Nova Scotia. The p in question was a short and succinct presentatio the problems that confront the prospector and of methods that had best be followed.

In this issue of the CANADIAN MINING JOURNAL readers will find an ampler and far more compre sive view of the matter. Not only do the princ and points enunciated bear specifically upon Nova tian gold mining, but they also apply with equal to certain large tracts in New Brunswick and Qu that are known to be gold-bearing.

The moral that is deducible from Mr. Prest's a is that prospecting must be controlled by com sense. The vague wanderings of the boulder-crac bushman are of little use. The academic meande of the pure geologist are of less use. Only the ar and intelligent labours of the trained modern pector are calculated to bring results. The thoug man will know instinctively just what geological is of use to him, and he will use it along with his excogitations.

We firmly believe that, if the right steps are t Nova Scotia will yet vindicate itself as a gold-mi country. In any case, nothing could be more oppo than Mr. Prest's paper. We commend and endor

The Ontario Bureau of Mines has made an add to its staff in the person of Mr. T. F. Sutherland, is to be Assistant-Inspector of Mines. Mr. Suther is a graduate of the Kingston School of Mines. years ago he suffered his apprenticeship in the mines of Eastern Ontario. Since graduation he spent seven or eight years in mining in south-ea British Columbia and Portland Canal. He also miliar with Cobalt and Porcupine. Mr. Sutherl appointment, we confidently expect, will meet approval.

THE NATURAL ASSOCIATIONS OF GOLD.

Because in some senses the geology and metallurgy of gold are simple in principle there are many simple facts that are either overlooked or not co-ordinated.

In the current number of Economic Geology, Mr. Francis Church Lincoln contributes a long monograph on the natural associations of gold, dividing his subject into two parts—the associations of gold with rocks, and the associations of gold with minerals.

It is impracticable to touch upon more than a few features of Mr. Lincoln's paper. All of it deserves close study.

Discussing the impregnation and replacement of rock in the neighbourhood of a vein, the writer points out that in all probability the extent of these phenomena is not yet fully appreciated. Gold reported as primary may in reality be secondary. Samples that are taken at a safe distance from known mineralization may really represent rock that has undergone secondary enrichment. Microscopic examination of thin sections is the only certain means of determination.

The assayer's "trace" usually means less than ten cents per ton avoirdupois, equivalent to 166 milligrams per metric ton. In 46 tabulated assays of igneous rocks only four are recognized as absolutely indicating primary gold. The rest are set down as either "probable" or "possible." Of 25 of these rocks, seven are basic, six are intermediate, and twelve acid. Disregarding abnormally high results, the normal gold content of these igneous rocks appears to be between 60 and 80 milligrams per metric ton. The distribution of gold seems to be somewhat even, irrespective of the chemical composition of the rocks. But the data collected are too incomplete to admit of drawing definite conclusions. What evidence there is tends to prove an irregular distribution of minute amounts of gold and silver in igneous rocks, the gold averaging about four cents per ton avoirdupois, and the silver about six cents. There is no marked difference in gold content as between acid and basic igneous rocks, while silver content basic rocks are probably slightly higher than acid rocks.

Sea water, sub-crustal waters, rock salt, clays, coal, and many organic substances contain gold in pondérable amounts. One coal has been reported from Wyoming containing $1 to $5 per ton.

Gold occurs in sedimentary rocks almost universally. Pro determinations reported the value is roughly one cent per ton. The general conclusion appears to warrant that the coarser the rock the higher the gold content.

The origin of gold in completely metamorphosed rocks is a matter of speculation. Primary gold has been mined in metamorphic rocks and has been won commercially from important placer deposits.

Generally, no evidence can be adduced to show that the gold of igneous rocks segregates in the more basic or the more acid members. It has been seen that there are few authentic occurrences of primary gold in igneous rock. The concentration of 3½ cents in gold per ton in the same ratios that have obtained in known magmatic segregations of iron, nickel, and chromium, would develop ores running from a few cents to $144 per ton. No such segregations of gold have been found. The Klondike gold has been estimated by Mr. Lincoln to represent a saving of 2 cents per ton of rock (sedimentaries) eroded. But no commercially important placers derived from igneous rocks are known. Thus the assumption of extensive magmatic segregation of gold in igneous rocks is not justified by available facts.

We have outlined above, with many serious gaps, the trend of the first section of Mr. Lincoln's article—the section dealing with associations of gold with rocks. The last paragraph synopsises the geologic history of gold — the distribution through the igneous magma, the concentration by erosion, the formation of coarse- or fine-textured rocks with higher gold content, the metamorphism of these sedimentaries, etc. It is pointed out that, though of economic interest, veins are quantitatively unimportant.

The second part of the paper space does not permit us to cover. A lengthy discussion of the mineral associations of gold, well illustrated with diagrams and photogravures of rock slides, is followed by conclusions that briefly outline results so far attained. As throwing light upon the extraordinary richness of many ores in which no gold is visible either to the unaided eye or under the microscope, it is suggested that the same relations exist between gold and other minerals on a sub-microscopic scale as exist on microscopic and macroscopic scales.

* * * *

Few more instructive essays have appeared than this of Mr. Lincoln's. It should be read and digested.

THE DIFFUSION OF CAPITAL.

Mining booms are not unmitigated evils. They stir up public interest, and are instrumental in disseminating all kinds of mining news. From the Rossland boom there have survived several strong organizations. Likewise has the Cobalt boom brought into existence scores of prosperous operating companies. Both booms taught their lesson, and both brought ultimate good to the country. This does not by any means imply that we approve the boomster.

Looking back over the rise of Cobalt there are many incidents that, considered together, prove that New Ontario has done considerably more for Old Ontario than has the Old for the New. The impressive array of new houses built by Cobalt money in the best residential sections of Toronto, not to speak of multitudinous motor cars, is direct evidence. Some millions of dollars of money made in Cobalt have been invested in real estate in Toronto. Montreal, also, can

boast more than one modern business structure that owes its existence to Cobalt profits.

There is evident now another effect of capital created in New Ontario. Cobalt men and their associates are purchasing and developing mines in British Columbia, in Western and Eastern Ontario, in Quebec, and in Nova Scotia. Sheep Creek, B.C., Sturgeon Lake, Ont., and Killag, N.S., are some of the most notable illustrations. At these three localities investors who have been directly identified with Cobalt are supplying the necessary money.

Porcupine is really the child of Cobalt. In what condition Porcupine would now be were it not for Cobalt shekels we can only surmise. Porcupine, however, will be the means of infusing life into other mining camps, more especially, we think, into old mining camps that have fallen by the wayside.

Thus Cobalt and Porcupine are not provincial but national in their influence. The boom that is impending in Porcupine will carry in its train less of misfortune and more of good exactly as the investing public is correctly informed as to facts. If the camp survives the boom, every other gold-mining region in Canada will, sooner or later, reap the benefit.

This is the large meaning of successful mining. No other industry calls into play such immediate enthusiasm, nor does any other industry diffuse so widely the wealth that it begets.

EDITORIAL NOTES.

In our report of the annual general meeting of the Maritime Oilfields, published in our issue of May 15, we omitted mention of the fact that Dr. J. A. L. Henderson was the chairman. As his brother, Mr. W. Hope Henderson, is also on the board, the correction is made to prevent confusion.

The Canada Refining and Smelting Company's plant at Orillia is the latest addition to our Cobalt ore smelters.

BOOK REVIEW.

THE DAVIS HANDBOOK OF THE PORCUPINE GOLD DISTRICT—WITH A DIRECTORY OF INCORPORATED COMPANIES—By H. P. Davis—131 pages — Illustrated — Price, Paper Cover, $1; Cloth Cover, $1.50 — Published by H. P. Davis, 25 Broad Street, New York.

Mr. Davis' work in connection with Cobalt is known to many of our readers. The Davis Cobalt Handbook proved to be a boon as a ready source of reference. The Porcupine Handbook should be equally useful. Among its contents are an historical review, a directory of incorporated companies, an outline of the geology of the region, a description of some important properties, and a claim-map.

It is Mr. Davis' intention to revise the book from time to time.

As mentioned in our editorial columns, this volume is not to be confounded with the book now being brought out by the Canadian Mining Journal. two books are of widely different character. To a l extent they supplement each other.

PERSONAL AND GENERAL.

Mr. Mosco Vici, mining engineer of Monti against whom suit was brought by Mr. James A. Br of the same city, was honourably acquitted rece by Judge Langelier in the Court of Sessions. The had been decided some time ago; but, on Mr. M Vici's request, a re-hearing was granted. The mer decision did not completely exonerate him; latter decision does.

Mr. R. B. Lamb is in Porcupine.

Mr. Frank Loring is inspecting properties aro Sturgeon Lake.

Mr. O. N. Scott has returned from Europe.

Mr. J. Eakins, formerly manager of the Fo O'Brien, is in Toronto.

Mr. J. W. Astley has taken an office at 13 Mann Arcade Annex.

Mr. George F. McNaughton is staying for a sh time at the Arlington Hotel, Toronto.

Mr. Robert S. Stewart, of Trail, B.C., general ma ger of the Consolidated Mining and Smelting Comp of Canada, Limited, was in Toronto during the la part of May.

Mr. Frederic Keffer, of Greenwood, B.C., mining gineer for the British Columbia Copper Company, L has been to Franklin camp, north fork of Kettle Ri to arrange for commencing exploratory work on McKinley group, lately bonded by the company un option of purchase.

Mr. H. Mortimer-Lamb, secretary of the Canad Mining Institute, has returned to Montreal fron visit to British Columbia.

Mr. Alexander Sharp, of Orient, Washington, U.S mining engineer for Mr. P. Burns and associates about to remove to Calgary, Alberta, where his he quarters will be in future.

Mr. H. G. Stehli, superintendent of the Dwigh Lloyd Metallurgical Company, of New York City, been at Trail, B.C., superintending the starting of of the company's sintering plants, put in at the C solidated Company's smeltery.

Mr. Albert I. Goodell, formerly manager of the Mc real & Boston Company's copper smeltery at Bound Falls, B.C., and afterwards of the Le Roi Mining C pany's smeltery at Northport, Washington, U.S.A. now buying ore for the International Mining and Sm ing Company, of Salt Lake City, Utah.

Mr. C. P. Hill, managing director of the Hille Coal and Coke Company, has returned to western berta from a visit to Porcupine, Ontario.

Mr. I. L. Merrill, of Los Angeles, California, pr dent of the Hedley Gold Mining Company, and Mr. Walter Beam, of Denver, Colorado, have returned the United States from a visit to the company's Nic Plate mine and stamp mill in Similkameen distr British Columbia.

Mr. R. P. Williams, for many years representative western Canada of the Canadian Rand and Jene Machine companies, has entered the joint employ the Canadian Rand Company, Montreal, and the gersoll-Rand Company, of New York. He will w in connection with the Vancouver, B.C., and Seat Washington, offices of those companies.

PROSPECTING IN NOVA SCOTIA.

Written for the Canadian Mining Journal by
W. H. Prest.*

Having been asked to contribute a short paper on prospecting in Nova Scotia, I find it difficult to separate the actual work from the geological problems with which they are intimately associated. In fact, the methods and distribution of work can hardly be described without giving the reasons for such distribution and these reasons are chiefly geological. The mere sinking of pits and opening of trenches without system is not prospecting. Systematic work in this line means a programme arranged after a fair preliminary knowledge of rock structure, surface distribution, and origin of debris. This is all that can be learned by a surface examination and only serves as a guide to the location of trial pits. The first work in jobs of this kind in Nova Scotia is nearly always experimental and only lays bare local peculiarities of drift distribution. Only then can a method of working be devised that will insure economy and success. The following working programme seems to me to be most suitable for deep surface such as we have in Nova Scotia.

Location.

Prospecting in Nova Scotia is as a rule a far different matter from prospecting in Ontario and the west. In our circumscribed areas the wandering prospector has little place. The chance surface finds are nearly all made, and the prospector makes his home in or near an established mining camp. The largest area not intersected by good roads is a tract of about 1,000 square miles in the western part of the province, and it is only there that the prospector goes to his work in western style. The prospector's duties are now chiefly confined to tracing float and, as this is usually done in deep surface, his sphere of operations is limited. Within the limits of each district are usually two or three localities noted for the discovery of rich float. This is usually held under lease or license as our too liberal mining laws have resulted in nearly all mining land of any value being held without working conditions. This state of affairs leaves little new land worth prospecting, and if the owner does not or cannot do the work it remains undone. Rich float was found on some properties nearly 50 years ago, the source of which has not yet been discovered. Therefore the prospector is usually hired as he can seldom afford to work on shares and pay those who help him.

As a rule, the gold mining districts are well defined and surveyed, and within the limits of these districts nearly all the prospecting in Nova Scotia is done. The five counties of Guysboro, Halifax, Hants, Lunenburg, and Queens, contain nearly all the gold mines in Nova Scotia. In these counties are 50 or 60 localities in which rich float has been found, indicating the existence of still undiscovered veins. The search for these hidden veins is the work of the prospector of the future. It is not likely that much more rich float will be found on the surface, as even the farmers invariably examine and break every piece of quartz or heavy rock they find. But the float already found points to many years of trenching and shaft sinking. In them we have the source of much probable profit as some of this float is very rich.

*Mining Engineer, Bedford, Nova Scotia.

Outfit.

In the early history of gold mining in Nova Scotia a prospector's outfit would not have called for much comment—a pick, a pan, a kettle, an axe, a few pounds of food, and the inseparable pipe, tobacco, and matches. Tent and blankets were luxuries to be despised by any man who desired an honourable reputation for hardihood. Camp and dishes grew on every white birch tree and every prospector had Indian lore enough to strip the bark and make them.

Now, however, all this is changed. The work is harder, the surface is deeper, and the prospector more particular. Now an outfit for ordinary work will include, say, one dozen heavy cast steel single pointed picks, one-half dozen long-handled pointed steel shovels for surface work, three short-handled pointed steel shovels for underground work, one stone hammer, one striking hammer, one blacksmith's hammer, one crowbar, one prospecting pick, one half-dozen short drills, one miner's spoon, two axes, three zinc pails, one gold pan, one pocket lens, one pocket compass, one handsaw, one blacksmith's file, two saw files, one cold chisel, one pair tongs, one 1½-inch augur, one keg (100 lbs.) of mixed 5 and 7-inch spikes, 25 pounds 3½-inch nails, ⅜-inch rod iron, hoop iron, one iron bound rock tub, one water barrel, 50 feet 1-inch rope with grummet, one 5-foot x 5-inch windlass with cranks and standards, one portable forge, one combined anvil and vice, one diaphragm hand pump with 2½-inch suction. Repair material for forge, pump, tub, and windlass. Lumber (1-inch) for spouts and other purposes; 1½-inch lumber for lagging, dump box, etc. Dynamite fuse and detonators, say enough for 20 shots. Camping and cooking outfit for at least four men. At least one month's provisions. A boarding house or even an empty house near by will greatly facilitate the work. The modern prospector in Nova Scotia must be prepared for trenching, shaft sinking, or tunnelling as conditions demand. The outfit also includes to an extent that it never did before, a knowledge of structural and glacial geology. In the new order of things the wandering prospector occupies but little space, therefore I can be excused for not describing farther a fast-vanishing phase in this occupation.

Before leaving this part of the subject I may say that the pay of a cook is often saved for more effectual work by including a few barrels of hard bread in the provision list. Not the kind that weak-mouthed home-stayers usually call hard tack, but those that the old-time British tars used to repel boarders with. Compact and nourishing, but durable as wood, I pity the martyrs to toothache who cannot eat them or will not try. My toothache stopped when I began their use twenty years ago.

Mapping.

This important preliminary to prospecting is usually neglected here, as elsewhere. If the Government maps have been published they are often used. The general maps are drawn on a scale of 1 inch to 1 mile, the district maps on a scale of 1 inch to 250 feet. These maps, which I may call Mr. Faribault's life work, cover about three-quarters the area of our gold bearing rocks and are well worth the time spent on them. Once done, the work will last for many generations. The struc-

tural geology and details of past mining operations are given with as much detail as the scale will allow. But for the prospector's use this information must be supplemented by much greater detail in depth of surface, distribution of drift, and surface contour. Therefore, a special survey should be made connecting with the nearest Government marks, and the results embodied in a map on a scale of at least 40 feet to 1-inch. This will enable details to be noted down even as small as one or two feet. On this plan should be noted down details of geological structure, surface contour, drainage, depth of drift, course of glacial transportation, and distribution of gold bearing float. Position and depth of pits already dug should be noted. These pits, as well as others to be dug, should be numbered and details of each as far as known entered in a note-book for comparison with other work. Previous work should furnish valuable information, but as a rule, through careless observation or exaggeration, the exact truth is hard to get at. Under these circumstances verification is necessary and this can only be obtained by sinking new shafts. A mere sketch map will hardly do, as the amount of money involved is often too much to risk through careless work of any kind. A little practice with an ordinary land compass will enable almost anyone to make a fairly accurate plan of the locality chosen for the work. Mr. Faribault's excellent maps can be used as a basis for a larger and more detailed plan, though it will be some years yet ere his work will reach the western end of the province. One day's surveying should furnish ample information for a working plan.

Panning.

Panning lessens the heavy preliminary work by making the mapped information more effective. It draws within closer limits the boundaries of gold distribution, defines the areas of coarse and fine gold and gives the prospector a centre of distribution as a safe location for pit sinking and trenching. It usually confirms the conclusions derived from the surface distribution of gold bearing quartz and saves the waste of time and labour on large barren areas which formerly characterized prospecting in Nova Scotia.

Panning can be done on samples from old dumps, surface soil, beds of brooks, and the sides of pits and trenches when above water level. About 200 pans, if possible, should be taken and a strictly exact record be kept of all results, viz.: location of samples and number of pans from each location, character and composition of drift (as a clue to its source), and number of colours from each pan. When this is done it will furnish two valuable bits of information, viz.: 1st, where your rich vein probably is, and, 2nd, almost equally important, where it is not.

Information derived from panning to be classified as follows: 1st, colours—divided into four sizes, the smallest seen only with a pocket lens, represented as a,b,c, d; thus 7a, 3b, 4c, 2d, means seven colours of the size a, three colours of the size b, etc. 2nd, sights, divided into four sizes, e,f,g,h; 3rd, shotty gold, divided into four sizes, i, j, k, l. 4th, nuggets, divided into four sizes, m, n, o, p.

Enter on your map a summary of these results by drawing a line around the outer limit of gold distribution. Draw another line enclosing the outer limit of the shotty gold and largest sights. This inner line will enclose your centre of distribution, within which, or at the northern extremity of which, the most of your future work will be done. The character of the debris in which your coarsest gold is found will in cases represent the character of the rock in w your rich vein is located. Two men, a panner a helper, should put this part of the work throug four or five days.

Test Shaft.

Another important part of the preliminary w especially where little or no work has been don fore, is a test pit. This, in order to find out i float gold is present in the upper, middle or l portion, or throughout the whole depth of the d to be cut through in future work. If gold is pr in only the upper layers of drift the source of probably some distance away and the pits ca placed at considerable distances apart and muc bour saved. If the upper layers only contain there is no need to sink through the barren drif low. If gold is present only in the bottom laye deep drift the vein searched for is probably no away and great care should be exercised in the tion of ground for new pits. Various other impo facts may be brought to light which would affect l ly the cost and location of future work. A test should always be sunk to bed rock within the l of the richest pannings or float ore, but near its thern or upper margin. A sectional plan shou made on a scale of 1 inch to 1 foot, or at least enough to contain marginal notes, thus saving con reference to a note book. The following facts shou noted:—

1st. The sub-divisions of drift, with depth, thick slope, mode of formation, and composition of Number each layer for future reference.

2nd. Pan tests of each layer with results grad before mentioned, and noted on plan of shaft a map of areas.

3rd. Absence or presence of gold bearing float, tity and apparent value per ton, number, size, d of wear, and character of each variety, with asso minerals, as a means of identification.

4th. Details concerning bed rock, such as dip, s cleavage, and results and courses of glacial acti

5th. Depth of water level, estimated quanti water per day. This item often bears strong the cost of work.

6th. Size of shaft and number of tubs of hoisted.

7th. Cribbage-cost of material and time.

8th. Number of days' work with estimate of for each part. The last four items are necessary fair estimate of the cost of future work.

All the gold bearing quartz from the test should be kept for comparison with that from shafts. They should be numbered and arranged orderly manner in boxes.

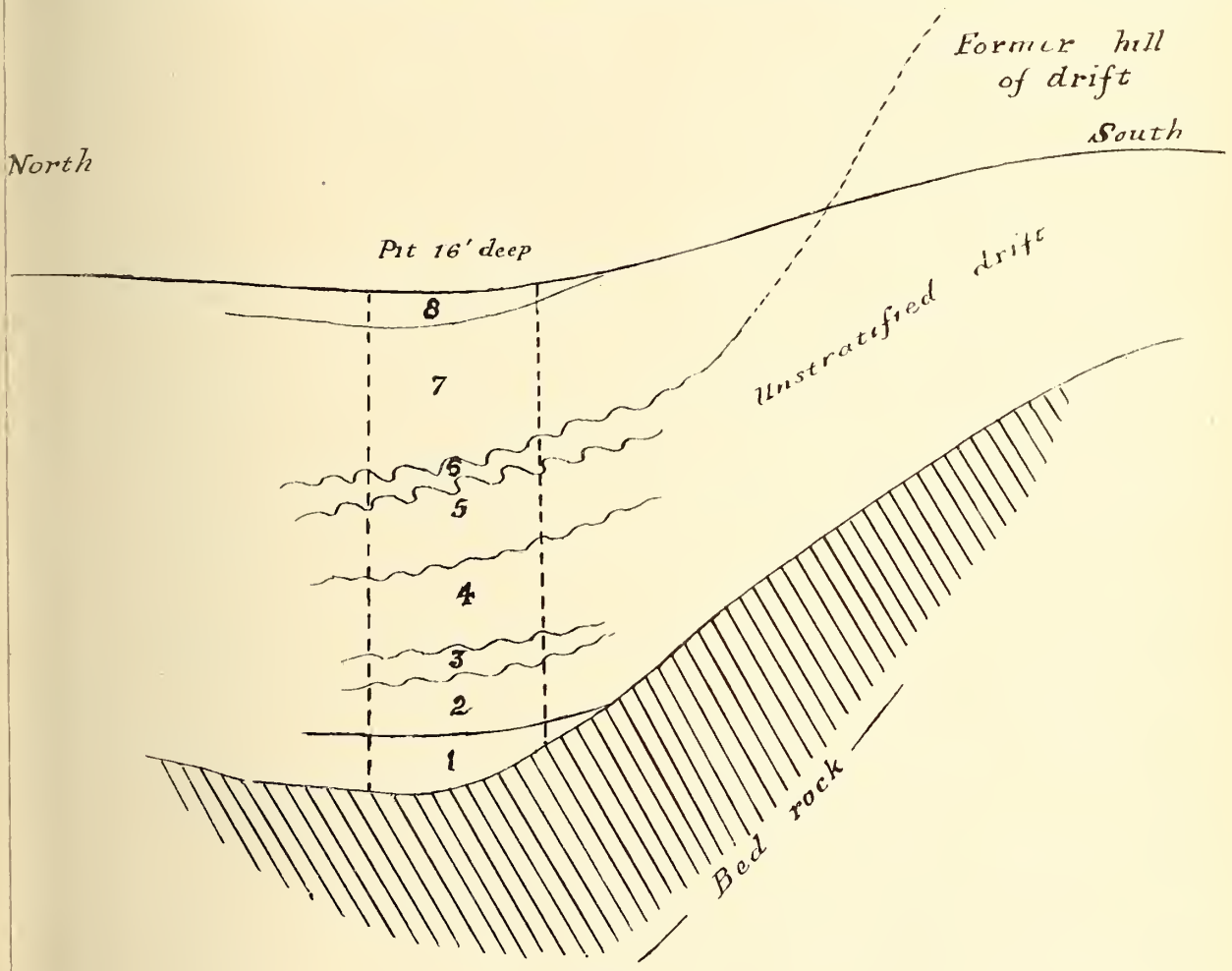
Sectional Plan.

The test shaft finished and the regular work there should be some simple way of showing and at a glance the progress of the work. Fo purpose a sectional plan should be made on a s at least 40 feet to 1 inch. In deep surface such a of facts is very necessary as mistakes under suc ditions would be costly. On this plan should the test shaft as well as every other pit that can cluded in its line of section. The different lay drift could thus be traced through each pit an contents compared and much valuable infor gained concerning the origin and distribution

gold. Details should be entered in a note book mparison whenever necessary.

The Regular Work.

th the understanding that deep surface is as usual operated in, we will describe the next step in the ramme. If help is plentiful two or three pits ould be started in the most likely direction to save me. These pits need not be sunk any deeper than the gold bearing layer, unless strong evidence of post-Glacial action leads us to suspect that the original course of the rich float has been deflected or reversed. Should all these pits be in gold bearing drift, the next set of pits could be put down in the same direction, abreast of each other as in the former case. Should ever, an open trench well bottomed would not be costly. If the sectional plan is on a small scale a plan of each pit should also be kept on which all details of stratification, composition, panning records, and finds of rich float could be entered. These could be compared from time to time and the information gained applied to the work in hand. Of course, we must not expect to find a perfectly orderly arrangement of beds in any one section of mining land. Some pits will contain more or less strata than others, and the corresponding layers may be identified, sometimes by means of a peculiar kind of ore or rock, or by its waterworn condition, or the general composition of the layer, or perhaps by its state of oxidation. Then it is not un-



No 1

t to the right contain no gold the next set of pits ould be sunk farther to the left, and vice versa, er to keep on the course of the drift transportation. The float gold being distributed from the pay-streak in a somewhat fan-shaped form, the area to be prospected will become more and more contracted as you proceed. At last a single pit at each advance will be all that is necessary, except in case of deviation of the float gold from the general course of drift transportation. Approaching the source of the gold the richest float is usually on or near the bed rock. Here the most care is needed in tracing the float, as it is often entirely absent near the vein from which it came. The above procedure is best for deep or fairly deep surface, the sinking of pits only to the gold bearing stratum and their location in well chosen positions saves much time and money. In shallow surface, however, it is common to find two beds containing float gold from the same vein, but these are usually the product of two different periods of erosion and hence are transported in somewhat different directions.

Problems in Prospecting—No. 1.

Inseparable from prospecting in Nova Scotia is the necessity of being able to explain some of the numerous problems in glacial and structural geology, which are continually coming before the prospector. They oppose him at every turn and unless he has a particular aptitude for the study of nature's lessons, fate usually marks him for a failure. Having no capital, it is of little use to talk to him about the employment of a specialist.

Some of these problems are quite simple, while others tax the knowledge of the geologist. The above from Gold River, N.S., is a sample:

1. Deposit of coarse mixed debris with gold bearing quartz, much waterworn and with a current of water running through it to lower land farther east. It was evidently the bed of a brook running over a rich vein farther west.

2. Unstratified drift of quartzite, sand, and clay.

3. Stratified drift, gravel, sand, and clay, with a little gold bearing quartz.

4. Unstratified drift of same character as 2.

5. Stratified drift becoming more sandy and finer in its upper part where it contained some clay.

6. Fine dark clay with pine and spruce cones, beech nuts, birch bark and various seeds and leaves, and remains of water plants and water bugs. The whole was crumpled into small folds.

7. Unstratified drift.

8. Stratified drift, chiefly granite gravel.

This shaft showed gold in the bottom layer. Under ordinary conditions the prospector would search to the north for the source of the gold. But in face of the unusual conditions shown in the plan it was evident that here was a problem needing investigation. Without detailing the various steps in this investigation, I will give the conclusions arrived at. Surface conditions—a high bluff of glacial drift to the south, a lower one to the north, a miry bog—the site of a former lake to the east, a slight ascent to the west. West of this pit about 250 feet was a gold bearing vein. A brook ran from the vein to the pit carrying with it fragments of gold bearing quartz and fine gold, forming bed No. 1, and undermining the bluff or hill to the south. Then came a fall of earth from the bluff forming bed No. 2. This partly stopped the brook but allowed some fine gold bearing material to flow down and form bed No. 3. Then followed another erosive stage resulting in another fall of earth—bed No. 4. This completely stopped the brook and formed a pond which afterward found an outlet toward the west. In this pond the wave wash stratified the upper portion of the last fall of earth into bed No. 5. Then succeeded a period of quiet during which a forest grew and grass, flags, and other water plants filled the pond. Water bugs crawled, cones, nuts, twigs, and leaves fell and were buried and humus accumulated. The presence of beech nuts here led to the further discovery of a former brook flowing north into the pond from a former lake one-half mile to the south. This lake is now a miry bog with a hill on its western side, the only place in the neighbourhood where beech trees can be found. The brook leading from this former lake is now filled with sand carrying gold, the source of which has not yet been discovered.

After a long and quiet period, the whole bluff to the south slid down the slanting surface of the glacier planed rock corrugating the muddy pond border. Then it suddenly gave way and buried the shore line with its vegetation under 5 feet of unstratified drift, forming bed No. 7. Then followed a slow surface wash from the hills on both sides forming the partly stratified bed No. 8. As this shows stratification, the water to which it over must have been turned to the east because of the stopping of the western outlet.

Here is an example in which a moderate knowledge of glacial geology is of great importance. Here was gathered together debris from different sources, transported from different directions, and under different conditions. The source of the rich float in the pit bed would, under ordinary conditions, have been searched for to the north, whereas it came from the west.

Problems in Prospecting—No. 2.

This example is from West Caledonia, N.S. The solution was an accident. For a long time the source of the rich float found here was supposed as usual to be to the north. Though two plans should illustrate this, a careful reading of the text will make it understood.

1. Lead, course N. by W., and S. by E.; the source of the rich float found in the neighbourhood.

2. General course of float transportation during Glacial age.

3. Deflected course of transportation in post-Glacial times.

4. Unmodified drift without gold.

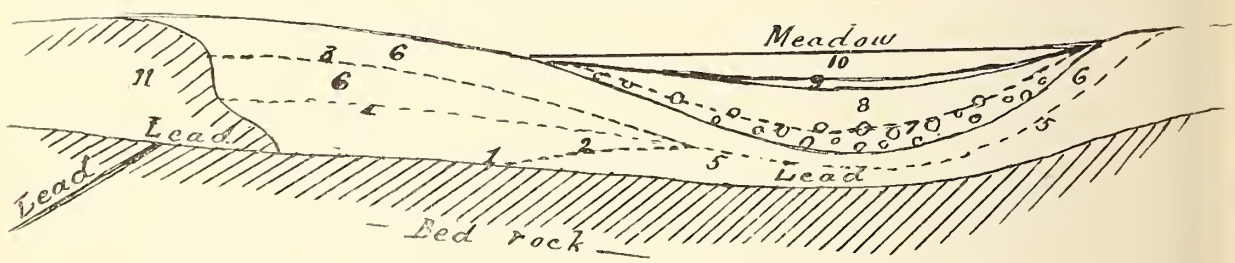
5. Unmodified drift containing gold.

6. Partly stratified drift containing gold.

7. Barren sand, gravel, and boulders from a higher level up stream.

8. Quicksand.

9. Fragments of wood, leaves, water plants and shells.



No. 2.

10. Peat and swamp muck.

The true explanation in this case seems to be the following. The debris from the vein was pushed down a gentle slope to the south by the general glacier. Then during post-Glacial times the gold bearing drift was cut away near its source, by a stream flowing to the southwest. This removed a large part of the drift to the northeast, jamming a gold bearing boulder into a crack in the south side of the bluff or ledge 11. As this boulder could not have been thrust in from the north, I was convinced that this portion of the gold bearing came from the south. In pursuance of this new idea, the vein searched for was soon after found. The expansion and transporting power of ice doubtless was accountable for a large part of the transportation to the northeast. After a time the debris formed a dam about 100 yards down stream. Behind this, gravel and sand accumulated until the brook turned in another direction, left a pond behind it. In this, peat grew and the water gradually drained away until a forest covered the peat, which finally gave place to the present meadow.

Problems in Prospecting—No. 3.

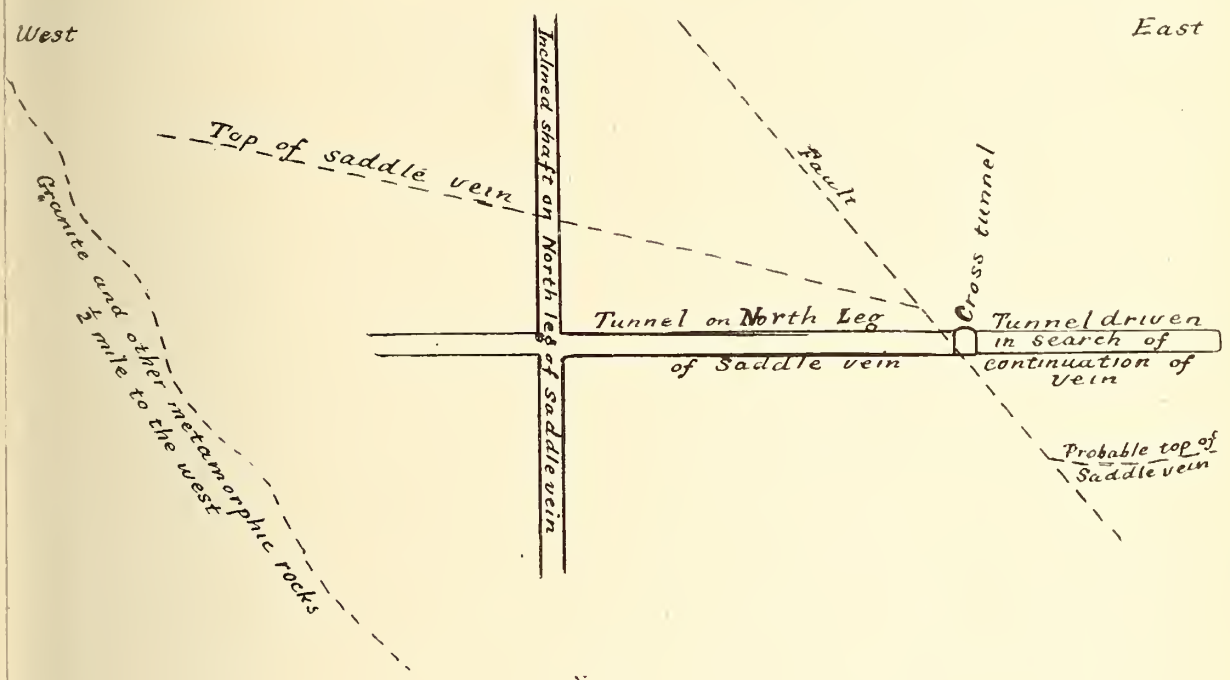
erground section in Mooseland, N.S.

e angles of dip and proportionate length of are only approximate, this sketeh will give a ea of a problem that eost the Mooseland Gold Company much money and disappointment. prospeetors despised geology, and the eastern on of the vein still remains unopened. The ting tunnel was first carried east along the of the antieline in the belief that the apex of ldle vein would be cut in its downward piteh to t. Failing in this, the tunnel was turned to the o ent the south leg of the vein. This plan also for the simple reason that the vein was not there.

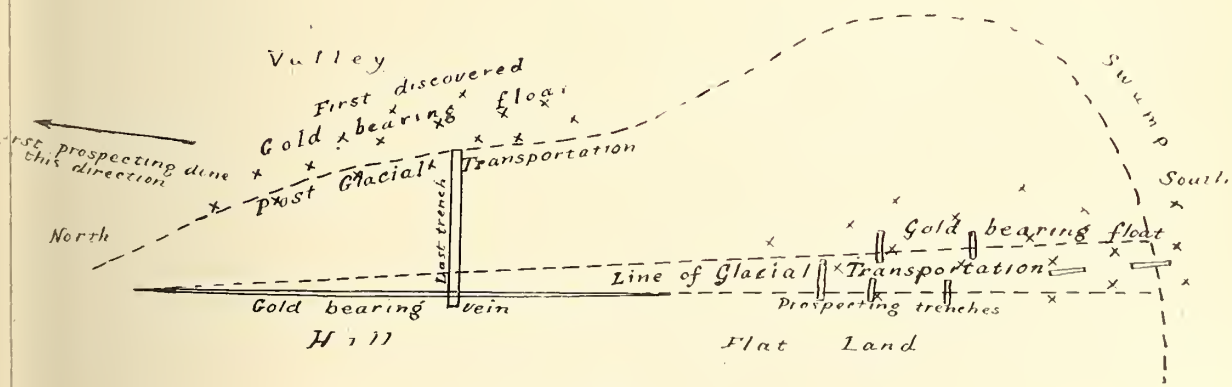
Problems in Prospecting—No. 4.

Spectacle Lakes, Lunenburg Co., N.S., Surfaee plan.

About 20 years ago large gold bearing boulders were noticed along the west side of a valley near Spectacle and Dares Lakes, and considerable prospecting done; as usual, in a northerly direction. At a short distanee the boulders disappeared and no vein was found. About 15 years ago I found, about a quarter-mile further south, another deposit of float ore, and put down a couple of trenches parallel to the line of drift. Beeoming convinced that the vein ran north and south, I put the next trenches across the line of drift. Then, as an examination of the other deposit of float ore made it evident that both eame from the same vein, I transferred my operations to the long trench which


West
East
Top of saddle vein
Inclined shaft on North leg of saddle vein
Fault
Cross tunnel
Granite and other metamorphic rocks ½ mile to the west
Tunnel on North Leg of Saddle vein
Tunnel driven in search of continuation of vein
Probable top of Saddle vein

No 3.



No. 4.

The evidenee available points to the following as the true explanation of the problem. Maintaining the metamorphic origin of the granite of Nova Seotia, this rock in eooling contraeted. This contraetion resulted in fault parallel to the boundary of the formerly molten mass. The western side of the fault being drawn toward the shrinking granite, left an opening into which the overhanging eastern side settled, thus bringing the higher strata on the eastern side opposite lower strata on the western side. The vertical displacement is still unknown.

crosses the vein. The deposit of float at the foot of the hill was evidently the result of erosion by subaerial influences in post-Glacial times. The discovery of the vein the next day, up the hillside and beneath only two feet of soil, eonfirmed my views. The general course of glaciation during the Glacial age was south a little east. Then eame the retreat of the eontinental iee sheet, while the province was still submerged; the deposition of the clays and sands which underlie the post-Glacial ore deposit here shown; then the deposit of the ore as mentioned in the valley east of the vein,

after the elevation of the land had made some progress. The action of frost, the flow of water, and the force of gravity, were ample causes for the transportation of ore from the higher to the lower level. This is a common occurrence in hilly countries, but is not often taken into consideration in this land of deep drift, where the finding of a vein so near the surface is a very unusual event. This problem is given as a sample of one of the simplest we have, but difficult only because we seldom expect it. However, there are in some of the eastern districts deposits of glacial debris modified by post-Glacial influences to a far less extent than in the above case, owing to the land being level, the surface deep, and brooks or lakes absent.

These few examples show the great variety of problems facing the prospector in Nova Scotia. Not only must he be a man of unlimited resource and skill in the manual work necessary, where money is doled out so sparingly as here, but he must be an adept the solving of riddles in structural and Glacial g ogy. With a proper training on lines indicated in th going article, I believe we would hear of fewe fa ures in prospecting. A revival of gold mining in Scotia should result from the finding of some long-hidden bonanzas, without reference to p known values. A prospectors' handbook, shorn f technical terms, and worded in the phraseology mucker, should find a ready sale here. Its use is pensable to the modern prospector in deep s yet I do not know that such a special work as t ever been published.

I shall close with the hope that the foregoin gestions and examples may be of use to some on like myself, has had to spend time and labour solving without instruction of the numerous pr facing the prospector.

OUR EUROPEAN LETTER

OUR EUROPEAN LETTER

South African mines a drug on the London market—Reasons Discussed — Reports of important properties — Tin and copper mining — Northern Nigeria and its tin pressing forward — Revival of Russian mining — An echo of the Whitaker Wright smash—British coal masters and thin seam mining.

(Exclusive correspondence to CANADIAN MINING JOURNAL.)

London, May 19th, 1911.

South African mining companies on the London and provincial Stock Exchanges continue to be so negligible that the monthly statements of the gold output and labour situation have very little influence. Certainly very good returns are almost without effect upon the market, though possibly if very bad ones came there would be an appreciable decline owing to the lack of support. The gold output for April shows a decrease compared with March of 8,351 ounces, but this is considered satisfactory seeing that March contained one working day more. It is pointed out, too, that the return represents a value of $1,033,660 in excess of that of April last year, and is a "record" for a 30-day month. The average daily yield for April from the Witwatersrand mines alone, 21,280 ounces, shows an increase on March of 337 ounces. The number of natives employed by mining companies forming the Witwatersrand Native Labour Association is higher now than ever before, and at 213,111 shows an increase of 11,000 on the month. This is the more satisfactory, having regard to the expected growing efficiency of the raw "boys" recruited during the past three or four months. In April last year the total number of natives employed was 206,680, and since then the figure has been below 195,000. The Rand, therefore, has not missed the Chinese coolies.

Many theories are propounded for the absence of public interest. It has been attributed to the operations of the "shops" who are accused of artificially raising or depressing shares under their control as it suited their books; to the surfeit of gambling in rubber and oil shares; to the Wernher-Beit Rand Mines "deal"; to what was thought to be the unfriendly attitude of the Union of South Africa Government in bringing forward adverse legislation; and to a condition of labour shortage resulting in higher working costs and smaller returns. With respect to th mentioned factor, a private telegram was re from Johannesburg on April 21st stating that monthly meeting of the Transvaal Chamber of the president expressed the opinion that by O 1st next there would be very few if any less employed on the mines than to-day.

The sixteenth annual report of the Rand Limited, a very important and bulky docume cludes a full report of the annual meeting h March last. At this the remarks of R. W Schu were of unusual interest. In view of the last returns, showing the employment of a larger n of "boys" on the Rand than ever before, it strange to read the Rand Mines' chairman's stat that scarcity of native labour does exist, and one serious cloud on the horizon. The natives n ing recruited are, he says, of inferior physiqu at all events, for the first few months, are not ve cient workers, while a great drawback has be exceedingly high death-rate among them. It is able, too, that with the increase of development more labourers than formerly are wanted. The dy in the opinion of Mr. Schumacher, is to trai white men for using machine drills. The grea gress made in mining by the more extended machine drills, the electrification of mine plant proved methods of handling ore, and the bett commodation of white and coloured employee opening up, he said, a new era in mining. A which created great interest in London, and for was a depressing market factor, was the purch shares from the Wernher-Beit group. In defe this the chairman pointed out that it is good poli the Rand Mines to acquire such important in and thereby extend the scope of their operations nine companies in which it is proposed that the Mines should acquire interests are all mines with areas, and of these the eight companies already have a grade above the average of the fields. chairman's speech treated the whole subject of mining most comprehensively, and a perusal would repay those interested.

The Barnato group of seven important Ran panies has just issued reports which compare vourably on the whole with 1909. Two concern

, but the remaining five have distinctly fallen The net profit of the Consolidated Langlaage as fallen from $520,000 to $170,000; The Ginsompany, from $265,000 to $190,000; the Glenompany, from $200,000 to 125,000; the Unified eef, from $185,000 to $85,000; and the New tein Estate, from a profit of $440,000 in sixteen to a loss of $295,000 in twelve months. With to the members of the group that have done the Witwatersrand Gold shows an increase of it from $480,000 to $825,000, and the New Primincrease from $785,000 to $940,000.

The mining of tin and copper is making rapid headay i the Transvaal and if anything like the same te c progress is maintained during the next few ears he base metals of the Transvaal may form the ions of industries which will be anyhow a very ood cond to the Rand both in volume and profit. Altho h it has been long known that there were deosits f tin ore in the Transvaal, they attracted very tt tention, and were not taken seriously until wh t known as the tin boom, which took place in 1905. n that year there were important finds of both m n copper, and two years later the output was ufficiet tly important to figure in the official returns. As regrds tin, the rapidity of the growth of the instry may be realized by noting that, while in 1905-6 he estnated value of the tin ore production was $22,-70. tl total produced up to the end of 1910 is reorded as $3,456,750. Up to date, it may be said that he ra e of the output is about $3,750,000, and fresh iscov ies are still coming along.

The reat bulk of the output of tin comes from the four cmpanies working on a considerable scale, each ompa y having a mill of ten stamps. The position of ffairs n the tin industry and the tin trade of the rest f the world is sufficiently interesting at the present me t give the Transvaal development in connection ith t metal a world-wide importance. The tin posiion gherally presents an economic prenomenon that as pehaps never had a precedent in the history of minera industry. Tin, notwithstanding the erratic luctuaions in price, has one of the steadiest and most ersist t of markets, so far as bona-fide sales for conumpt n are concerned.

As te population of the world increases and civiliation preads, the demand for tin becomes greater and ull g ater. Meantime, the supply of tin remains ractidly stationary. While the output of the metal s con antly being added to by new discoveries, the lder elds are being gradually exhausted, and, takng th world-wide result, there is so little change in he aggregate that it is difficult to see the probability f any considerable development in the future.

Whether copper-mining in the Transvaal will ever e of ery great relative importance is still, perhaps, t moot point. There is known to be south of the Limopo iver, near the Rhodesian boundary, a large ren i which copper exists, and one company at least s exploiting the deposits. At present there is a cerain dficulty with regard to transport, but the comany, hich is finding very rich ore, is sending it to Sando erkop, about 60 miles from the mines. The re ha been treated in Europe, and up to June of st yr the 7,000 tons odd which had been shipped re sal to average 54 per cent. of copper contents. This, f course, is extremely rich stuff, and it can hardly be expected to continue at the same high level f any great quantities. It is estimated that the averge would work out at about 12½ per cent.

Interested parties are still seizing every opportunity for bringing Northern Nigeria, and especially its tin resources, more and more before the British public. Sir Hesketh Bell, the Governor of Northern Nigeria, read a paper in London at a dinner on May 12th in which he remarked upon the successful administration of this African protectorate. On the question of transport, which so intimately affects the growing mining industry there, he said that the most important development of late consisted in the construction of the Baro-Kano Railway. This line, originally suggested by Sir Frederick Lugard and planned by Sir Percy Girouard, was practically completed only three weeks ago. It held a record for celerity of construction and economy of cost. Three years had hardly elapsed since the first sod was turned at Baro, and on the 8th of April the first train steamed into Kano, having travelled from Baro, 360 miles distant. Between Zaria and Kano no less than 6¼ miles of rails were laid in a single day. The cost would only very slightly exceed Sir Percy Girouard's original estimate of $15,000 per mile, and the line had the merit of being by far the cheapest railway ever constructed in tropical Africa. In a few weeks it would be possible to go from Lagos by way of Kano, nearly 800 miles from the coast, in little more than three days. Up to quite recently such a journey, even on horseback, could not have been done in less than a month.

Several new tin companies have been floated in London, but on the properties themselves nothing much can be done until the close of the wet season. Segar R. Bastard, a solicitor by profession, is perhaps the best known figure behind the Nigeria tin movement in London. A contemporary of the present Premier at the City of London School, he was one of the earliest financiers and promoters who interested themselves in Northern Nigeria. It was owing to his enterprise that the Champion Gold Reefs of West Africa, a gold mine which had practically floundered, sold up its remaining assets and invested the last of its money two or three years ago in the then untried Northern Nigerian tin fields to such a good extent that within the first year a hundred per cent. dividend was paid. The company, now known as the Champion Tin Mines of Northern Nigeria, is now the parent of half a dozen of the most important alluvial tin propositions out there.

An interesting revival is taking place in the English capitalized mines of Russia. Prices of the leading dozen companies have risen substantially in the last month and Lena Goldfields have received special attention. Very many of the deals here are on behalf of people in St. Petersburg, who have taken up one share after another. This Russian group, so far as London is concerned, has been in such a moribund condition since the sensational collapse of about four years ago that even now it would not be overstating to say that dealers generally are completely bewildered at this unexpected turn of events. In the meantime, a demand is proceeding on Continental account which literally takes one's breath away, having regard to the heavy lines of stock which are daily changing hands.

One of the biggest achievements and greatest gambles of the Whitaker Wright regime is recalled by the announcement of a reconstitution scheme for Lake View Consols. The scheme is explained in a circular from the directors, and it is proposed to form a new company with a capital of $875,000 in ten shilling ($2.50) shares, one of which will be given in exchange for each

five-dollar share in the existing company. Formed in 1896 under the auspices of the notorious London and Globe Finance Corporation, Lake View Consols acquired the Kalgoorlie properties known as the Lake View and Boulder East from a colonial company for $1,100,000 in fully-paid shares. The quotation of the shares was soon soaring to great heights. In October, 1897, an interim dividend of $2.50 a share was paid, and the five-dollar shares reached $63⅛. A further $2.50 was paid in April, 1898. In 1899, $12.50 per share, or 250 per cent., was paid, and the quotation reached its record mark of $144⅜. The wild fluctuations of the shares can be gathered from the fact that in the same year the price dipped to $45 15-16. In 1900, during which $6.25 a share was paid, the highest price was $76⅞. At the end of that year came the great Whitaker Wright crash, and on December 28, 1900, the shares were cut down by one fell stroke from $65 to $38¾. In the following year 50 per cent. was paid in dividends, but since then the distributions have amounted in all to no more than $1.60 a share. The quotation reached its low record of $1.50 in 1908. Now it is $3.56.

British coal masters are being driven to a rapid improvement of their methods by the fact that the days of plenty of coal are drawing to an end in this country as they must do with an annual output of 264,000,000 tons. Coal owners are being forced to open up extremely thin seams, and at the present time seams of coal is being worked in Lanarkshire which is only 14 inches in thickness. To enable the collier to get at the coal it is "undercut" 5 inches, and so the collier is favoured with a space 19 inches wide, in which he has to spend about seven hours per day. To get to his "place" he wriggles, or one may say swims, some yards.

It will be realized that the cost of "getting" coal from a thin seam must be very much greater per ton than from a thick seam, and the problem which the colliery manager faces is how to reduce this cost. The result of studying this subject was, first, the coal cutter and, as a natural complement, the face conveyor. This problem of the coal cutter is largely one of compact and strong gearing, and it will be evident how far this problem is from a satisfactory solution when it is stated that a machine costing, say, $1,000, may easily take $500 per annum to keep it in repair. It must be remembered, of course, that a collier is no machine and that from him machines need expect no gentle handling and very little sympathetic treatment.

THE VOLUMETRIC ESTIMATION OF SULPHUR IN IRON AND STEEL.

By T. GIFFORD ELLIOT (Sheffield).

(Paper read before the Iron and Steel Institute.)

The methods used in the analysis of iron and steel twenty years ago were largely gravimetric, whereas the majority of those in use at the present time — at least in a works laboratory — are volumetric, although in the estimation of sulphur in iron and steel no volumetric process has yet been discovered which is universally applicable, and the gravimetric process known as the "aqua regia" is still in constant use.

Whether the "aqua regia" or Bamber's method be used, the gravimetric estimation of sulphur is very tedious, and liable to error even in skilful hands. This is proved by the difficulty of obtaining results in agreement from different laboratories on the same sample, although variations in the method of working are probably responsible for some of the discrepancies.

The volumetric estimation of sulphur has received considerable attention during the last few years, and many papers have been written on the subject. Most of the work has been devoted to eliminating the loss of sulphur in the evolution method, generally thought to be due to the formation of organic sulphur compounds instead of sulphuretted hydrogen, on attacking the metal with acid.

Various suggestions have been made with a view to effecting this most necessary result. The chief are as follows :(1) The speed of solution should be as quick as possible. (2) The gases from the evolution flask should be passed through a hot tube to decompose any organic sulphur compounds, and then into an absorption flask. (3) The weighed portion of the sample should be annealed in a non-oxidizing atmosphere before treatment with acid. (4) The acid used to dissolve the metal should be concentrated hydrochloric acid of 1.19 specific gravity.

Schulte[1] and also Phillips[2] in 1895 suggested passing the gases through a red-hot tube.

In 1902 Walters and Miller[3] first suggested the annealing of the weighed portion for analysis before treatment in the evolution flask. They placed the sample in a porcelain boat and heated to bright redness in a tube in a current of hydrogen for fifteen minutes, if the sample contained an "appreciable amount of titanium," for half an hour.

In the same year Dougherty[4] made the annealing more practicable, by suggesting the use of a covered porcelain crucible for the purpose, with a piece of filter paper placed on the drillings to provide the non-oxidizing atmosphere.

C. A. Seyler[5] described his experiences with Dougherty's method, in a paper read before the Society of Public Analysts in December, 1902. He obtained the best results by annealing at 750 deg. C., although he stated that more experiments were required to determine the best temperature. So far as I am aware, this is the only published instance where the temperature of annealing was measured.

S. S. Knight[6] modified Dougherty's method in 1906 by mixing the sample with pure iron dust reduced in hydrogen. The mixture was placed in a porcelain crucible, covered with a little more iron dust and a piece of filter paper. The lid was put on, and the crucible heated for ten minutes "at the highest heat obtainable by a blast lamp."

In 1906, J. MacFarlane and A. W. Gregory[7] suggested the use of cream of tartar to mix with the drillings for annealing. They mixed 5 grammes of the powdered sample with half a gramme of cream of tartar, wrapped the drillings in filter paper, placed in a small porcelain

le, covered, and annealed at a bright red heat in le for fifteen minutes.

interesting report was presented in 1908 by H. r,[8] of the work of a chemical commission appoint- the German Society of Ironworkers, to inquire he estimation of sulphur in iron and steel. The gur obtained show that the highest results were got e use of strong hydrochloric acid, 1.19 specific ravy, and quick evolution, and that under these con- tio the use of a red-hot tube is unnecessary.

In laboratory where the ordinary routine consists analysis of samples varying from the best hæ- iron to high phosphorus foundry iron, and from rest transformer iron through the many varieties l used for steel castings to complex alloy steels, plicability of a method for general use is severely te

I ve found that many samples of iron and steel do not olve their full sulphur contents after merely an- lig in a non-oxidizing atmosphere, when treated with oncentrated hydrochloric acid. MacFarlane and Gregory's method of annealing with cream of tartar, ho er, gave me excellent results with some brands of iron ith which I had previously not succeeded; but with ther brands, and particularly with nickel-chrom- um eels and other self-hardening material for which I wa very anxious to find a quick method of determin- ng te sulphur, the full amount was not obtained. I am n t overlooking the fact that the method was only desig ed for irons.

My experience agrees with the finding of the German mission as to the importance of using concentrated acid nd rapid evolution. Moreover, in many experi- ment I passed the gases from the absorption flask throu h a red-hot tube and into a second flask, but the a ount of sulphide obtained in the second solution was gligible.

In rder to find a more active reagent than cream of tarta I tried various substances, and finally chose pota sium ferrocyanide. The effect of heat upon this subst nce is to decompose it into carbide of iron, potas- ium yanide, and nitrogen. The result is, that the drill gs are more or less carbonized, and a strongly reduc g atmosphere obtained.

Ex riments made to determine the length of time requi d for annealing, indicated that with less than went minutes, low results are obtained. On the other hand, no advantage is usually to be gained by ex eeding this period, whilst in the case of steel drill- ngs, xidation is then liable to occur.

An aling experiments with different amounts of ferro yanide indicated that 0.25 gramme mixed with 5 gra mes of the sample, was the most suitable amount. If m e is used, cyanogen compounds may be driven into e absorption flask, especially if the condensing tube ets hot. The result is, that when the titration is ma e by adding iodine to the contents of the ab- sorpt n flask without filtering, acidified only with acet ic acid, an excess of iodine may be added beyond that equired to dissolve the sulphide, without any colou being imparted to the solution. (A drop of stare solution added here gives the characteristic blue colou) On adding dilute hydrochloric acid, the brown colou due to the excess of iodine appears, and the tit- ration is proceeded with as usual, the result being un- affect d, notwithstanding.

Ex rience has shown that in order to obtain correct result it is absolutely necessary to control the tem- pera e of annealing. As will be seen from the table of results the correct temperature lies between 750 deg. C. and 850 deg. C.

If there are no means of measuring the temperature available, it is necessary to work a standard of known sulphur content with each batch of samples annealed.

An indication as to whether the sulphur is being evolved correctly is furnished by the colour of the precipitated cadmium sulphide. This should be distinctly yellow. A pale precipitate is usually associated with a low result, and suggests that the annealing has not been conducted properly.

In order to promote uniformity in the rate of solution, which is important, it is advisable that the drillings of the sample should be of the same degree of fineness as the standard, and of similar composition. Reference is made below to the use of a standard.

The method I have adopted is as follows: 5 grammes of the sample are mixed, as far as is practicable, with 0.25 gramme of pure finely powdered anhydrous potassium ferro-cyanide, and wrapped in one 9-centimetre filter paper if the sample is a graphitic iron, or two papers if it is a steel or white iron, placed in a small porcelain crucible (Royal Berlin O.A.), covered with the lid, and annealed at 750 deg. C. to 850 deg. C for twenty minutes in a closed muffle. After the annealing and subsequent slow cooling outside the muffle, the drillings should still be covered practically completely by the charred filter paper, if the temperature has not been above 850 deg. C. or they have not been in the muffle too long. I make a point of observing the appearance of the annealed drillings very closely, because low results are obtained if the paper is completely burnt away from the top of them. After cooling, the crucible is emptied into a glass mortar, and the slightly caked drillings loosened with a pestle. They are then brushed on to a small piece of stiff paper, which is rolled into cylindrical shape so that it will fit right into the neck of the evolution flask, and allow of the drillings being transferred to the flask without touching its neck or sides. The evolution flask is connected with a condensing tube 6 inches by 1 inch, containing about 2 inches of water, and standing in a conical beaker filled with cold water. A tube from this dips into a flask containing 60 cubic centimetres of the cadmium chloride solution, which again is connected with another flask containing more cadmium solution. Fifty cubic centimetres of concentrated hydrochloric acid are now added, and heat is immediately applied to the flask until the frothing of the contents indicates that the solution is well in progress. The flame of the burner used to heat the flask is lowered. As soon as the speed of the bubbles of gas passing through the cadmium solution begins to slacken, the flame of the burner is raised so that the liquid in the flask just boils. The boiling is continued so long as any appreciable amount of gas is given off from the solution. The apparatus is then disconnected, and iodine solution added in excess to the contents of the absorption flask — usually nothing is found in the safety flask; then 10 cubic centimetres or so of diluted hydrochloric acid (one part acid and two parts water) are added, and the liquid shaken to complete the solution of the sulphide. The excess of iodine is then titrated with sodium thiosulphate, starch solution being added when the iodine colour has nearly disappeared. (The air in the apparatus may be washed out by carbonic acid before the addition of the acid to commence with, and again at the end of solution of the drillings, if desired, though

the slight advantage gained thereby is hardly worth the extra trouble for works practice.)

If the filter paper used to wrap the drillings, or the ferro-cyanide itself, contains sulphates, the latter are reduced during the annealing, and their sulphur given off as sulphuretted hydrogen in the evolution flask, so that a blank determination becomes necessary. The blank can be conveniently determined upon a pure iron, by dissolving 5 grammes of the iron in concentrated hydrochloric acid, and absorbing the sulphuretted hydrogen as usual. By annealing another 5 grammes of the iron in the usual way, and determining the sulphur contents as in the direct estimation, any difference due to the above causes can be determined.

The iodine and thiosulphate solutions may be standardized by means of a steel or iron, the sulphur contents of which have been accurately determined by the "aqua regia" or Bamber's method. The value of the solutions in sulphur so obtained, should agree closely with that got by calculation after standardizing the thiosulphate against a standard solution of potassium permanganate. The latter is very easily performed, and is a very useful check on the working of the process. The solutions of iodine and thiosulphate used are of such strength, that 1 cubic centimetre equals 0.005 per cent. sulphur on 5 grammes of the example.

The cadmium chloride solution is prepared by dissolving 20 grammes of cadmium chloride in water with the aid of a few drops of hydrochloric acid. Ammonia is added until the precipitate of cadmium hydrate formed, completely dissolves. Acetic acid is then added until the solution becomes slightly acid, when a further 20 cubic centimetres are added in excess, and the solution made up to 2 litres.

I find the cadmium solution acidified with acetic acid, and containing ammonium acetate, the best absorbent to use. It does not absorb the hydrocarbons, phosphides, etc., simultaneously evolved with the sulphur compounds, to the extent that solutions of salts of zinc, lead, and copper do, or as do the alkaline solutions frequently used for this purpose. I have frequently tested the point by filtering off the cadmium sulphide before titration, and comparing the results obtained by titrating the washed sulphide, with those got by direct titration.

The three steels each contain over 1 per cent. of both nickel and chromium. No. 8620 is in the cast condition, R. 4290 in the tempered, and No. 8672 in the annealed state. The latter contained under 0.05 per cent. of hardening carbon, and practically the whole of the sulphur was obtained as cadmium sulphide by direct evolution. This is most important, and I believe that therein lies the solution of the problem of how to obtain the whole of the sulphur in a sample of iron or evolved as sulphuretted hydrogen by hydroch acid. It is, of course, absolutely necessary that sample should be completely decomposed by the In the case of irons containing titanium, as Blair shown, this is not the case, and some of the sul may remain in the evolution flask in the inso residue. I have experimented with an iron contai 0.2 per cent. of titanium. The sulphur content tained by a gravimetric method which included fusion of the insoluble graphitic residue after t ment with aqua regia, was 0.080 per cent. The d evolution gave 0.017 and 0.018 per cent. After an ing at 800 deg. C. the amount obtained was 0.06 cent. The special treatment (referred to in the column of results in the table) consisted in placing crucible containing the sample in the muffle at 950 C., and leaving at that temperature for five min The gas was then turned off, and the muffle allow cool down to just below 800 deg. C. The gas was relighted, and the temperature of the muffle ke about 790 deg. C. for fifteen minutes. The cru was then brought out to the front of the muffle allowed to cool slowly. The sample containing t ium after this treatment gave 0.076 per cent., w suggests that by a proper preliminary treatmen whole of the sulphur may be obtained even fron iron containing titanium by the evolution process

Iron No. 471 was found to give off the whole sulphur as sulphuretted hydrogen by direct evol (i.e., without any preliminary treatment).

As it is my custom to have all iron samples ann before treatment in the evolution flask, I experim with this sample in order to test the effect of th nealing on the amount of sulphur obtained. The re are given in the table.

I wish to express my thanks to Messrs. G. B. W A.R.S.M., and E. G. Barnes (the latter of whon been responsible for the control of the annealing whom I am indebted for the carrying out of a amount of the experimental work involved in the paration of this paper.

1 Chemical News, vol. lxxv., p. 47.
2 Journal of the Society of Chemical Industry, 1896, p
3 Journal of the Iron and Steel Institute, 1902, No. 1, p
4 Iron Age, May 8, 1902, p. 14.
5 Analyst, April 1903.
6 Chemical News, vol. xc., p. 326.
7 Ibid., vol. xciii., p. 201.
8 Stahl und Eisen, 1908, No. 8, p. 249.
9 Transactions of the American Institute of Mining neers, vol. xxxi., p. 748.

TABLE OF RESULTS

Description of Sample	Gravimetric Method Silicon per Cent.	Evolution Method Annealed (Temperatures) Unannealed	700° C.	750° C.	800° C.	850° C.	900° C.	950° C.	Special Treatments	Remar
Steel, No. 8620	0.061	0.025 0.026	0.046 0.045	0.058 0.058	0.061 0.060	0.059 0.059	0.053 0.054	0.046a 0.051b	.....	a) Paper burnt off slightly oxidised. (b) Drillings qui after annealing l grey, as in the annealed at a low erature. The Duplicat were obtained by workers using dif paratus
Steel, R. 4290	0.051	0.030 0.031	0.045 0.048	0.049 0.050	0.051 0.051	0.050 0.047	0.048 0.046	..	0.050	
Steel, No. 8627	0.054	0.053	.....	.....	0.053 0.054	....	0.048	.....	0.054 0.055	
Iron, No. 471	0.085	0.085 0.086	0.083 0.087	.....	0.084 0.085	0.080 0.081	0.066 0.071	.....	0.084	Do.
Iron, No. 726	0.053	0.028	.....	0.052	0.051	0.048	.....	.....	0.051	Do.

Canadian Mining Institute—Western Branch.

The tenth general meeting of the Western Branch of the Canadian Mining Institute was held at Trail, British Columbia, on May 18. Mr. Wm. Fleet Robertson, provincial mineralogist, chairman of the branch, presided, and there was an attendance of members and visitors from various parts of the Kootenay and Boundary districts, the neighbouring State of Washington, and the coast cities, Victoria and Vancouver. There were two sessions—afternoon and evening.

The visitors were welcomed by the president of the Trail Board of Trade, after which several papers were read and discussed. These were: "The Burns Anthracite Coal Property, Alberta," by Mr. Alexander Sharp, M.E., Orient, Washington; "Costs of Operation at the Rambler Bell Mine, Kootenay Lake, B.C.," by Mr. S. S. Fowler, M.E., Riondell, B.C.; "Notes on Property of the Le Roi No. 2, Limited, at Rossland, B.C.," by Mr. Ernest Levy, M.E.; "The Standard Mine, Silverton, B.C." by Mr. John Valance; and (by title only) "Notes on the Lucky Jim Zinc Mine, Slocan, B.C.," by Mr. A. J. Becker; "The British Columbia Copper Company's Smeltery, Greenwood, B.C."; "The Van-Roi Mining Company's Concentrating Mill, Four-mile Creek, Slocan," and a description of the copper smelting side of the Consolidated Mining and Smelting Company's smeltery at Trail.

Mr. H. Mortimer-Lamb, secretary of the Institute, who had journeyed from Montreal, Quebec, to British Columbia to attend the meeting, read a letter of greeting from Dr. F. D. Adams, president of the Institute, and explained the proposal of the council of the Institute to hold a semi-annual meeting in British Columbia in the autumn of each year, this to be as far as practicable similar to the general meeting of members held annually in one of the cities of Quebec or Ontario. It was recommended that the first of these proposed semi-annual meetings shall be held next autumn. The matter was referred to the incoming branch council with a recommendation that it further the efforts of the general council to make such semi-annual meeting a success.

An invitation to hold the next general meeting of the branch (in September) at New Denver, Slocan Lake, in the vicinity of which town several important silver-lead mines and concentrating mills are being operated, was favourably received and referred to the branch council for its decision thereon.

A proposal that the Provincial Government be urged to either add to the staff of the Provincial Bureau of Mines, or employ mining engineers not on the staff, to do exploratory work in new districts in the province giving promise of becoming mining fields, was not adopted, it being considered that the meeting was not in possession of sufficient information to show that there exists a public demand for such action, or other reasons that would warrant its making such a recommendation to the Government.

The result of the ballot for chairman and members of the branch council for the ensuing year was that Mr. Robert R. Hedley, of Vancouver, B.C., was unanimously elected chairman, while all but one of the twelve elective members of the branch council were re-elected, the only new member being M. E. Purcell, superintendent of the Centre Star group of mines, Rossland, B.C. The Branch officers and council for the ensuing year are as follows: Chairman, Robert R. Hedley, Vancouver, B.C.; Secretary, E. Jacobs, Victoria, B.C.: Council—W. H. Armstrong, Vancouver, B.C.; *S. G. Blaylock, Moyie, B.C.; S. S. Fowler, Riondel, B.C.; Norman Fraser, Michel, B.C.; Chas. Graham, Middlesboro, B.C.; Thos. Graham, Nanaimo, B.C.; J. Cleveland Haas, Spokane, Wash.; John Hopp, Barkerville, B.C.; W. H. Trewartha-James, Victoria, B.C.; *Frederic Keffer, Greenwood, B.C.; *Thos. Kiddie, Vancouver, B.C.; F. C. Merry, Ferguson, B.C.; M. E. Purcell, Rossland, B.C.; *W. F. Robertson, Victoria, B.C.; Lewis Stockett, Hosmer, B.C.; *O. E. S. Whiteside, Coleman, Alberta; W. E. Zwicky, Kaslo, B.C. Mr. Hedley presided during the latter part of the evening session.

On Friday morning, May 19, some of the visitors were shown through the Consolidated Mining and Smelting Company's copper and lead smelting works and electrolytic lead refinery at Trail, and in the afternoon spent several hours in the company's Centre Star mines, at Rossland.

The Burns Anthracite Coal Property, Alberta.

Mr. Sharp showed that this property consists of 15,360 acres of Crown-granted land, beside an area leased from the Dominion Government. The nearest railway towns are Calgary and Okotoks, each distant about 45 miles from the property. The coal measures belong to the Lower Cretaceous period (Kootenay series). The formation comprises about 4,000 feet of sandstone, dark shale, conglomerates, and—near the base—some clay and ironstone. At intervals in the strata occur the coal seams and coaly shales, the whole resting on carboniferous lime. The area is 11 miles long and from one mile to three miles broad. The measures lie in a long, narrow, synclinal trough; strike N. 42 deg. W., and dipping to westward at an angle varying from 52 to 80 degrees. The southeastern outcrops are at elevations from 300 to 2,000 feet above the valley of Sheep Creek, but towards the north, at Burns Creek, the coal comes down to the level of the valley and has every indication of going deeper. Ten or twelve seams of coal have been exposed and traced, by drifts and open-cuts, about five miles. These exposures show fully 100 feet of coal in the measures. Fifteen samples, taken from seams ranging from 4 feet 6 inches to 20 feet in thickness, gave analyses varying between the following percentages: Moisture, 1 at 2.10 per cent.; fixed carbon, 70.05 at 82.25 per cent.; ash, 3.5 at 17 per cent.; sulphur, 0 at 1 per cent.; volatile, 9.6 at 13.43 per cent.; B.t.u. (one sample), 14.877. Complete analyses of two samples from a 7-foot seam on Rickert Creek were as under:

Water, 0.98, 1.02; carbon, 84.77, 87.24; ash, 5.42, 5.92; sulphur, 0.18, 0.18; hydrogen, 3.63, 2.92; oxygen and nitrogen, 4.48, 3.24, coke, 90.64, 92.81.

The topography of the country is favourable to economical mining. Some of the seams come down to the level of the valley, so can easily be reached by tunnels at the valley floor. Any of the seams can be drifted on from either side of the several creeks that cut the formation. Thus a chain of collieries can be operated along the valley Power can be generated from water power of the creeks. The seams are being prospected at different horizons so that the nature of the roof and floor texture may be ascertained before any permanent opening shall be made. The difference in elevation between the coal property and Okotoks is about 2,150 feet, or approximately 48 feet to the mile

*Members of Council ex-officio.

Costs at the Blue Bell Mine, Kootenay Lake, B.C.

Mr. Fowler, who will later prepare his paper in fuller detail, made an appeal for voluntary publication of costs of operation of mines or dressing plants, stated in connection with all the conditions which control those costs. The object of obtaining these would be to afford means whereby those to whom the figuring should become accessible might more accurately forecast the results of new undertakings. In order to set an example Mr. Fowler presented figures of costs pertaining to the operation of the Blue Bell mine and ore-dressing plant, including all overhead charges except interest and sinking fund. A summary of the figures presented shows that in the treatment of 43,069 tons of ore (containing lead, iron, and zinc) during nine months prior to March 31, 1910, the cost of ore extraction was 98.4 cents; concentration, including weighing of ore and loading of product, 50.2 cents; and management and all general expenses, 37,6 cents; total, $1.862 per ton. These costs were attainable only through the means of extraordinarily favourable physical conditions, but the result was also much assisted by the loyal co-operation of staff and mine and mill crew.

Property of Le Roi No. 2, Ltd., Rossland, B. C.

This property comprises more than 150 acres, situated in the vicinity of the mining groups of the Consolidated Mining and Smelting Company of Canada, Ltd., and the Le Roi Mining Company, Ltd., Rossland, B.C. It has been investigated by two mines—Josie and No. 1—and by numerous surface workings. Several veins have been worked. The country is much broken and displaced by numerous dikes, and the solution of the problem as to what is the result of these disturbances is still unfolded. The most important dike is that known as the Josie, which has an average width of 100 feet, striking approximately north and south and dipping 84 degrees to the west. Corresponding figures for the Tramway dike are: Width, 50 feet; strike, N. 20 deg. E., and dip 70 deg. E. Both are accountable for surface depressions, due to their adaptability to more rapid erosion. The minor dikes strike roughly parallel with the Josie, with dips, as a rule, not far from vertical. The main rock disclosed by the workings is the augite porphyrite which varies considerably in texture, hardness, and breaking qualities in different parts of the mines. The orebodies are erratic, both as to position and variability in size, as well as disposition of value; additional difficulty is experienced owing to the visible characteristics of the ore seldom indicating its value at all, and this involves constant recourse to assaying. The orebodies vary in width from a knife-edge to 30 feet, so that there have been called for both the square-set and "shrinkage" stoping methods of ore extraction. The latter system is exercised to as great an extent as practicable on account of its smaller cost. By far the larger proportion of past production has been derived from between the 300 and 700-foot levels of the Josie mine.

The Josie main shaft inclines at 74 deg., has three compartments, and extends to the 1,300-foot level. It is 14 feet 6 inches by 5 feet inside the timbers, and is equipped with a 150- h.p. double conical-drum hoist. In the shaft building are grizzlies, 4 inch and 1 inch spaces, on which hand-sorting of ore takes place. The ore is separated into first-class, second-class, and mill ore. First-class fines is shipped to the smeltery, and the remainder sorted into shipping and mill ore, and waste; second-class fines is sent to the mill, and the remainder distributed as in the case of first-class. M ore is trammed direct to the concentrator. No. mine shaft is 3-compartment, 800 feet deep, and equipped, similarly to the Josie, with hoisting eng and sorting floors.

Figures covering the operations of the last fin cial year will serve to give an idea of what is acc plished by hand-sorting. They are:

	Tons extracted.
First-class ore	42,770
Second-class ore	5,790
Mill ore	4,480
	=53,040 to

which by sorting was resolved into:—

	Tons.
Shipping ore	29,776
Mill ore	17,553
Waste	5,711
	=53,040 to

Stoping costs were:—

Ore production: labour	$0.76
Explosives	0.32
Illuminants	0.03
Sundries	0.04
	—$1
Ore sorting labour	0
General expense	0
Power plant: labour	0.07
Supplies	0.36
	— 0
Mine general: Labour	0.33
Supplies	0.07
	— 0
	—
	$2

Average assay value of ore shipped was: Gold, 0.8 ounces; silver, 0.8086 ounces; copper, 1.6305 per c

During the last financial year there was done: D ing and cross-cutting, 4,202 feet; raising and winz 160 feet; total, 4,362 feet. Cost per foot, $17.72. was exceptionally high, however, due to greater de of working (chiefly on 1,300-foot level), bad pow and several other unusual conditions. The follow comparative table will show corresponding costs several consecutive years:

Year to Sept. 30.	Drifting and cross-cutting. Feet.	Raising and winzing. Feet.	Total Footage. Feet.	Total per f
1910	4,202	160	4,362	$1
1909	3,220	338	3,558	1
1908	4,302	270	4,572	1
1907	2,538	255	2,793	1
1906	3,392	187	3,579	1

In addition to the work done in 1910, as shown ab the main shaft was deepened 193 feet, at a cos $1.73 per foot, and 11,508 feet of diamond drilling done at $1.73 per foot. The average depth of dri hole was 371 feet.

The concentrator is capable of milling and trea 60 tons of ore per diem. The machinery is electric driven by motors aggregating 100 h.p.; it compr one 9 by 16-inch and two 8 by 12-inch Blake crush two 6-foot Chilean mills, and four Wilfley tables.

During the last financial year the grade of ore tr ed, and results, were: Mill feed, 17,235 tons; a value, gold 0.122 ounces and silver 0.255 ounces ton, and copper 0.554 per cent. Concentrate prod totalled 1,368 tons, assaying gold 1.297 ounces and

0.748 ounces per ton, and copper 1.144 per cent. per ton crushed was $0.99.

s a result of the company's mining and milling operations in Rossland during the financial year ended September 30, 1910, the net profit was $249,255.81.

Standard Mine, Silverton, B.C.

r. Vallance gave a comprehensive description of this property, which has attracted much notice of late owing to the opening in it of large shoots of ore containing much galena of good grade.

The group includes 13 mineral claims. The mine is at an altitude of 3,354 feet above sea level and 1,594 feet above Silverton, on the eastern shore of Slocan Lake, and distant from the mine one mile and a half. Development work on a systematic plan has been in practically continuous progress since 1904. The "big ore shoot" was cut by the lower levels in 1909-10, and the present remarkable showings of ore exposed.

The enclosing country consists of old and very siliceous sedimentary rocks, cut in places by masses and dikes of an eruptive rock generally classed as granodiorite. A large "boss" of this rock occurs along the east side of the Standard claim and is, apparently, the centre from which the local dikes radiate. The sedimentary strata is mainly hard, blocky argillites, siliceous shales, and impure quartzites. The Standard vein is a strong fissure cutting the Bedding planes of the enclosing sedimentary rocks; a dike of quartz-diorite-porphyry is intruded into the fissure and lies along the footwall side. This dike rock is much altered and appears to in some manner be closely connected with the principal orebodies found in the veins; probably the clayey-talcose matter of the altered dike has influenced the course of the mineral-bearing solutions and caused the ore to be deposited on or near the dike, where it is most frequently found. Much evidence of large and repeated movements is found in the vein, especially toward the hanging wall side, and, at some points movements have occurred after the formation of the orebodies—masses of galena being found deeply striated by movement of adjoining hard gangue material.

The principal minerals are argentiferous galena and zinc blende, with some pyrite, chalcopyrite, and grey copper (Freibergite) as associated minerals. The Freibergite occurs as speeks and bunches mixed with the galena, mostly, but occasionally with the blende, and it is evidently highly argentiferous for specimens have assayed as high as 2,000 ounces silver per ton. The vein gangue is quartz, lime spar, and spathic iron, with enclosed fragments of shale and occasional masses of altered dike rock.

In the workings above the fourth level, the orebodies were found lenticular in form and following a zone pitching about 30 degrees. From No. 4 down to No. 5 level the big shoot of galena has a pitch nearly 28 deg. Where the big shoot is cut by No. 5 level the vein gradually widens from 4 to 30 feet. Here the clean galena has its maximum width of 15 feet, the remaining 15 feet being high-grade milling ore with included masses of clean galena. From here to the present face of No. 5, which is approximately 1,200 feet from the portal of the adit, the vein widens and the orebody gradually changes its character, the shoot of clean ore giving place to a great mass of milling ore enclosing irregular bodies of solid galena. The ore shoot has been opened a length of 250 feet; a cross-cut at the present face shows ore, chiefly milling grade, about 85 feet in width.

The mine workings consist of six levels. with connecting raises from No. 5 upward, and a number of cross-cuts from the levels, where the vein is wide. Not including stopes and cross-cuts, the mine openings have, together, a length of 8,500 feet. The depth on the vein, from No. 1 to No. 6 level, is 740 feet. After connection shall be made with No. 5 raise, No. 6 will become the main adit for the mine, and the upper terminal of the aerial tramway will be placed at its portal.

Ore from stopes above No. 4 level was taken out by ordinary overhand method, and the ground timbered with a two-piece set, or by stulls, as required. In the lower levels, where the vein is wider, the large orebody will be extracted by overhand stopes, with square-set timbering. Ore extracted has been roughly graded in the workings; the cleaner ore has been sent to the sorting houses, while the cobbings from this, and all second-grade ore from the mine, have been placed on the milling ore dumps. Shipments to the smeltery to date aggregate 4,418 tons; average metal contents were: Silver, 78.46 ounces per ton; lead, 62.5 per cent.; zinc, 5.88 per cent. Some shipments returned more than 100 ounces silver per ton, and others 73 per cent. lead. In addition to large orebodies blocked out in the mine, there is much ore in the sorting houses ready for shipment when the aerial tramway shall be completed, while the quantity on the milling dumps is estimated at 8,000 tons, which will concentrate 3½ or 4 tons into one ton of shipping product.

Preparatory to mining on a larger scale than in the past, and commencing milling operations, a 10-drill compressor plant and a concentrating mill with a grinding capacity of 200 tons and dressing facilities for 100 tons per diem, are being put in. Water power will be utilized, with a head of 160 feet at the compressor and 275 feet at the mill. The Leschen aerial tramway will be 7,900 feet in length, with a grade of 16 per cent., and a carrying capacity of 20 tons per hour. The tramway and compressor should be in operation in July and the mill in October next.

Efforts are being made to organize a mining school in Nelson, B.C. A provincial grant is asked for, and the school will be in affiliation with the local high school.

One of the most enterprising mine owners of Slocan district, British Columbia, is Mr. Alex Smith, formerly of Toronto. For years he and a partner have been engaged in developing the Surprise mine, situated on the mountain divide between Cody Creek and McGuigan Basin, Slocan. After having sunk to a depth of 300 feet and taken out a considerable quantity of ore, the work of driving a long deep-level adit was undertaken. Several years' work resulted in the face of this tunnel reaching a point under the old workings of the mine, from which a raise was commenced. The distance to be raised was nearly 800 feet, and of this about 600 feet has been accomplished. The work with only hand drills and the ventilation not being good, progress has been slow, but there is now only 170 feet required to be raised to make the intended connection.

COAL-DUST EXPLOSIONS

(Abstract of Miners' Circular No. 3, U. S. Bureau of Mines.)

By George S. Rice.

(Continued from last issue.)

Moistening the Air Current.

The simplest method of keeping a mine damp is to put moisture into the ventilating current; then the air going through the mine does not dry the dust but carries moisture to it. There are two ways of putting moisture into mine air. One is by using fixed sprays of water placed at intervals through the mine; the other is by moistening the intake air at the mouth of the mine.

Water Sprays.

Water sprinklers should give a fine spray, as much like fog as possible, so that the water will be carried along by the air until it is absorbed as invisible vapor. The chief care needed in using sprays is to keep the nozzles from clogging and to prevent men and boys who do not understand the necessity for spraying, from damaging the sprays or turning them off to avoid getting wet in passing by.

Clean water should be used for spraying. The nozzles should be of the form least liable to clog and most easily and quickly cleaned after clogging. All nozzles should be inspected at frequent intervals.

There can be no question of the value of water sprays for laying dust. However, to get the best results from their use some mine official must be made responsible for the condition of the sprays at all times. He must also be required to see that there are sprays enough running to keep the relative humidity of the air currents at, or above, 90 per cent. In zero weather the incoming air may traverse 2,000 to 3,000 feet of entry before its temperature rises above the freezing point. Therefore at mines in districts where the winters are cold, provision must be made for draining pipes and nozzles throughout the intake part liable to freeze; and in cold weather the area must be wet down by hose or by water cars, so that it does not become dry. A recent dust explosion started in the haulage road, which was also the intake, at a point only 600 feet from the mouth of the mine.

Heating the Air and Using Water Sprays.

At certain mines the experiment is being made of heating the ventilating current at the intake to mine temperature and then moistening it by water sprays. This requires a somewhat costly heating plant, for in zero weather the warming of 100,000 cubic feet, more or less, of air per minute takes much heat. This method will moisten the mine air, but it is more expensive and complicated than the following method.

Steam Jets.

Under some conditions the easiest way of moistening the air current entering the mine is to use exhaust steam. The heat of the steam warms the intake air a little, and the moisture is supplied as vapor and in finely divided form, like fog. Generally the exhaust steam from the fan engine will suffice to dampen the air except in the coldest weather. After a mine has been thoroughly moistened, a slight shortage of water in the intake air for a week will not prove serious, and in most of the coal fields of this country cold waves do not last long. However, if a mine shows a tendency to get dry, some live steam will be needed to supplement the exhaust steam.

Many mining men have thought that the use exhaust steam would mean the presence in the int air course of a vapor so hot that the roof would sl and fall, as it does in some entries where a steam m is laid. Such is not found to be the case in pract The steam expands as it leaves the nozzles, and rap ly cools, so that 15 or 20 feet away the air curr feels merely warm even in medium weather, and feet away there is no perceptible warmth from presence of the vapor.

If the part of the entry close to the jets is p tected by lining or lagging, the roof will not be p ceptibly affected by the heat. Although moisture m have a bad effect on some roofs, generally it has b alternate wetting and drying that has caused roofs weaken.

The steam-jet method, if systematically used, make the ventilating current evenly humid. M mines that have introduced the method have exp enced no bad results. The cost of maintenance is tually nothing if steam is employed around the m and the exhaust steam is not otherwise used.

If the ventilating fan is driven by a slide-valve gine, as is usually the case, the exhaust steam th from is sufficient for moistening the air in all but coldest periods; then some steam from other sou may be needed. The efficiency of the method, w systematically followed up, has been shown bey question by its trial and adoption in a consider number of important mines.

Steam jets can not be used on a haulage road wl locomotive tenders, mule drivers, or trip riders employed, since the jets fog the air for a long tance and make the haulage difficult or danger Therefore, their application is generally limited mines that have pressure or blowing fans and do use the intake airways for haulage.

Steam Jets and Water Sprays Combined.

With the generally approved system of ventila employed in mines that make an appreciable quan of methane, haulage and travel are not allowed in tries carrying the return currents, but only in the take entries. Where this system is used and no h age is done except on the day shift, a combinatio water sprays and steam jets has given good res When trips are being hauled over the road the w sprays are used. In cold weather these sprays m be situated so far inside the mine that the incon air will not freeze them. During the night, or w there is no haulage to the outside, the exhaust st sprays are turned on at the mouth of the intake the main entries thoroughly dampened. In this a small number of water sprays help to keep the m moist during the day shift.

Use of Calcium Chloride.

Another method of keeping down coal dust is using a deliquescent salt, one which slowly disso by absorbing moisture from the air. Calcium chlo is such a salt. It has been used for a couple of y at coal mines near Welch, West Virginia; also at eral mines in different parts of this country.

...y crude calcium chloride, as sold by dealers, con... 60 per cent. or more of calcium chloride; the ... 40 per cent. or less is chiefly common salt (sodi... chloride). The latter, if pure, does not absorb mo...ture from the air and is of no value for laying dus... Pure calcium chloride can absorb three or four tim... its weight of water.

I... the larger cities of the eastern part of the United Sta...s calcium chloride costs, in carload lots, from $14 to $8 per ton. It may be bought in three forms: Dis...solved, solid, or granulated. The solid form, which co...s in large drums, contains a high percentage of wat... and has to be broken for use. This form is not as ...nvenient for mine purposes as the others. The gra...lated form is easy to scatter along an entry, and ...f it is packed in air-tight cases, so that it can not ...bsorb moisture during shipment and storage, it is the ...est form to buy.

T...ere are two ways of using calcium chloride. One way ...is to dissolve 5 or 6 pounds of it in 100 pounds of ...ater and sprinkle the solution along the road-way ... by water cars or by hand pumps. The salt must ...e used in this way in order to moisten the ribs, roof, and ...imbers.

T... other way to use calcium chloride is to sow the gra...lated form broadcast. This method is especially suite... for dampening gobs or the floors of entries; on road... where coal dust is thick it gives much more last-ing ...sults than does sprinkling. The little granules of th... salt lie on the surface, and by the moisture they abso... from the air they make the dust particles stick toge...er. After the surface of the dust in a road is thus ...moistened any new dust that falls upon it will stick ...nd get moist in turn.

A... person who intends to try the calcium chloride treat...ent for coal dust should remember that the crud... calcium chloride is not pure, and some that has been ...old contains so much common salt that it has little ...value for laying dust. In one instance brought to th... attention of the Bureau of Mines the substance sold ...s calcium chloride contained no calcium chloride at al... but was chiefly common salt.

Conclusions.

Th... mining engineers of the Bureau of Mines, from the ...periments they have made and from the facts they ...ave gathered in examining hundreds of coal mines ... believe that explosions of coal dust can be pre-vente... by proper care. Furthermore, they believe that ... though the use of any one of the methods de-scribe... in this circular may be difficult and expensive ...nder some conditions, there will be little danger of a wides...read dust explosion at a mine where any one of th... methods is properly carried out.

Th... engineers of this bureau believe that, although ...many mine operators have taken great pains to pro-tec... miners from most of the dangers of mining, the pr...a...tions regarding dry coal dust are not always co...p...te. Some operators who keep the main roads free ...om dry coal dust do not make sure that in all parts ...f the mines the dust is in a harmless condition. Hence it sometimes happens that a blow-out shot or a small ...xplosion of gas sets fire to the dust in a dry room ...r a dry heading, and the resulting explosion crosse... an area that was kept so damp that a dust ex-plosio... could not have originated within it.

It ...ust be remembered that after a dust explosion ...s d...veloped the shock and the flame are so strong that ...ightly dampened coal dust may be caught up ... ...ited to spread the explosion. It must also be ...mbered that a dry area usually contains more dust than can be completely burned by the oxygen that is at hand. So if an explosion gets a good start in such an area, it may have strength enough to carry burning and unburned dust into and perhaps across a dampened area. The latter, though it may furnish no coal dust, can supply the oxygen needed to burn the dust carried over from the dry area.

In a recent mine disaster in this country the explosion travelled 1,500 feet along a slope that had been washed down with hose just before the explosion and even had a wet floor after the explosion. The explosion burst forth from the slope mouth in a great flame and deposited much coked dust on the timbers of the trestle. The flame and the thick crusts of coked dust showed how great was the quantity of unburned dust and gases that had been carried for 1,500 feet along a slope that was so damp it might have been considered

Precautions.

In a mine working a coal that makes inflammable dust, the risk of a dust explosion can be greatly lessened by following these precautions:

Use permissible explosives where the coal can not be wedged down, and use them in the ways suggested by the Bureau of Mines in Miners' Circular 2.

Don't use black powder, dynamite, or any long-flame explosive.

Don't blast the coal "off the solid." Undercut it or shear it, and wedge it down if possible.

Don't drill the holes beyond the undercutting or shearing.

Don't fire two shots at once, except by electricity from outside the mine. Allow enough time between shots for the dust to settle.

When shots throughout a mine are fired after the shift by shot-firers, they should be fired on the last of the air first, then successively toward the intake, so that the dust and gases from the earlier shots will not be carried towards and possibly ignited by the later shots.

Don't tamp shots with coal dust, bug dust, or small coal, whether wet or dry. Use clay or other material that will not flame.

Lead out all coal dust or bug dust from the working places and do not let it collect along the roads. It is dangerous in the mine; it has value as fuel outside.

Use tight cars and keep the coal below the sides of the cars.

Flush the tops of the loads with sprays.

Remember that a dry mine is a dangerous mine.

Wash the coal dust from the roof, ribs, and timbers; or, if this is not done, keep the dust damp by making the mine "sweat" all winter as it does in summer; or else keep the coal dust covered with rock dust, clay, or similar material.

Don't be satisfied with having some parts of the mine wet.

Keep all the mine wet, so wet that the roof and sides are beaded with moisture and the dust packs down on the floor and looks wet.

Although in the year only 150 tons of tungsten ore were marketed, the present annual consumption is well over 4,000 tons of concentrated ore carrying from 60 per cent. to 70 per cent. tungstic oxide.

The Tilt Cove Copper Company, Limited, operating at Tilt Cove, Newfoundland, earned a gross profit during the calendar year 1911, of £12,152 8s. 2d. The company is a subsidiary of the Cape Copper Company, Ltd., a London concern that was organized in 1863. The Tilt Cove mine is held under a 99-year lease, expiring 1989.

On the Organic Origin of the Sedimentary Ores of Iron and of their Metamorphosed Forms: The Phosphoric Magnetites.

Read before the Iron and Steel Institute by W. H. Herdsman, Glasgow.

There is, I am aware, nothing new in attributing the formation of the phosphoric ores of iron to organic agency. The subject, however, has not yet, in my opinion, received the attention which it merits.

I bring it before you, therefore, for consideration and discussion, as these ores are of increasing importance to the steel industry on account of the growing scarcity of non-phosphoric ores, while the sedimentary ores appear to exist in practically inexhaustible quantities, and must form the basis of our calculated supplies in the not very distant future.

The oolitic or pisolitic structure of so many of the sedimentary ores of iron, and the phosphoric character of all, have long led me to see in those features evidences of an organic origin, a view our advancing knowledge of the numerous micro-organisms at work in nature tends to support, bringing, as it does, to our notice many forms apparently adapted to play the part of builders-up of iron ore deposits.

Perhaps the strongest evidence bearing on the subject is afforded by the deposits of bog iron ore which are to be seen in many countries in process of formation, and have been shown to be due to the activity of organisms, generally identified as bacteria, in the ferruginous waters.

There is no doubt that several genera of bacteria have been definitely recognized as habitually precipitating iron from its solutions; they bear names in inverse ratio to their own length (with a list of which I need not trouble you), and are generally known as "the Iron Bacteria." The Russian bacteriologist, Winogradsky, has claimed that the deposition of iron by these bacteria is not a mechanical process, but is due to the physiological activity of the organisms, which liberates energy by oxidizing ferrous oxide in its protoplasm, ferric hydrate being formed, which accumulates in the sheath and gradually passes into the more insoluble ferric oxide. Dr. Hans Molisch, of Vienna, however, contests this physiological action, and Dr. David Ellis, of the Technical College, Glasgow, the leading British authority on the iron bacteria, is, pending further investigation, in agreement with Dr. Molisch.

Putting aside, however, the character of the action by which the precipitation is effected, it has been proved that many of the bog ores are almost entirely composed of the ferruginous walls of the thread bacteria B. Gallionella and Leptothrix.

Dr. Molisch, in a recent work, shows photomicrographs of a Siberian bog ore consisting of the "rust-red" walls of Gallionella Ferruginea and Leptothrix Ochracea; he also shows a similar ore from Plass in Bohemia, which consists largely of the remains of the Chlamydothrix Ochracea. Dr. Molisch was one of the first to point out that Leptothrix have also the power to store up manganese oxides in their walls, and so form ore masses of this metal. He also noted that the same bacteria can alternately precipitate iron or manganese according to the character of the solutions available.

D. D. Jackson, an American authority, has further described a new species of Crenothrix which he named C. Manganifera, the remains of which in one case he found to consist of 34 per cent. of manganese o and 14 per cent. of iron oxide, while in other c the manganese oxide varied from 30 to 66 per c with varying smaller amounts of iron oxide.

We have Dr. Molisch's authority for the state that apart from the iron bacteria there are othe ganisms which have the power to convert soluble of iron and manganese into insoluble forms as ox He especially mentions certain confervoid alga which class the diatoms also belong, and a marin ganism, Cocconeis, which surrounds itself wit brown covering of manganese oxide.

A quite accidental confirmation of the state that other organisms have the power to deal with oxides was afforded me recently, when a sampl iron ore, which, with a number of other mineral ples, was lying on a wooden shelf in a somewhat situation in my coach-house, was attacked by a gus, which Dr. Ellis has been good enough to inde for me as that of ordinary "dry rot." The whole of fungus growing between the shelf and the gradually assumed a reddish hue and threw off s of oxide of iron which covered the shelf below w red powder, giving, on assay, the same iron con as the ore attacked.

It is notable that of about ten pieces of diff minerals in the same parcel only the iron ore w tacked, and on the iron ore being removed, the f gradually resumed its normal colour, and the sl of mineral dust falling from it ceased.

This illustration of the fact that apparently forms of organisms will act as precipitants of oxides may help us to understand the varied under which the sedimentary iron ores are found differences of the several beds of the Clevéland colnshire, and other ores may evidently be d varying climatic and other conditions favouring one and then another type of organism agent deposition, during the period of their formation. greater differences which are found between the mentary iron ores of the different geological p may be similarly explained.

During the earlier geological times bacteria probably diatomaceæ, may be assumed to have the principal agents at work, giving us the pe and generally siliceous ores of the Cambro-Si age; while, with the gradual development of o life, we have the protozoa and calcareous ele brought into play, the former acting through th ganisms, or, as calcareous nuclei, acting chem together with numerous molluscs similarly a would contribute to the ores of the later periods more highly calcareous and variable phosphoru tents.

To some it may appear difficult to understan organisms so minute as bacteria, of which son millions are required to cover a square inch of s should be capable of forming ore deposits which amount to thousands of millions of tons, yet w learn of the rapidity with which they multiply sion under conditions favourable to their grow development, we see that, given those favourab ditions, the dimensions of the deposits can o

ted by the supply of material—that is, ferruginand phosphoric solutions available.

s regards the phosphoric contents of the sedimentr ores of iron and its relationship to their organie orin, the association of phosphorus with living matters of ancient date, and it is well known that phosphrus in a soluble form must be supplied to all land, grving crops. Tests recently carried out by me show the presenee of 5.28 per cent. of phosphorus in the ash of he "dry rot" fungus already mentioned, while in the ash of ordinary mushrooms I found as much as 6.8 per cent. In a sample of seaweed I found 1.86 per eent. phosphorus in the ash, equal to 0.104 per cer in the plant itself. The highly phosphoric contens of bog iron ores which are shown to be compos of bacteria remains, confirms the phosphorie haeter of those organisms also.

Te very considerable variations of the phosphorus corents in the different sedimentary ores may be asund to be due to the different organisms concerned in heir deposition, and possibly also to the varying degee in which the matter of the organisms itself ma have become incorporated in the ore deposits.

Tough the phosphorus present in iron ores is inarbly of organic origin, it does not always indicate an rganie origin of the ore itself. Some fifteen or twety years ago some shipments of Elba iron ore sent to is country were found on analysis to be higher in hosphorus than usual, parts showing as much as 1 5 er cent. phosphorus. As the Elba ore had hither to en one of the purest of our ore supplies, this aud some consternation to the parties interested. and I was sent out to the island to investigate the matr. I was able to trace the phosphoric ore to the sumit of a hill not far from the coast, and came to the onclusion that the excessive phosphorus contents of hat part were due to it having at some remote perid been the haunt of sea fowl, the guano deposit of hich had in the course of time become incorporated with the surfaee layers of the iron ore masses at that point.

M explanation, I remember, was ridiculed at the time by one of our leading luminaries, but has since been amply confirmed by similar experiences in insula positions elsewhere.

On the connection of the oolitie structure with the rganic origin I do not dwell, as at present I have no evidhee to offer.

I propose now to deal with the phosphorie magnetites especially those of Swedish Lapland, my remarks being suggested by a recent purusal of the Carnegie Researeh Report, by Dr. O. Stutzer, on the "Geology and Origin of the Lapland Iron Ores," published in No. II. of the Journal of the Institute for 1907. Dr. Stutzer appears to have made a very careful examination of these ore fields, and reviews impartially the various theories regarding their origin, and the evidence by which they are supported, his own conclusions, however, invariably being that they are magmatic segregations in depth, which, with their enclosing crystalline rocks, have been injected to their present position.

I find myself entirely at variance with Dr. Stutzer on his conclusions, which, in my opinion, are also contrary to the mass of evidence he adduces to support them and as the problem of the Lapland ores has, since my own brief visit, appeared to me a simple one, I propose to submit my views for eritieism and comparison with those of Dr. Stutzer and others, set out in the paper referred to.

My opinion is that the Kiruna and other phosphoric magnetites of Sweden are sedimentary ores of organie origin of Cambro-Silurian age, similar to and probably eontemporary in deposition with the Wabana ore beds of Newfoundland. These Swedish deposits, together with their containing rocks, have been metamorphosed by heat of dynamie origin, due to compression caused by the shrinkage of the earth's crust, to which foree all volcanie aetivity is probably due. The evidenee of this action is the tilted position of the ore bodies; the ore was brought to a state of fusion, or an equivalent physieal condition at the great depth at which this action took plaee, and the peroxide particles have been converted into magnetite, which appears to be the ultimate produet of thermal metamorphism. The particles of this magnetite have segregated into the dense form in whieh it now exists —the silica, alumina, and lime of the sedimentary ore passing into the composition of the containing clays, shales, etc., whieh now, by semi or complete fusion, are transformed into the gneisses, porphyries, and syenites associated with the present ore masses.

In the Kiruna distriet the ore and rocks have been subjected to a higher temperature than at Gellivara, where the granular strueture of much of the ore probably represents the remains of its original oolitie strueture, and the gneisses the ineomplete fusion of the shales whieh contained the original ore beds.

That the width of the ore body at Kiruna is greatly in excess of any known sedimentary iron ore bed is explained by presuming the segregation of several ore beds into one body, their partings naturally uniting by fusion with the adjacent roeks, while some further thickening would probably occur by the action of gravity on the tilted ore mass; it is notable that the greatest thickening occurs at Kiruna, where there is also evidence that the highest temperature and consequent greatest approach to fluidity prevailed.

From Dr. Stutzer's paper I find that a sedimentary origin for the Lapland deposits is advocated by Sjogren, Hamberg, and De Launay, though none of these authorities appears to offer any definite explanation of the subsequent metamorphosis.

That the ore beds form part of a regular sedimentary series is shown by the section given on p. 117 of Dr. Stutzer's report, and is confirmed by all the evidence he has collected.

When the series became heated by the pressure which brought about the metamorphosis of the ore into magnetite, the highly alkaline fueoid elays enclosing the ore beds would naturally be the first to soften and fuse, while the more acid members would be metamorphosed without fusion, or the loss of their sedimentary identity to the sehists and qnartzites as they now exist. The specular ore deposits of the quartzites frequently referred to by Dr. Stutzer are of quite different origin, being non-phosphoric impregnations of the original sandstones, which have been segregated and metamorphosed during the period of high temperature into their present specular condition. They are of the same elass and type as those found throughout the northern parts of the Seandinavian Peninsula constituting the ores of Dunderland and Sydvaranger. The ore is frequently mixed specular hæmatite and magnetite, showing an ineomplete stage of metamorphism due to thermo-physieal eauses respecting whieh we are at present imperfeetly informed. The complete transformation of peroxide ores into magnetite is apparently only brought about when actnal fusion results.

To Dr. Stutzer and other advocates of a magmatic origin for these and similar deposits I would point out that the magnetite which is contained in the accompanying crystalline rocks is invariably titaniferous, as Dr. Stutzer himself records in so many of his observations, and as the iron sands resulting from the disintegration of such rocks are always found to be. The analysis of the Kiruna syenite given in Dr. Stutzer's paper on p. 113 shows that the magnetite yielded by segregation from such rock would contain 20 per cent. of titanic acid, while the Kiruna ore contains but traces of this substance. As Dr. Stutzer admits or claims a contemporary origin for the syenites and the ore bodies they enclose, I shall be interested to learn how he reconciles these facts with a magmatic origin for the ore. Had Dr. Stutzer checked his observations more frequently by chemical analysis, he would, I think, have avoided many pitfalls and arrived at a different conclusion.

In supporting the theory of a sedimentary origin for these Lapland ores, I would draw attention to the fact that similar iron ore deposition is now going on in the same district, and probably under very similar conditions to those prevailing when these great deposits were laid down.

Dr. Stutzer notices the occurrence on pp. 108 and 111 of his paper without apparently appreciating the relevance of the matter to the subject he was studying. He says: "In the numerous peat-bogs the iron of the more ferriferous rocks has been largely changed by reduction to an organic ferrous salt, which, when removed in solution in running water, is re-oxidized to ferric hydrate, furnishing material for lake and bog ore deposits." And again he says: "The innumerable peat-bogs of Lapland have a powerful solvent effect on the more ferriferous rocks, the dark red porphyries being soon bleached white; the iron-laden bog waters collecting and stagnating (?) in ponds deposit their contents as a dark brown ferric hydrate."

Here Dr. Stutzer has accurately noticed and recorded natural processes of iron ore deposition going on, which we have every reason to believe have gone on through all the cycles of the geological ages. These processes, which modern science enables us to trace to organic agency, furnish, I submit, a simple and natural explanation of the origin of these deposits more probable and more convincing than those requiring us to accept them as deep-seated magmatic segregations, subsequently injected to their present positions, or as of "pneumatolytic hydatogene" origin, "derived from gases in solution in the magma or contact deposits." That they are of sedimentary origin, however, is, I think, rapidly becoming the accepted belief, and in claiming, as I do, that their metamorphosis has been caused by heat generated in the constant shrinkage of the earth's crust, always steadily going on, with the consequent folding and compression which is every where apparent where igneous and eruptive manifestations are found, I am again looking to a simple and natural agency to explain their present condition.

In support of my views I would point out that—

(1) The general alignment of the magnetite outcrops, and the continuity of the deposits in length and in depth where worked or tested, correspond in every way with the extensive areas generally covered by sedimentary iron ore deposits.

(2) The average phosphorus contents of these deposits (the magnetites) is everywhere from 1 to 2 per cent., agreeing in this important respect with sedimentary deposits of similar geological age.

(3) In the Annapolis-Torbrook district of Nova Scotia the metamorphosis of a sedimentary hæmatite into a phosphoric magnetite can be definitely traced

(4) Mr. L. Cayeux has shown that the magnetite ore of Dielette, France, is a metamorphosed sedimentary ore, as it still preserves a typical oolitic structure

In conclusion, I may note that a consideration of the organic origin of certain ores of iron has incidentally brought to notice the fact that manganese ores may be similarly formed.

It throws more light on the close and constant association of the ores of the two metals in nature, and suggests that organic agency may have been responsible, at least in part, for the great sedimentary manganese beds of the Caucasus and South Russia which frequently show an oolitic structure, and other manganese deposits elsewhere whose sedimentary origin has been lost or obscured by subsequent metamorphism. With respect to the connection which I have endeavoured to show between the phosphoric magnetites and the sedimentary ores of iron, it is evident that the acceptance of my views would recognize, in the metamorphic action, a natural refining process which has thrown out the earthy constituents of the sedimentary ores and raised the metallic contents of the metamorphosed product to a high degree of concentration.

If this be so, then the same refining and enriching process may be expected to be met with elsewhere wherever sedimentary ore beds have been subjected to disturbance by earth movements from their original horizontal position, the degree of enrichment being proportionate to the dynamic force developed and the thermal equivalent resulting therefrom.

In preparing this paper, I have to thank Dr. L. Ellis, of the Technical College, Glasgow, for much valuable information respecting the iron bacteria, of which, as is well known, he has made a special study.

Methods of Removing Slag at Granby Company's Smeltery, B.

The Granby Consolidated Mining, Smelting, and Power Company, Limited, is preparing to dispose of the slag from the blast furnaces at its copper smeltery at Grand Forks, Boundary district of British Columbia, by a different system to that in use there, which latter has been for years the hauling from the furnaces to the dump, of the slag while hot in cars by steam locomotives.

The extent of the smelting operations of this company, the smeltery of which is stated to be the largest copper reduction works in the British Empire, and among the biggest in the world (second only to the great Washee works at Anaconda, Montana) is indicated in the following brief outline of the smelting plant and equipment in use at Grand Forks. At the smeltery there are eight rectangular, water-jacket blast furnaces—six 44 by 266 inch, and two 48 by 240 inch, at tuyeres, depth 15 feet 8 inches—having a total capacity of 4,000 to 4,500 tons of ore per diem. Connersville blowers, with a total air capacity of 60,000 cubic feet; specially designed mechanical furnace charging system; hot slag haulage, by 14-ton steam locomotives in 44-cubic ft. slag cars; three converter stands, 84 by 126 inches, operated by electricity

and, 72 by 100 inches for which hydraulic power d, converter capacity being 50,000,000 pounds of r per annum; three blowing engines, total ca- 19,700 cubic feet of air per minute, and much ory plant and machinery.

ing the earlier years of the company's smelting ions the slag was granulated by water and run dump by gravity, in the ordinary way. Then, as mp filled to an extent making it difficult to main- he grade requisite for the continuance of this d of disposal of the slag, it became necessary stitute for it the hot slag haulage system now to be dispensed with in favour of a return to lation by water and disposition of slag by a me- escribed as follows:

r large receiving bins will be erected below the t level of the slag dump and at a distance of 150 feet from the blast furnace settlers. The ill be granulated by water immediately after its rge from the settlers, in the ordinary way, and veyed thence to the receiving bins in launders. the bins it will be distributed over the dump by s of conveyor belts, at first up a gradual incline aximum height of about 100 feet, and then by a onveyor to the place for dumping. These belts e ordinary 30-inch conveyors. The incline will t be over a series of trestles, but afterwards the of the dumped slag will be so regulated as to give quisite incline up to whatever height it shall be economically practicable to carry it. The con- belts will be operated by two electric motors. Arrangements are being made for the supply of lumber for construction of the receiving bins, trestles, launders, etc., and the excavation of trenches for the launders from the settlers to the receiving bins is already in progress.

Two main reasons have caused the management of the company to make this change in the method of disposal of slag. One is, the excessive cost of the present hot slag haulage system, owing to the slag having to be hauled about three-quarters of a mile to the dump, together with the high cost of maintenance in good working condition of locomotives and slag cars; and a second, the increasing difficulty of disposal as the dumping room below the present level becomes more and more curtailed. The substitution of the new method of slag disposition for that long in use is expected to involve an outlay of between $30,000 and $40,000, but important compensating results will be lower cost of disposal of the slag, and provision of dumping room for fully 10,000,000 tons of slag. To long continue the present hot-dumping system would mean the changing of the course of the north fork of Kettle River, with resultant cost of land that would be destroyed thereby, so the change determined upon will avoid a large expenditure in that direction and at the same time bring about a substantial reduction in operating costs. It will probably be about four months—near the end of September—before it will be practicable to make the change now being prepared for; meanwhile the slag will be dumped while molten, as during several years last past.

THE ST. ANTHONY GOLD MINE.

OR'S NOTE.—The following article was written at th request of the Journal. It is based upon a pri- vate eport compiled by Mr. J. C. Houston. The ob- ject appending the lengthy assay sheet is to adduce evide ce of the possibilities of the region. The present owne s of the St. Anthony are floating no company. Whil we cannot, of course, assume responsibility for the accuracy of the samples and assays, we are satis- ied at they have been done honestly and carefully.

General View of the Buildings

Office, Storehouse and General View of Harbour

(Written for the CANADIAN MINING JOURNAL.)

The building of the new transcontinental railroad through Northern Ontario and particularly through that ction of Ontario north and west of Port Arthur now as Sturgeon Lake district, has made readily ac- ssible and brought into some prominence the gold bearing areas in that locality. On account of the inac- ssibility of this district little development work has been done in the past on the numerous prospects staked along the shores of Sturgeon Lake, although specimens of visible gold-bearing quartz of almost incredible richness have been brought into Fort William and Port Arthur, which were reached in the old days by one hundred miles of lake and river navigation and then by the Canadian Pacific Railway from Ignace.

To those who are not familiar with the location of this gold field, it may be well to explain that the route from the east is, first to Fort William via the C.P.R., this city being eleven hundred miles west from Montreal, eight hundred miles west of Toronto, and about four hundred miles east of Winnipeg. From Fort William a branch of the Grand Trunk Pacific is now open for traffic as far west as Superior Junction, one hundred and eighty miles distant. The new line of the Transcontinental Railroad is now being built east from that point, and it is inside the angle formed by the junction of the two roads that the Sturgeon Lake gold district lies. The lake itself, lying northeast and

Open Cut running north from the shore of Coture Lake.

southwest, practically forms the third side of a triangle, for its northeast end reaches within three and one-half miles of the main line of the G.T.P., while the south end, or the foot of the lake, is within six miles of the Port Arthur branch of the G.T.P.

As much of the supplies for the building of this section of the Transcontinental Railroad east of Superior Junction were brought in over the lake, the contractors found it advantageous to connect the foot of the lake with the railroad by a six-mile spur. They then established a boat service on the lake, so that there is now a continuous water and rail connection with the outside world. In the old days freight was taken in by canoe from Ignace with great hardship, often at a cost of $200 a ton; but now it may be billed through from any point and at most reasonable rates. The contractors announce that they are going to operate their spur line and boats to the advantage of mining people in the district. Once the main line of the Transcontinental is in operation facilities for getting in freight will be even better and the rates lower. Since nearly all the properties now being developed in the Sturgeon Lake district are either on islands in the lake itself, or on the shore, and since steamers are now landing passengers and freight on the docks of all of these, it will eliminate much of the hardship and expense of other days, and rapid development of the more able properties is sure to follow.

Sturgeon Lake itself is a beautiful body of about 36 miles long and of varying width, som up to two miles. There are numerous islands great many bays in the lake, the shore line of is clothed with spruce, balsam, jack pine, popla The country generally is rolling and is the ha many of our large game species. The lakes ar stocked with fish, the large grey trout predomin

A visit to the various claims now being dev in this district shows that the summer is to be one. At the Rainbow property, which is situat an island about midway in the lake, there is a sh of blue quartz in a vein some 30 inches wide carries values on the surface, and in the shallo which were sunk on the vein. The values also into the wall rock for about two feet, thus gi probable total width of about four feet of milli This property is owned by English capitalist work is being pushed vigorously under the supe of a mining engineer of wide experience in Au and the West African gold fields.

Besides the Rainbow property there are many locations upon which a good deal of work ha done, such as the Douglas, the Dawson, the W the Faucett, and the Covenay. None of these ever, has reached the producing stage. The onl perty on the lake that has been developed th is the St. Anthony, which is situated at the h the lake and which has recently been acquir Toronto investors. The property is in charge J. C. Houston, formerly manager of the Right o mine, Cobalt. Mr. Houston, "Joe" to his fan is thoroughly acquainted with the Rainy Riv Lake of the Woods mining camps.

The following facts are taken from Mr. Ho report. The samples were taken by him and a under his supervision:

Geological.

The main vein has a north and south course. the contact between the schist and granite ru northeast and southwest direction with a varyi towards the southeast. Thus the values are pa schist and partly in granite. The character enclosing rock does not seem to have much influe the ore as the samples show just as favourably north end which is altogether in the granite, as south end which is wholly in the schist. The v the schist appear to have more regularity than granite. All of the ore so far mined on the pr has been taken out of an open cut at the south indicated on the plan and longitudinal sketch herewith.

Old Tailings Dump

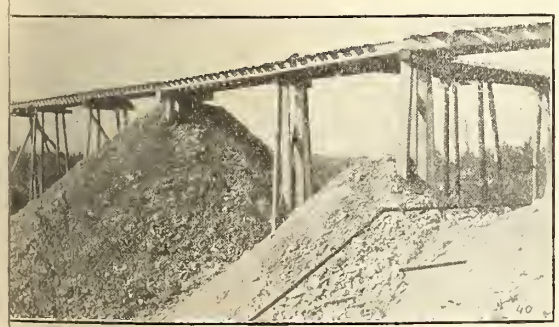
Longitudinal Section.

s open-cut begins about four feet above the water of Coture Lake, and continues for about 145 It then dips down about 40 feet to the tunnel formed the 100-foot level. It extends along this for about 100 feet and then angles up to the surt about 60 degrees. This section has been stoped om 10 to 25 feet wide and while some waste was led the greater portion of it was ore.

A rift was run south on the 100-foot level from the bottom of this open-cut for a distance of about 45 feet and a winze sunk there, to a depth of over 50 feet. Good ore was opened up in this drift, the whole length of it showing $25 to $40 per ton. In the winze the vein dips to the west and consequently passed out of the shaft which was sunk vertically at a depth of 40 feet. This also showed good ore, as it gave an average from about 20 samples of $19.20. The open-cut immediately over the winze gave assays of $39 and $42 over widths of 14 and 12 feet respectively. At the north end of the open-cut the vein split into two portions, the easterly portion of which was drifted on at the 100-foot level, as indicated by Stations 15, 14, 13, 12. Good ore shows all the way along at that level. At Station 12 it shows four feet of $20 ore. At this station a cross-cut was run to the west for a distance of about 70 feet; it then curves to the north past Station 8, where it encounters the west section of the large vein. Here no values of any particular moment were shown up for nearly 100 feet; but close to Station 3 values begin to come in and for a distance of 120 feet along the drift and up the raise to the surface there is pay ore. On an average of about 45 assays this ore runs $23.60 to the ton. On the surface this section of the vein shows from 12 to 25 feet wide, and where the raise holes through to the surface there is over 30 feet of ore that will run from $7 to $8 to the ton.

Continuing north from the bottom of the raise, considerable dead work has been done. There is a drift north from Station 8 about 150 feet in length which is in absolutely barren ground. At Station 10 this drift turned sharply to the west, and as soon as the vein was picked up, the work in that direction ceased. At Station 2 a cross-cut has been run over to the east to connect with the main shaft and continued eastward for about 130 feet. About 50 feet to the east from the main shaft this cross-cut intersects the vein that was known on from Station 12, and at the intersection the assay return was $35 over a face of four feet.

Number two vein, which shows on the surface, for about 200 feet in length and has a varying width of from 8 to 12 feet, gives assays of from $2.40 to over $4. On the surface No. 1 vein can be traced northward from where the raise holes through to the surface for a distance of about 300 feet, and shows a varying width of



Ore Dump

Surroundings where the 100 ft. level holes through to the surface.

from 6 to 12 feet. On the north end of this surface showing two pits have been sunk, and three assays taken from these pits give the following results: $7.60, $24.80, and $8 respectively. No. 1 vein does not end where these pits are sunk, but apparently outcrops across a swamp 1,000 feet further on. It was surprising to find that here in this section about which little is known, there was to be found a property with over 1,000 feet of drifting at the 100-foot level, with a main working shaft sunk for a distance of about 120 feet, and at a distance of about 400 feet from the main shaft was a winze sunk to an additional depth of 52 feet, with good ore showing in it down past the 40-foot mark.

Assay Sheet.

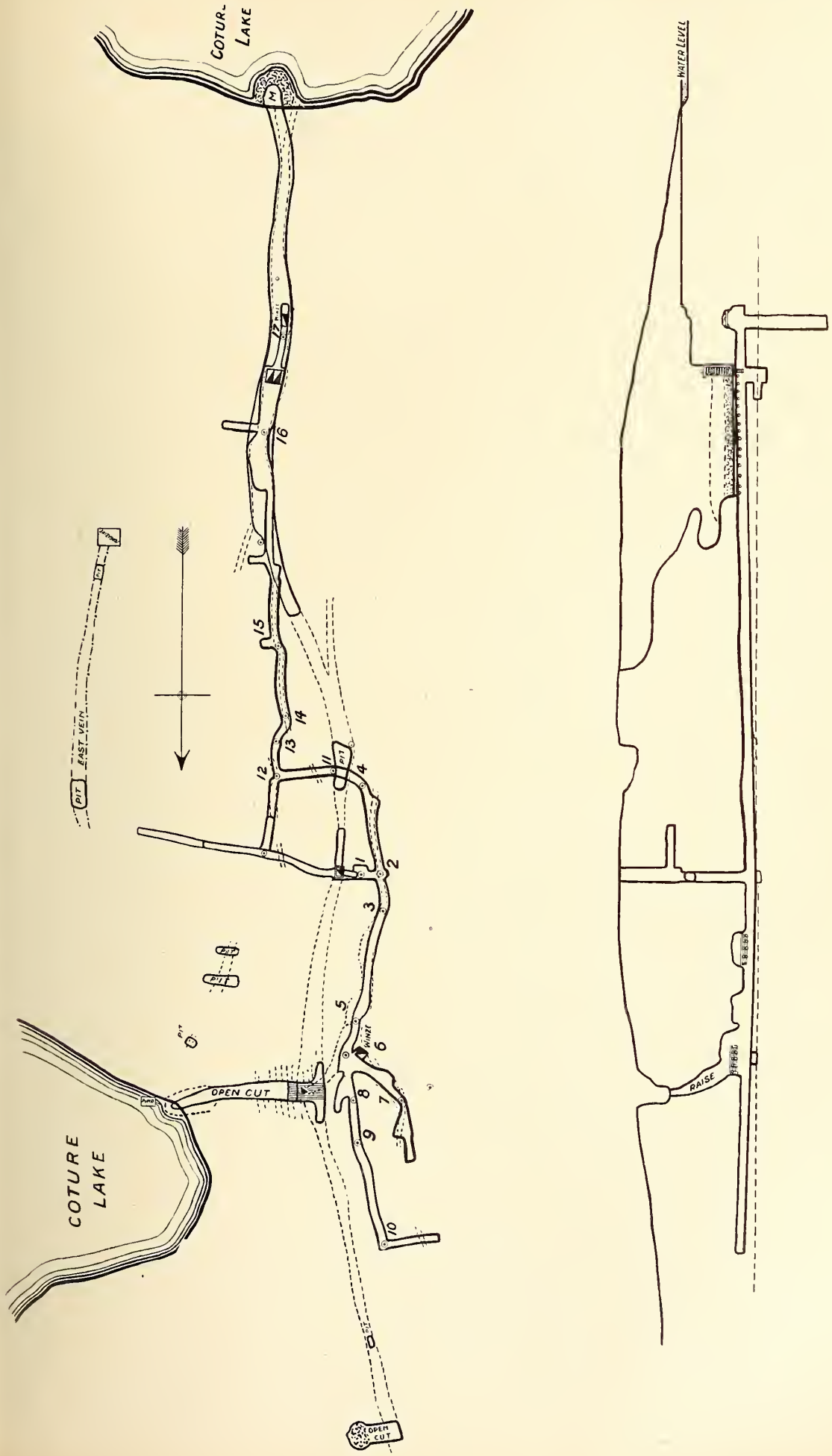
South end of drift, 100-foot level.

No. 1	$112.00
2	74.40
3	11.20
4	67.60
5	110.80
6	58.80
7	16.40
8	19.20
9	7.20

10		8.80
11		5.60
12		6.00
13		10.40
14		6.00
15		2.80
16		22.40
17		6.80
18		4.80
19		12.40
20		2.40
21		2.00
22		1.20
23		Trace
Samples from Winze—		
24		22.40
25		55.20
26		11.60
27		127.60
28		7.20
29		7.20
30		2.00
31		2.80
32		13.20
33		2.00
34		6.00
35		12.80
36		10.40
37		5.60
38		23.60
39		7.20
40		7.60
41		9.20
42		8.80

Surroundings where the 100 ft. level holes through to the surface.

200 feet of 100-foot level north from open cut—		
43		3.60
44		2.80
45		3.20
46		3.20
47		3.60
48		44.00
49		7.60
50		8.40
51		4.80
52		4.00
53		42.00
54		6.40
55		9.60
56		4.80
57		11.20
58		6.00
59		40.40
60		34.00
61		29.60
62		18.00
63		8.80
64		20.40
65		2.00
66		4.40
67		24.40
68		10.80
69		4.80
From Station 12 north for 40 feet—		
70		5.20
71		25.20
72		22.00
73		84.40
74		19.60
75		13.20
76		10.80
77		22.00
78		22.00
79		62.00
80		123.20
81		2.40
82		5.20
83		Trace
84		Trace
85		Nothing
86		2.00
87		Trace
From Station 4 to Station 3—		
88		Trace
89		Trace
90		4.40
91		3.20
92		Blank
93		Blank
94		Trace
95		Trace
96		Trace
97		Trace
98		Trace
99		Trace
100		Trace
101		Trace
102		2.00
Station 3 to Station 7 and up the raise—		
103		1.20
104		3.20
105		6.40
106		5.20
107		16.40
108		6.80
109		3.20
110		25.60
111		3.20
112		25.60
113		23.20
114		19.20
115		18.80
116		38.40
117		11.20
118		5.20
119		8.80
120		68.40
121		38.40
122		46.80
123		21.20
124		40.00
125		24.00
126		50.80
127		20.40


COTUR. LAKE
17
16
15
14
13
12
11
PIT
4
2
1
3
5
WINZE
6
7
8
9
10
OPEN CUT
COTURE LAKE
EAST VEIN
PIT
D
WATER LEVEL
RAISE

128	14.20
129	99.60
130	23.60
131	60.00
132	13.60
133	10.00
134	58.40
135	19.60
136	20.40
137	34.80
138	54.40
139	32.80
140	26.00
141	8.80
142	6.00
143	19.60
144	1.20
145	1.20
146	.80
Sample A	6.20
Sample B	5.60
Sample C	18.00
Sample D	10.80
Sample E	14.00
Sample F	39.60
Dump Lake	20.80
New Vein	2.00
X Cut South Side	4.80
X Cut North Side	10.40

From First 50 feet of Main Shaft—

147	7.60
148	4.80
149	8.40
150	19.60

From open cut directly above winze across 9 foot and 12 foot—

151	42.00
152	39.60
153	12.40
154	21.60
155	14.40

Across 50 feet at head of raise on surface—

156	.80
157	....
158	.80
159	....
160	.80
161	....
162	4.00
163	....
164	4.40
165	....
166	3.60
167	....
168	4.00
169	....
170	1.20
171	26.80
172	26.00
173	24.00
174	2.40
175	4.00

From north end of open cut—

176	39.60
177	35.20

Pit at north end of main vein—

178	7.60
179	21.40
180	18.20

Pit near north end of main vein—

G	24.80
H	8.00
I	51.00
J	38.40
K	4.80
L	10.40
M	20.80

Ore dumped into lake—

Tailings Samples.

1	27.60
2	30.00
3	6.40
4	3.60
5	8.40
6	3.20
7	29.60

The old mill equipment used by the former o is being partly discarded and largely supplen by the present owners, who expect that by July they will have installed and in operation a co 10-stamp mill, with a six-foot pebble mill for re- ing purposes. There is equipment of two 80- power boilers, a 40-horse-power Corless engine, cross-compound compressor, 4-drill capacity, a hoist with three hundred feet of cable, a co outfit of water pumps, water tanks, etc. The m shop is provided with a large lathe, a drill press er, and other necessary equipment. The assay is also in good shape. As will be seen by the graphs furnished herewith the property is wel pliced with buildings, there being a sleeping ca cook-house, and other buildings large enough commodate a force of 40 or 50 men.

At the present time the fuel supply for the pr is being obtained from the forest of the surrou country, but there is every reason to expect that in a comparatively short time it will not be nec to depend on the timber growth for fuel, as th a large water fall on the Sturgeon River about miles from the St. Anthony which will furnish sufficient to supply all the needs of the Sturgeon Gold Fields even if developed on a very large

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Dominion Coal Output.

The output obtained from the mines of the Dominion Coal Company in May was as under:—

No. 1	50,770
No. 2	69,070
No. 3	18,710
No. 4	39,670
No. 5	32,140
No. 6	23,240
No. 7	14,580
No. 8	14,580
No. 9	34,490
No. 10	16,770

No. 12	22,010
No. 14	11,300
No. 15	2,300
No. 16	1,150
Tons	350,770

This is the largest production ever obtained by the Coal Company in May. The nearest record was in May, 1908, in which month the output was 335,829 tons.

The production for the five months ending May, during the present and recent years, is as follows:—

1908	1,585,364
1909	1,273,676
1910	1,196,917
1911	1,523,190

While the output is some 326,000 tons ahead of last year at the end of May, yet it is 62,000 tons behind the corresponding period of 1908. The first seven months of 1908 produced 2,-000,000 tons, and it is not likely that this output can be reached by the end of July this year. The last half of 1908, however, was a very poor one, as shipping was hindered by forest fires and fogs in the St. Lawrence, and a marked trade depression was making itself felt. It is hoped during the coming summer to maintain the present rate of output, and it is reasonably probable that the output for 1911 will reach over 800,000 tons, and get away from the 3½ million mark around which Dominion Coal outputs have so persistently hovered for six years.

Dominion Steel Corporation Employees' Debentures.

As intimated by the president of the Dominion Steel Corporation at the annual meeting in Montreal, this corporation has taken the commendable step of issuing 6 per cent. debentures to their employees in such low denominations as $50 and $100, and on an easy instalment-purchase plan. These debentures are issued only to employees or the trustee or benefit societies connected with the corporation or its subsidiary companies. The scheme, therefore, embraces employees at the Sydney Steel Works, the Marble Mountain, and other limestone quarries of the Steel Company, the ore mines at Wabana, the mines and works of the Dominion Coal Company, and at the Springhill mines. The debentures may be paid for in sum, or in 24 or 36 monthly instalments, which will be deducted from wages. Once the instalments are all paid the debenture is transferable, being made out to bearer, but it is not transferable in course of purchase, except to another employee of the corporation. If a purchaser desires to surrender his rights and discontinue the instalments he may do so, and will be allowed ordinary bank interest on the accumulated instalments. Provision is made for temporary suspension of payments when circumstances render this necessary or desirable. A most attractive feature of the issue is that if a purchaser should die before his instalments are paid up, the corporation will itself pay up all instalments due after his death, treat the debenture as fully paid up, and his representatives may at once receive the debenture, or its face value in cash. The debentures run for six years, and the holder, if he is still an employee at the end of this term, may receive the face value or a renewal debenture on which interest will be paid at not less than 5 per cent. per annum.

It is probable that this debenture issue will be largely taken up, as it affords a real necessity among an industrial population earning fair wages, namely, an absolutely safe investment returning twice the interest rate allowed by savings banks. The usual bond issue in denominations of $500 and $1,000 is altogether out of the reach of the thrifty workingman, but there must be a great number of men with a few hundred dollars who will welcome this issue, particularly with the added insurance provision. There are also large numbers of young men, earning good wages, who can easily find the small instalments of from $1.30 to $4 monthly required to purchase a $50 or a $100 debenture, who will find this form of investment an excellent way to accumulate the nest egg necessary for marriage, or old age.

The following interesting paragraph appeared in the "Colliery Guardian" of the 12th May:—

"At the Mansfield colliery, belonging to the Bolsover Colliery Company, as the result of one week's working of 5½ days, ending Tuesday, May 2nd, a record for a week's turning was made, the total quantity of coal brought to the surface being 25,068 tons. This gives an average turning of over 4,557 tons each day, or 620 tons per hour. It is worthy of mention that during the year 1910 not a single fatal accident occurred at the pit."

This is a record to be proud of so far as production goes, but to mine over a million tons of coal without a single fatal accident is a far greater reason for congratulation. The Bolsover Colliery Company's mines are in the northern portion of the Derbyshire and Nottinghamshire coalfields in the English Midlands, and this company has always been known for its solicitude for the safety and comfort of the workmen. The colliery village of Bolsover is a model of what a colliery village should be. It was laid out with this intention and has justified the expenditure and thought that was devoted to this end.

The Springhill Strike.

The Springhill strike was called off on the 28th May by a unanimous vote of the men, having lasted from early in Augnst, 1909. The date recalls the fact that just one year and one month from this date the Glace Bay strike was declared off, the vote to return to work having been taken in this case on the 28th April, 1910. Springhill is a place that has an unenviable notoriety for strikes, but it is to be hoped that the strike which has just closed will have satisfied even the most inveterate advocate of strikes for a long time to come.

The strike followed upon the refusal of the men to accept the findings of a Conciliation Board. The demands of the men were for recognition of the U.M.W.A., for an increase in wages, and the adoption of a fixed wage schedule, and payment for the coal produced by the ton and not by the box, with a modification of the system of docking for stone. The Board refused to recommend any of the demands of the men, but suggested an arrangement in connection with docking for stone, which the men rejected.

Shortly after the commencement of the strike the Cumberland Coal & Railway Company announced that the strikers would not be taken back to work except under a reduction of 15 per cent. in the wages of coal cutters.

Towards the end of 1910 the Dominion Steel Corporation purchased the stock of the Cumberland Coal & Railway Company, and attached the Springhill mines to the properties operated by the Dominion Coal Company.

The militia were called out in July, 1910, to repress disorder. Owing, however, to the restrictions placed upon the military when acting in aid of the civil power, and the indifferent attitude of the town police of Springhill, the strikers for a long time had practical control of the town, and by a system of pickets were able to prevent any men returning to work. In March, 1911, the militia were withdrawn and the town was placed under the jurisdiction of a Provincial Commissioner of Police, who, with the assistance of 30 provincial constables, was able for the first time to put an effectual stop to the picketing and molesting of the men at work. Almost immediately following the arrival of the Police Commissioner, several of the most prominent strikers returned to work, and it was evident that many others were tired of the useless struggle and had only been deterred from seeking work by fear of bodily injury at the hands of the strikers.

At the beginning of the year the Provincial Workmen's Association revived the old Pioneer Lodge at Springhill. Nego-

tiations were entered into between the officers of the P.W.A. and the management of the Dominion Coal Company for a lessening of the 15 per cent. reduction announced after the strike was called, and endorsed by the Coal Company when it assumed the management at Springhill, for a modification of the docking arrangement and for consideration for abnormal working places.

The strike leaders began to realize that the situation was daily getting more hopeless for them, and the Police Commissioner approached the Premier with a committee of strikers seeking through his intervention to obtain terms from the Coal Company which would enable them to return to work. After negotiations extending over several weeks, the Coal Company agreed to take back the men who had been on strike as fast as places could be found for them, the company stating it believed it possible to do this within 45 days. The finding of the Longley Board is to govern the method of docking for stone. The wages of coal producers will be reduced 10 per cent. below those existing prior to the strike, but fair consideration will be allowed in abnormal places. No other reductions are to be made in day wages, the schedule which was announced by the Coal Company in January remaining in force, with the exception of the concession to the coal-cutters.

The net result of the strike is that the U.M.W.A. has not gained recognition, that the award of the Longley Board with reference to the docking system which the men refused is to become effective, and that instead of increased wages, the coal cutters will suffer a 10 per cent. reduction.

The United Mine Workers of America have spent a lot of money in Nova Scotia to little purpose. It is estimated that in the strikes at Springhill, Glace Bay, Morien, and Inverness at least $1,800,000 has been expended, and in each case the strikes were either abortive from the first or eventually unsuccessful. The chief reason for the failure of the U. M. W. to obtain recognition in Nova Scotia is that this organization is unnecessary. Taking advantage of an insignificant "insurgent" movement in the P. W. A., the U. M. W. attempted to usurp the jurisdiction of the Nova Scotian union, and posed as the heralds of unionism to a benighted mining population, ignoring the fact that Nova Scotia mines had been unionized long before the U. M. W. came into existence, and that the conditions under which Nova Scotian miners live and work are immeasurably superior to the conditions in the proper habitat of the U. M. W. of America.

Others reasons for the failure of the U. M. W. were the introduction of American strike methods, altogether foreign to Nova Scotian ideals, brutal and organized intimidation, the lavish use of union funds to corrupt those who could aid the strike cause or give the leaders information; the open advocacy of the extremest tenets of international socialism, and above all, the utter rottenness and insincerity of the whole U. M. W. campaign with its specious appeal to the foreign portion of the mining population and the newly arrived and credulous miner from the British Isles. The chief officials of the U. M. W. must have found it very difficult to explain, and more difficult to defend, the huge expenditure of union funds in Nova Scotia, where the status of the miner is higher than in any United States coalfield, where the fatality rate is lower and the conditions of living are better; where the true aims of unionism are better understood and practised than in any labour union affiliated with that reactionary and tyrannous body known as the A. F. of L.

Many of the miners of Nova Scotia were carried away by the midsummer madness of the U. M. W. agitation, and the unlimited promises of this union's paid organizers, accepting all too credulously the vapourings of migratory orators whose sole mission was that of destructive agitation. To-day the disgust of these men is all the deeper because of their first unsophisticated enthusiasm. Looking back over the past two years is to review the most disastrous period in the hist of Nova Scotian coal-mining, all the more to be deplored b of the entire needlessness of all the strikes which were at the mandate of the United Mine Workers of America. was not a grievance, real or fancied, in all the complai the U. M. W. which could not have been settled on terms without the intervention of this alien organizatio without all the loss of money, reputation, and trade whi been entailed upon the miners and the coal owners.

ONTARIO.

Cobalt and Gowganda.

The power situation is now all that could be desired an production from the camp is back at its former level in but owing to increased concentration is lower in tonnage the silver prospects with money in the treasury to resun velopment have commenced to search for the white again and there are probably as many men now employ Cobalt as during the past year and before the power sho But the speculative element has entirely disappeared, an less a property can actually show silver in a fairly conti ore body it is hard to raise money for development.

In the annual report soon to be published, the Buffalo will show a production of a million and a half ounces proximately the same as last year. 1,250,000 ounces wer duced at the mill from 41,000 tons of ore, or an avera about 30 ounces per ton milled. The ore reserves will proximately the same, about 41 million ounces, the old re of last year scarcely being touched. Much of the or year has come from development on the new level at th foot, and some old stopes on No. 10 vein.

The problem of the treatment of the low grade ore Crown Reserve and the Kerr Lake has been solved. I at first proposed to erect a customs concentrator at Kerr but there was a hitch at the eleventh hour and the schen through. Now an arrangement has been made whereb Nova Scotia mill treats both the Crown Reserve and the Lake ore at a certain fixed price per ton for five years. total amount contracted for is 175 tons from both mine the time fixed is five years. The Nova Scotia has to be expense of adding another 20-stamp to its equipment, to the 6,000-foot aerial tramway, and give a guaranteed e tion. The bullion will be delivered back to the two comp for them to market themselves. The mill should be al handle ore by the first of August.

Fire destroyed the power house at the Nancy Helen i first week of June. The plant, which consisted of a ga ducer plant, a hundred horse-power engine, and the first of a 12-drill compressor, was probably worth about $15,00 work has been in progress for some time, and it is be that fire must have originated from crossed wires. Ne tions were in progress whereby the control of the compan to be turned over to Port Arthur capitalists.

Mr. C. A. O'Connell has taken charge of the Trethewey in place of Mr. George MacNaughton, who succeeded Mr. Loring as manager. Mr. McNaughton is going to Porc after a visit to Nova Scotia.

A strike has been made at the 140-foot level of the Lake north of the shaft, showing a lead about two wide, but of very rich ore indeed. Very few shipment being made from this property at the present time, th grade being conserved until it can be treated at the Scotia mill.

In a bush fire at the Beaver Lake station, South Lorra the British Canadian Company, the power house was b down and the transformers so damaged that they will ha be replaced. This will affect three mines working with tric power, namely, the Wettlaufer, the King George the Alice Lorrain. The accident will not affect the serv Cobalt and Kerr Lake at all.

Kerry mine has now finished pumping out its shaft and commencing to sink the shaft below the 350-foot level. The Consolidated, another lease on Peterson Lake, has commenced operations on Cart Lake. Brydge lease, St. Anthony, Pacific, and Little Nipissing are all working again.

The Meteor Mining Company, a wealthy Pittsburg syndicate is now sinking a shaft on the west side of its claim near the Savage, in an attempt to catch the Savage veins. A considerable amount of work has previously been done by tunnelling into the hill but without result.

The sale of the Cobalt Central has again been postponed and the further date for the offering up of this company is now placed at June 17. All the local debts of the Standard Cobalt, which is controlled by the Cobalt Central, have been paid so that there is some probability that the property will never come to the hammer, but will be worked again by the company under the new management.

Those who are agitating for a Gowganda-Elk Lake railroad are now confident that they will get their desire in spite of the cold reception the Government gave the project a little while ago. It is stated that some New York capitalists are ready and willing to build an electric road if they are given exclusive rights in the territory. Mr. Englehart is going up to Elk Lake to look over the situation early in July.

Excellent results are being obtained at the Miller Lake O'Brien property this year. The ore bodies at the 200-foot and 350-foot level are far better than above, and during the first part of this year the ore reserves have been greatly increased.

NORTHERN ONTARIO AND QUEBEC.

Porcupine, Swastika, Keekeek, and Matachewan.

The fire at the Hollinger was the one event in the history of the new goldfields most likely to delay the inevitable boom. The Hollinger is the company that has so far represented Porcupine abroad, and now that its plant has been burned and its mill operations delayed for six or eight months, there is nothing yet in the camp to take its place.

The compressor at the Hollinger was not damaged and one boiler is available, so that it will be possible to keep work going on a small scale until machinery can be taken in over the railroad to South Porcupine and beyond. The reports from Porcupine are to the effect that the road from South Porcupine to the Hollinger is in such a condition that it is not possible to take heavy machinery over it, and that such transportation will have to be made when the railroad gets in. The T. and N. O. has now promised that there shall be no delay in extending the line from South Porcupine to South Tisdale, and this decision will undoubtedly have important consequences. The best natural townsite in the whole camp is on the sandy plain between the Mattagami and the Hollinger, and here the Hollinger Gold Mines propose to lay out a townsite. No doubt a considerable settlement will grow up here.

Steel on the Porcupine railroad has already been laid to Golden City, Porcupine, and it will be extended to South Porcupine by the middle of June. On July 1st, when the first passenger train will run over the line, it should be well on the way to the Hollinger.

Prospectors coming out of the Keekeek country in Northern Quebec report that while there appears to be no visible gold, the country is excellent for prospecting, and a considerable number of veteran prospectors will be in there this summer.

The route in at present is from Ville Marie to Quinze, 22 miles on a stage, from foot of Quinze Lake to Sturgeon Rapids, 32 miles in a gasoline launch, from Sturgeon Rapids to Gonderal Portage out of the Kenojovis River 22 miles, one mile and quarter and one-quarter of a mile portage into Simonard River, paddle two miles and a half to portage into Wobiskus Lake and thence into Keekeek.

Prospectors have taken full advantage of the easy terms upon which staking can be undertaken in Quebec and lines have been run round probably 100,000 acres to date. Sam LeRoy, the original staker in this country, has a big vein of quartz in the schist on the edge of a bluff near the lake, and J. B. Roy, about two miles and a half back in the bush, has just torn the moss off what appears to be a pegmatite dike about 15 feet wide. Some few men are now going in to do work, and the country looks so promising that good discoveries are quite likely to be made between Keekeek Lake and the Transcontinental before the summer is over.

There is also a rush into the Fort Matachewan country north of Elk Lake, near the Montreal River. No authentic reports have been received from this field yet.

Bewick Moreing & Company, who now control the Rea Mines, have issued a statement that a reef has been struck at the 200-foot level about 15 feet from the shaft. It is 23 inches wide and shows a considerable amount of free gold. At a depth of 240 feet the sections from the shot drill show $19.20 to the ton after free gold had been picked out.

It is stated on excellent authority that the Drummond interests of Montreal have taken over the control of the Jupiter properties in South Porcupine. This will insure efficient development for another Porcupine property. On the next claim to the Jupiter, the vein has been traced on to the Armstrong Booth for a distance of 350 feet. The lead is in places four feet wide and runs on grab assay from the pay streak $42. At 83 feet a diamond drill core contained $20 and $40 assays from the same vein. Mr. E. P. Earle, of the Nipissing, and Mr. Frank Armstrong are interested in this property.

There has been a change in the management of the Swastika mine, an increase of capitalization, and a determination to put the mine on a working basis forthwith. The capital of the company has been increased from $1,000,000 to $2,000,000, and twenty stamps are to be added to the mill, with adequate compressor capacity also. Mr. R. B. Lamb stays as consulting engineer, but Mr. Summerhayes, formerly of the Porcupine Central, takes the place of Mr. Vandergrift as superintendent. Owing to the other good finds made round the Swastika, there is now a considerable amount of speculative interest in this area and a small settlement is rapidly growing up.

The National Porcupine Mines, the first to start operations in the Township of Ogden, have abandoned their option on the Weston properties.

BRITISH COLUMBIA.

A late spring has in some measure retarded progress in the metal mining districts of British Columbia, first cold weather and then much rain having been experienced in many camps. By the end of May, though, weather conditions were generally favourable, with the season's placer gold mining operations fairly entered upon, and wagon roads in lode mining districts, wherever transportation is by horse teams, again hard enough for heavy hauling to be undertaken.

The effects of the general cessation of work in the coal mining districts of eastern British Columbia and western Alberta are not being felt to so great an extent in British Columbia lode mining camps, as it was feared they would be. The prompt action of the British Columbia Copper Company in obtaining a supply of coke for metallurgical purposes from Pennsylvania, followed by the Consolidated Mining and Smelting Company and, at the end of May, by the Granby Company, has resulted in there being no interruption in smelting operations at the respective works of the B. C. Copper and Consolidated companies, and only three weeks' suspension at those of the Granby Company, which last was in some measure influenced as well by the necessity for general overhaul and repair of blast furnaces and accessory plant.

Little or no progress seemed to have been made by the end of May by the Board of Conciliation and Investigation in the

direction of bringing about an agreement between the Western Coal Operators' Association and District No. 18, United Mine Workers of America. For some unexplained reason the board took a recess of three weeks after having visited a number of collieries and taken evidence. Whether or not operators and miners will be any nearer to a settlement when the board shall resume its sittings is not known to the public at the time this is being written. Meanwhile the various collieries are idle and the U. M. W. A. local organization is giving its members a little assistance in the shape of provisions. Opinion outside of those immediately concerned seems to be that there is no present prospect of an agreement being arrived at without further delay.

Cariboo and Cassiar.—Little news is obtainable thus early in the season from the placer mining camps of these districts. Hydraulicking has been fairly started and, there having been an abundant fall of snow through the winter, water is plentiful for gravel sluicing. If the backward spring be not followed by an early hot summer, the season will probably be long and results correspondingly profitable. On the whole there should be a larger total recovery of gold from hydraulic mining operations this year than for several recent years, for some of the larger mines are better equipped and their water supply facilities are larger than in the past.

East Kootenay.—The Sullivan group is now the largest producer of ore in this district, the output of the St. Eugene mine, also operated by the Consolidated M. and S. Company, having fallen off considerably. A comparatively small production is expected from the Society Girl mine, and possibly the Aurora will also send out some ore. There is not likely to be any important change in conditions in the northern part of Fort Steele mining division until after the construction of the Kootenay Central Railway shall have provided railway transportation facilities. Similarly, lode mining in Windermere division will remain at a standstill, so far as production is concerned, although it may be some mine owners will be encouraged to resume development work now that the construction of the railway has been definitely promised and is being proceeded with. Placer mining will be on a small scale on Wild Horse and several other creeks, while on Perry Creek a decided improvement is looked for in connection with the enterprise of some Vancouver men who last year put in a steam shovel to admit of the gravel being handled in larger quantity. Coal mining and coke making in East Kootenay have been stopped for the time being. It was reported about the end of May that an underground fire had necessitated the sealing up of one of the Michel mines of the Crow's Nest Pass Coal Company, but fortunately there had not been any loss of life in connection therewith. The Corbin coal mine, which had an agreement with its men continuing to a later period than that of the larger mines, is now, like the others, not producing coal. Idle miners and coke makers, while not permitted to work themselves, daily see coke from Pennsylvania being hauled over the railway through the Crow's Nest Pass district, on its way to smelting works in Kootenay and Boundary districts.

West Kootenay.—In Ainsworth division, endeavours are being made to extend lode mining operations in the vicinity of the town of Ainsworth, where several properties are being developed. Across the lake, the Blue Bell is still idle. Up the north fork of Kaslo Creek work is being done at three or four mines which from time to time ship ore. The Utica, on Paddy's Peak Mountain, and the Whitewater group, situated nearer the divide between Ainsworth and Slocan divisions, are both being developed with a prospect of again shipping ore if proposed arrangements for a resumption of traffic on the Kaslo & Slocan Railway shall be carried out.

The outlook is favourable for Slocan mining division, especially as regards McGuigan Basin and Four-mile Creek camps. The early construction of a spur from the C. P. R. line from Sandon to Slocan Lake is looked for, a route for this having been surveyed and preparations made for provisioning the m who will be engaged in construction work. The completion this spur will provide railway transportation for zinc ore fr the Lucky Jim mine, near Bear Lake, on the Ainsworth-Slo divide. It will also make practicable the shipment of m silver-lead ore from the Rambler-Cariboo, in McGuigan Ba in which mine developments continue to be most promising, ore has lately been found on the 1,200-foot level, which give another face for ore extraction to add to those alre opened on the 1,050-foot and other levels up to the 700. Ab Cody, conditions seem to be improving, for the finding of other shoot of ore in the Reco has been reported, while velopment on the Noble Five group, Sunset, and Surprise, dicates that all three may be expected to be on the ore-shipp list again before the close of the ensuing summer. N Sandon, the Ruth-Hope, Richmond-Eureka, and Slocan S groups are all being worked, and further production is pected from them. In the vicinity of Three Forks, the Allister has changed hands and the Idaho-Alamo is again ur lease. Near New Denver, the Mollie Hughes is being ta over by a Spokane company, which is expected to work mine on a larger scale than in the past, while the Sweetg is being developed with promise of its making a profitable put of ore. Several of the smaller mines in the mountains New Denver are also having attention this season.

Four-mile Creek camp, or Silverton camp as it is also ca is now the most active in Slocan division, with three im ant mines and two concentrating mills in operation. At Standard mine, development on Nos. 5 and 6 levels has continued. The face of No. 5 is now in milling ore of grade; cross-cutting both ways from the adit has shown width of ore here to be about 85 feet. No. 6 has not yet driven far enough to reach the downward extension of the shoot of galena ore occurring in No. 5, and which is beli to continue to the lower level. Construction of the a tramway to the mill site near the lake shore, about 8,000 away, is in progress, as is also that of the ditch and flum bring water from Four-mile Creek to the place where the compressor plant is to be erected, and thence to the mill Cribbing and excavations for foundations of mill building plant have been completed, and machinery and plant for t way, compressor, and mill equipment are being received. machinery of the new mill the Van-Roi Mining Com started operating on March 15 is running smoothly and re are satisfactory. During the month of April the tonnag ore put through the mill was 3,273 dry tons, the shipping ducts obtained from which were, approximately, 190 ton silver-lead and 230 tons of silver-zinc concentrates. The mer is being shipped to the Consolidated Company's sme at Trail, B.C., and the latter to Bartlesville, Oklahoma, U The Van-Roi mine is looking well, with a large tonnage o blocked out ready for extraction, so that prospects are fa able for a long and continuous mill run under conditions indicate profitable results to the company. The Silv Mines, Limited, operating the Hewitt-Lorna Doone grou also expecting to have an uninterrupted season of produc For several years the development of its mine has been s ily proceeded with, until now there is much ore ready shipment. The higher grade ore, in which freely occur silver and grey copper, the latter also containing much s is sorted out by hand and shipped crude to the smeltery. second-class ore is sent to the Wakefield mill, on Four Creek, for concentration by ordinary water process. One of the Elmore Vacuum Process plant is being put in at mill, to treat the zinc middlings and make a shipping pr to contain 45 per cent. or more of zinc and 100 ounces o ver per ton.

In Slocan City division, the Enterprise and Eastmon Ten-mile Creek; and the Arlington, Ottawa, Meteor, Prince, and Hampton, all on or near Springer Creek, are

l. The Enterprise is under lease to Mr. S. S. Fowler, of ; two shifts of men were employed throughout the win- th the result that shoots of ore were opened from which nts will be made now that the wagon road to the lake is hard enough for use by the freight teams. The East- s owned by the Ellis Silver Mining Company, of Toronto; the winter 15 to 20 men were employed on the pro- and a lower adit was driven. Several shoots of ore passed through and the main orebody opened in the levels was afterwards entered. It is expected that more ll now be shipped than during the corresponding period year. Of recent developments on the several other City properties above mentioned, the most important at on the Meteor, where a shoot of ore was found, 14 to 20 inches in width, and of high grade; from this several cars of ore are expected to be obtained.

General.—Late developments in Rossland mines are more than ordinarily promising. Mines in Nelson division, especially some of those in Sheep Creek camp, are also looking well. Similarly encouraging reports come from some of the mines of the Granby and B. C. Copper companies, in Boundary district. In the Similkameen, the Nickle Plate group is still making excellent returns, and bids fair to long continue to do so. On the Coast favourable reports come regarding the Britannia mines, near Vancouver; the Marble Bay and Cornell mines, Texada Island; and the Hidden Creek copper mine, on Observatory Inlet, under bond to the Granby Company. Space restrictions, however, prevent further notice of these at this time.

GENERAL MINING NEWS.

NOVA SCOTIA.

ey, N.S., June 1.—A new steel ingot record was made . The output was bettered by about 400 tons. The record of 28,142 tons was made in June, 1909.

has started on the foundation of the new nail mill.

ONTARIO.

to, June 3.—In his report on the Hollinger mine made eral Manager Robbins, the details of which the directors king public, Mr. Robbins says the stoppage of mining ns from the fire is not serious, as they have a sufficient of ore developed to keep the mill going for several The principal loss is in the delay which will now occur the mill can be built and put into operation, but even ot a serious matter.

company will now be able to build the complete mill nide plant together and start operations upon a larger an we had previously planned," he says. "All plans g prepared with a view to ultimately treating a large . The new shaft will have four compartments and the ar will be designed to accommodate self-dumping skips. derground work will be so arranged that by means of an d west main cross-cut all of the workings will be con- to the main shaft. The ore will be dumped directly into sher station, and after being put through the coarse it will be elevated to the sampling mill. The reject e sampling mill will be delivered by conveyor to the bins. The probable treatment will consist of coarse g, fine grinding in tube mills, concentration of sulphides tallics which will be treated separately, and cyaniding ntire pulp.

re is little doubt that within a year or so the company e to increase this milling plant to a capacity sufficient from 400 to 500 tons per day. There is in the mine in hbourhood of 200,000 tons of ore sufficiently developed e the company to begin mining upon an extensive scale as the mill is running.

ing the past two months a large part of the under- work has been confined to cross-cutting east and west ain vein and a total of approximately 650 feet of cross- been driven. The result of the work has been highly tory as it has proven that the various veins which par- main vein upon the surface persist below the surface y high values to and below the 100-foot level.

t of the main vein two parallel veins have been proven e 100-foot level. These veins with the mineralized wall rm bodies of payable ore from four to eight feet in Samples taken at random have shown values from $2 to ton.

"East of the main vein a cross-cut has been driven approximately 100 feet to intercept a dome of quartz which outcrops upon the surface. The surface outcropping has been traced for over 300 feet. The cross-cut driven through this vein at the 100-foot level has disclosed the width of the ore body to be 22 feet, carrying values from $9 per ton on the foot wall to $34 per ton on the hanging wall and giving an average of approximately $18 per ton over the entire width of the vein.

"The deepest workings are those on the 200-foot level of the main vein where something over 200 feet of drifting has been accomplished. The vein is from four to 20 feet in width, and the assays are most erratic, varying from $1.60 to $437 per ton. A sample of 16 tons taken from the 200-foot level, about 25 feet north of the winze, was found upon treatment to carry approximately $84 per ton."

Mr. Robbins says the figures are quoted merely as an illustration of the fact that the high values encountered upon the 100-foot level are duplicated upon the 200-foot level.

The report concludes by saying that no disappointments have resulted from either cross-cutting or sinking and the indications are that during the next year work in the unproven ground to the west and to the north of the present workings will add greatly to the intrinsic worth of the mine.

Toronto, June 9.—The by-law to double the capital stock from $1,000,000 to $2,000,000 was unanimously adopted by the shareholders of the Swastika Mining Company at their meeting yesterday. The president stated that his reports from the mine were highly satisfactory. Arrangements have already been made for the underwriting of a large block of the new stock.

The Swastika Company was reported as still in funds, and has $150,000 of the old stock in the treasury.

Toronto, June 2.—Two decisions in cases in which E. J. Townsend, a mining promoter of Sudbury, was defendant, were given yesterday by Chief Justice Falconbridge. A. H. Beath sued Townsend for 10,000 shares of stock in the Golden Rose Mining Company, in which Townsend had a controlling interest, which is in the Temagami district, and asked Beath to assist him in promoting it, promising Beath ten thousand shares. Townsend tried to back out of the agreement, and asked Beath to resign. In giving judgment, His Lordship said that the preponderance of evidence was in Beath's favour and that Townsend's witness was a mere creature. "The defendant was endeavouring to make signals to him in the witness box," said the judge, who gave Beath judgment for 9,000 shares.

The other suit was brought by John F. Black, of Sudbury, respecting the same claim. Black had a small interest in the claim and signed an agreement with Townsend that they would form a company to be known as the "Queen of Sheba Mining Company."

Black claims to have advanced over $3,000 in personal loans to Townsend and for various purposes, such as the purchase of equipment and the selling of stock. He sued for this and $20,000 damages, or 150,000 shares in the Golden Rose Company. Judgment was given for Black with a reference to the Master-in-Ordinary to ascertain the amount due Black.

Cobalt.—The surveys for the 6,000 feet aerial tramway between the Nova Scotia mill and the Crown Reserve, at Cobalt, are now completed, and construction will commence at once. A contract will be let immediately for the installation of 20 additional stamps at the Nova Scotia mill to take care of the 100 tons per day from the Crown Reserve and the 200 tons per day which it is most probable will be trammed to it from another Kerr Lake mine, with which a contract is now being made. This will give the mill 40 stamps and raise the capacity to more than double its present crushing power.

Porcupine, June 1.—The Porcupine branch of the Temiskaming and Northern Ontario Railway will be extended on past the Dome as far as the Pearl Lake district and presumably as far west as the Mattagami. This follows directly in line with the action of the big interests in the Hollinger who have to a greater or less extent been instrumental in securing the decision to carry the road through past their mine.

ALBERTA.

Coleman, Alta., June 6.—Dr. Gordon and Colin Macleod, members of the conciliation board which was to re-convene here to-day to resume the inquiry being made into the dispute between the mine workers and operators in District No. 18, United Mine Workers of America, failed to reach town, and Secretary Carter, the other member of the board, who went to Indianapolis a week ago and who arrived on the west-bound flyer, after waiting until the arrival of the local train from the east, went to Fernie to-night. The executive board of the district held a meeting this afternoon, but nothing was given out as to what action was taken. Vice-President Hayes, of Indianapolis, wired Mr. Carter this afternoon that he was starting for Coleman to-day. M. F. Purcell and William Diamond, of the international board, are here, and Charles Garner will arrive to-morrow. None of the operators have yet arrived, but Manager Wilson and President Stockett are expected this evening.

BRITISH COLUMBIA.

Stewart, June 3.—One of the parties of the Dominion Government Survey Department, who, under Dr. King, the chief astronomer of Canada, are engaged in delineating the Alaskan boundary, arrived here on Sunday, May 21, by the G. T. P. Company's steamer Prince Albert and registered at the Empress Hotel. This party, which consists of the following, Mr. J. H. Mackie, in charge, Messrs. R. G. Evans, J. M. Bates, C. W. Hayward, F. M. Badham, W. Bond, H. McLelland, and B. Dodds, moved out into the field on Tuesday last, and are now encamped at Portland City, two miles from here. Their work will be to carry a series of triangles from the original base extension down to the mouth of the Inlet. Beacons will be established on all points both of the main and secondary triangulations, and a very accurate topographical survey will be made for two miles on either side of the canal. It is estimated that the field work of this portion of the international boundary will occupy three seasons.

The work of delineating the international boundary throughout its length is carried out by alternating parties of Canadian and United States surveyors, and each party is accompanied by a representative from the other nation. The American representative with Mr. Mackie's party has not yet arrived.

The work of the Geological Survey in the Portland Canal district will be continued this year by the Dominion Government. Mr. Connell, who was here last year, is expected fortnight with a party of assistants.

UNITED STATES.

Miami, Ariz.—The Miami plant is running in fine fash Underground work is being carried forward at the rat about 2,000 feet monthly. It is wholly confined to ore-bea ground. Considerable ore is being taken from the stock on the surface, but the bulk of the ore comes from the velopment.

Cripple Creek, Colo., June 3.—From the El Paso min Beacon Hill, company and lessees sent out 131 cars in Ma which the company, mining in the levels just recovered the recession of water, contributed 62 cars, or two cars a

The grade of the ore is about $25 a ton. Several big st are being mined not only by the company, but by lessees. is the banner production from this property to be made number of years, even before the El Paso was flooded. greater portion was mined in the old levels which were clared worked out a number of years ago and which have been producing regularly.

Boston, Mass.—The directors of the Calumet & Hecla declared a quarterly dividend of $6 per share. Three mo ago $6 was declared, a year ago $7. With the payment of dividend just declared the stockholders will have received $5, 450,000 in dividends since the formation of the company

Fairbanks, Alaska, June 5.—A gold strike is reported to been made at Indian Creek, a tributary of the Koyokuk R 300 miles up stream. Pay earth has been struck in two pl Miners are stampeding from here. Gold has also been st on Long Creek, on the north side of the Yukon, opposite M The earth yielded five to fifteen cents to the pan.

MEXICO.

Guadalajara, Mex., June 2.—Milling operations are well der way at the new reduction works of the El Favor Mi Company in the Hostotipaquillo district of Jalisco. The 100-ton plant is running constantly and giving not the slig trouble. At first the launders and tables required adjust in order to produce the proper flow of the heavy "pulp," that has been accomplished, and as soon as the two addit tube mills which are on the ground have been placed in mission, the stamp duty will be increased from four to stamp a day, the present load, to seven tons a stamp daily, perhaps even higher ultimately. At present the product the batteries is first being put through 20-mesh screens, these will be displaced with 8-mesh screens, which will gi much coarser product for concentration over the Wilfley t and Frue vanners. The overflow from the tables will b ground in the tube mills and again pass over the tables t cyanide treatment department.

According to the week's tests, 34½ per cent of the a value of the ore of the El Favor is being saved in the co trates, and slightly better than 50 per cent. of the total a value is being saved in the zinc boxes, making a total reco of 84½ per cent. It is confidently expected that a much hi percentage of saving will be effected as the mill is trimme by steady operation.

The concentrates now are running six kilograms of s to the ton and will furnish in returns at the present cap of the mill a weekly saving of something better than $6,000. saving in the zinc boxes will amount to about $10,000 we The management of El Favor says it is too early yet to pr with safety the ultimate results, as the present tonnag scarcely more than half what it is expected it will be withi next few weeks.

STATISTICS AND RETURNS

TRETHEWEY FOR MAY.

The following is the mill report for the month of May from the Trethewey mine:—

Pounds of concentrates shipped to Thorold, 75,315; No. 1 ore and concentrates shipped to Carnegie, 72,360; ore treated tons 3,577; jig concentrates (pounds), 37,641; table concentrate (pounds), 75,438; totals—75,485 ounces. First-class ore from mine, 35,418 ounces. Total in ounces—109,903. Bullion shipments for month, 1,459 pounds.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending June 9, and those from Jan. 1, 1911, to date:

	June 9. Ore in lbs.	Since Jan. 1. Ore in lbs.
Elger	.....	55,200
Exley	.....	40,000
Esther	.....	6,000
Beaver	.....	716,708
Buffalo	56,590	1,288,010
Cambers Ferland	63,200	575,000
City of Cobalt	.....	493,780
Cobalt Lake	55,980	1,805,250
Cobalt Townsite	.....	480,700
Colonial	.....	42,000
Chiagas	.....	1,873,520
Crown Reserve	49,670	1,208,220
Hargraves	60,000	101,100
Hudson Bay	63,600	438,450
Kerr Lake	.....	1,262,030
King Edward	.....	40,000
La Rose	.....	2,764,870
McKinley-Darragh Savage	64,060	2,685,290
Nipissing	64,920	2,714,910
O'Brien	.....	607,790
Peterson Lake (Little Nip)	.....	58,430
Provincial	.....	40,510
Right of Way	67,680	519,460
Silver Cliff	.....	106,680
Standard	.....	102,813
Temiskaming	.....	775,302
Trethewey	71,400	672,302
Wettlaufer	.....	117,232

The shipments for the week were 617,100 pounds, or 308 tons. The shipments from Jan. 1 to June 9 were 21,693,635 pounds, or 10,8[illegible] tons.

B. C. ORE SHIPMENTS.

Both the Granby mine and the Granby smelter are absent from the ore returns this week, but both are expected to resume operations in a fortnight's time.

The following are the returns of the ore production and movement for the week ended June 3, and for the year to date:

Boundary Shipments.

Mother Lode	6,636	144,685
Rawhide	5,220	84,123
Jack Pot	473	14,220
Athelstan	225	1,942
Napoleon	662	2,637
Insurgent	162	328
Lone Star	397	2,043
Other mines	.....	488,989
Total	13,775	738,967

Rossland Shipments.

Centre Star	3,032	84,841
Le Roi No. 2	580	11,707
Le Roi No. 2, milled	300	6,600
Le Roi	227	5,326
I. X. L.	7	43
Other mines	.....	378
Total	4,146	108,895

Slocan-Kootenay Shipments.

Sullivan	672	14,514
Richmond-Eureka	29	1,089
Rambler-Cariboo	29	770
Hewitt	21	215
Maestro	19	113
Eastmont	31	121
Knob Hill	206	1,386
Twighlight	11	11
St. Eugene, milled	420	13,896
Queen, milled	420	9,030
Granite-Poorman, milled	250	5,500
Nugget, milled	110	2,420
Wilcox, milled	75	1,650
Van Roi, milled	800	8,249
Other mines	.....	4,907
Total	3,093	63,871

The total shipments for the week, including the estimated milling, were 21,014 tons, and for the year to date, 911,723 tons.

B. C. Copper Co.'s Receipts.

Greenwood, B.C.

Mother Lode	6,636	144,685
Rawhide	5,220	84,123
Jack Pot	473	14,220
Athelstan	225	1,942
Napoleon	662	2,637
Insurgent	162	328
Lone Star	397	2,043
Other mines	.....	240
Total	13,775	250,218

Granby Smelter Receipts.

Granby	.....	458,982

Consolidated Co.'s Receipts.

Trail, B. C.

Centre Star	3,032	84,841
Sullivan	672	14,514
Le Roi No. 2	580	11,707
Le Roi	227	5,326
Richmond-Eureka	29	1,089
St. Eugene	62	2,938
Rambler-Cariboo	29	770
Hewitt	21	215
Maestro	19	113
Eastmont	31	121
I. X. L.	7	43
Knob Hill	206	1,386
Van Roi	65	297
Twighlight	11	11
Other mines	.....	36,658
Total	4,991	160,029

The total receipts at the smelters for the week, including concentrates, were 18,766 tons, and for the year to date, 869,229 tons.

TORONTO MARKETS.

June 12 (Quotations from Canada Metal Co., Toronto).
Spelter, 5.50 cents per pound.
Lead, 3.65 cents per pound.
Antimony, 8 to 9 cents per pound.
Tin, 48 cents per pound.
Copper, casting, 12¾ cents per pound.
Electrolytic, 12¾ cents per pound.
Ingot brass, 8 to 12 cents per pound.

GENERAL MARKETS.

June 8.—Connellsville Coke (f.o.b. ovens).
Furnace Coke, prompt, $1.40 to $1.50 per ton.
Foundry Coke, prompt, $1.90 to $2 per ton.
June 9.—Tin, Straits, 48.50 cents.
Copper, Prime Lake, 12.50 cents.
Electrolytic copper, 12.40 to 12.50 cents.
Copper wire, 13.75 cents.
Lead, 4.47½ cents.
Spelter, 5.50 cents.
Sheet zinc (f.o.b. smelter), 7.25 cents.
Antimony, Cookson's, 9.00 cents.
Aluminium, 19.75 to 20.25 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $42.50 per ounce.
Platinum, hard, $44.50 per ounce.
Bismuth, $1.80 to $2 per pound.
Quicksilver, $43 per 75-pound flask.

Silver Prices.

	New York. cents.	London. pence.
May 25	53¼	24 9/16
" 26	53¼	24 9/16
" 27	53¼	24 9/16
" 29	53⅛	24½
" 30	Holiday	24½
" 31	53¼	24 9/16
June 1	53¼	24 9/16
" 2	53⅜	24⅝
" 3	53⅜	24⅝
" 5	53⅜	Holiday
" 6	53⅛	24½
" 7	53¼	24 9/16
" 8	53¼	24 9/16
" 9	53	24½

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous.

	June 12, 1911.	
Dominion Steel Corporation	59	60
Nova Scotia Steel	..	99
Crow's Nest Pass	..	68
Granby	37½	38
Consolidated Mining & Smelting	35	40
Amalgamated Asbestos	..	..
Black Lake Asbestos	..	15

Porcupine Stocks.

Foley	.97	1.04
Det. New Ontario	.50	.51
Pore. Northern	.63	.66
Rea	6.10	6.15
Apex	.14	.15
Canada	1.13	1.20
Pore. Central	.80	.81
Dobie	2.90	3.15
Dome Ext.	.65	.66
Hollinger	14.76	14.85
Monita	.15	.2
Preston	.32¼	.3
Gold Reef	.21	.25
Pearl Lake	.58½	.62
Imperial	.15	.19
Tisdale	.10	.11
Swastika	.58	.59
United	.05	.06
Pore. Gold	.60	.60
Standard	.18	.25
West Dome	1.25	2.00
Coronation	.26	.32
Crown Chartered	.49½	.51

Cobalt Stocks.

Amalgamated	..	...
Bailey	.04½	04
Beaver Consolidated	.50	.51
Buffalo	1.75	2.00
Chambers-Ferland	.12	.14
City of Cobalt	.16	.18
Cobalt Central	.01	.04
Cobalt Lake	.20¾	.21
Coniagas	6.60	7.20
Crown Reserve	3.15	3.30
Foster	.04½	.06
Gifford	.02	.04
Great Northern	.17¼	.18
Green Meehan	.03⅝	.03
Hargraves	.17½	.18
Hudson Bay	98.00	102.00
John Black	...	...
Kerr Lake	5.50	6.00
La Rose	4.20	4.40
Little Nipissing	.04	.04
McKinley	1.70	1.72
Nancy Helen	.01	.04
Nipissing	10.40	10.50
Nova Scotia	.10	.15
Ophir	.10	.14
Otisse	.01¼	.02
Peterson Lake	.09½	.10
Right of Way	.09	.10
Rochester	.07	.08
Silver Leaf	.03¾	.04
Silver Bar	...	...
Silver Queen	.05	08
Temiskaming	.65	.66
Trethewey	1.05	1.06
Watts	...	...
Wettlaufer	1.19	1.20

New York Curb.

Prit. Col. Copper	5⅜	5
Butte Coalition	19⅝	19
Chino Copper	..	..
Davis-Daly Copper	1¼	1
Ely Consolidated	1/16	
Giroux Mining	7	7
Goldfield Consolidated	6	6
Greene-Canadian	7⅛	7
Hareuvar Copper	..	..
Inspiration Copper	8⅞	9
Miami Copper	..	..
New Baltic Copper	6½	7
Nevada Con. Copper	19⅞	20
Ohio Copper	1½	1
Rawhide Coalition	..	..
Ray Central	1 3/16	1
Ray Consolidated	17½	18
Union Mines	⅜	1
Yukon Gold	3 15/16	4

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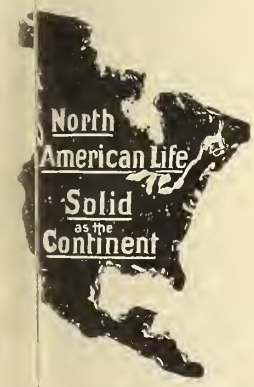

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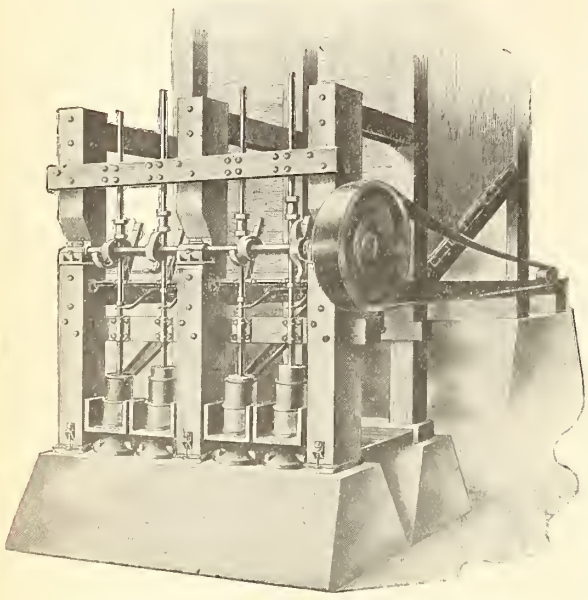

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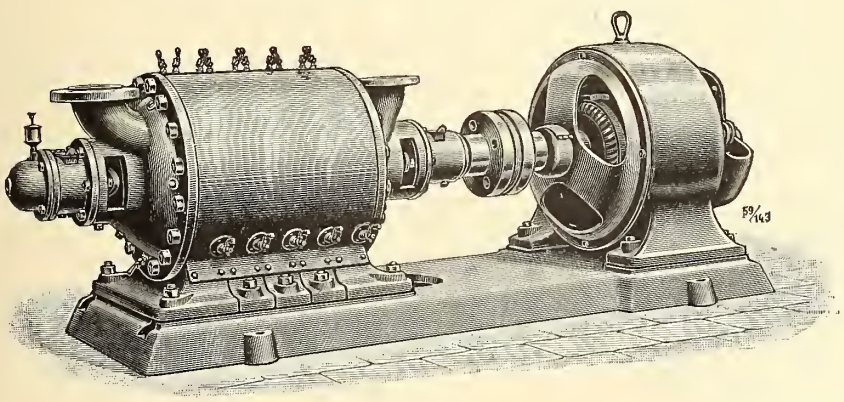

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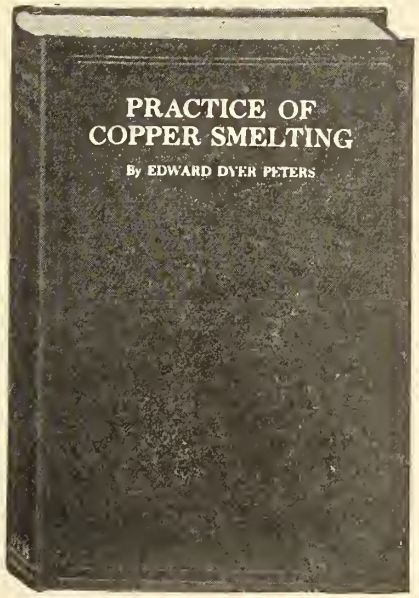

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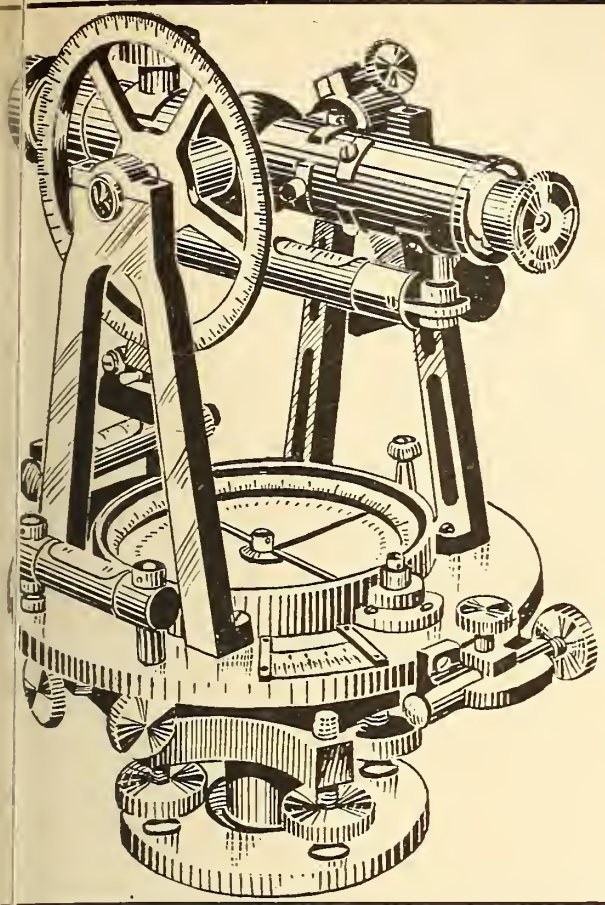

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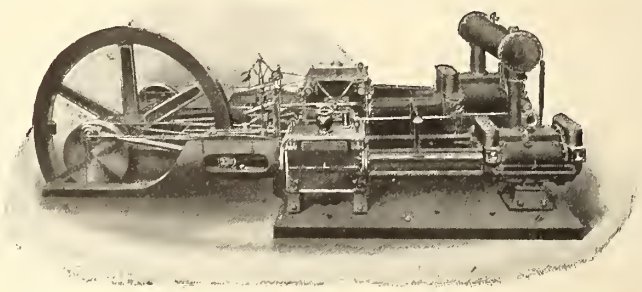

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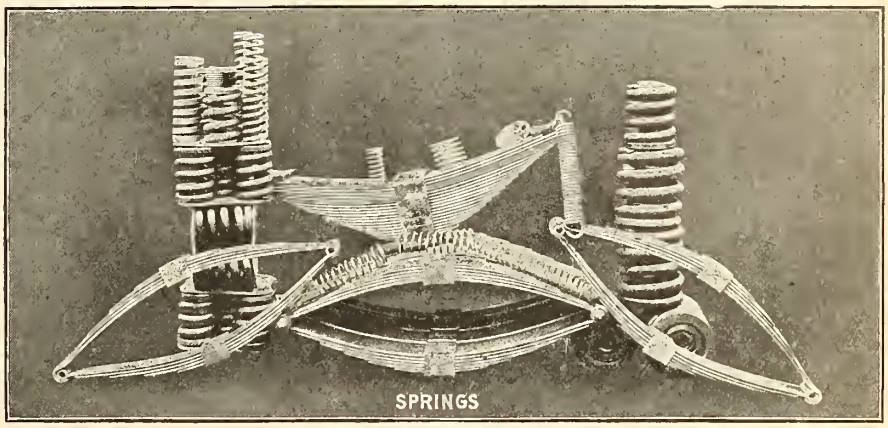
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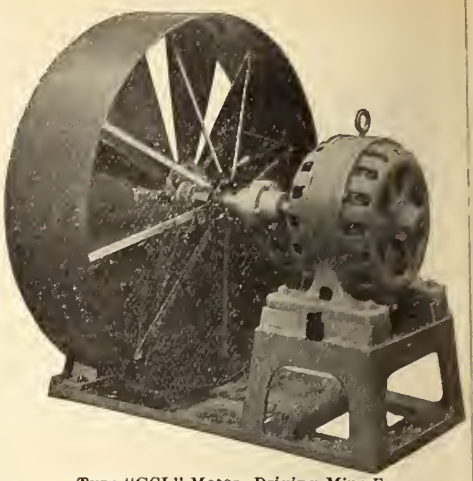

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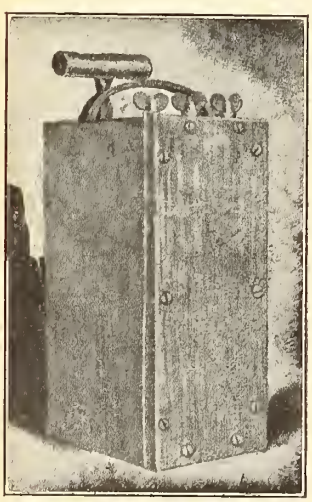

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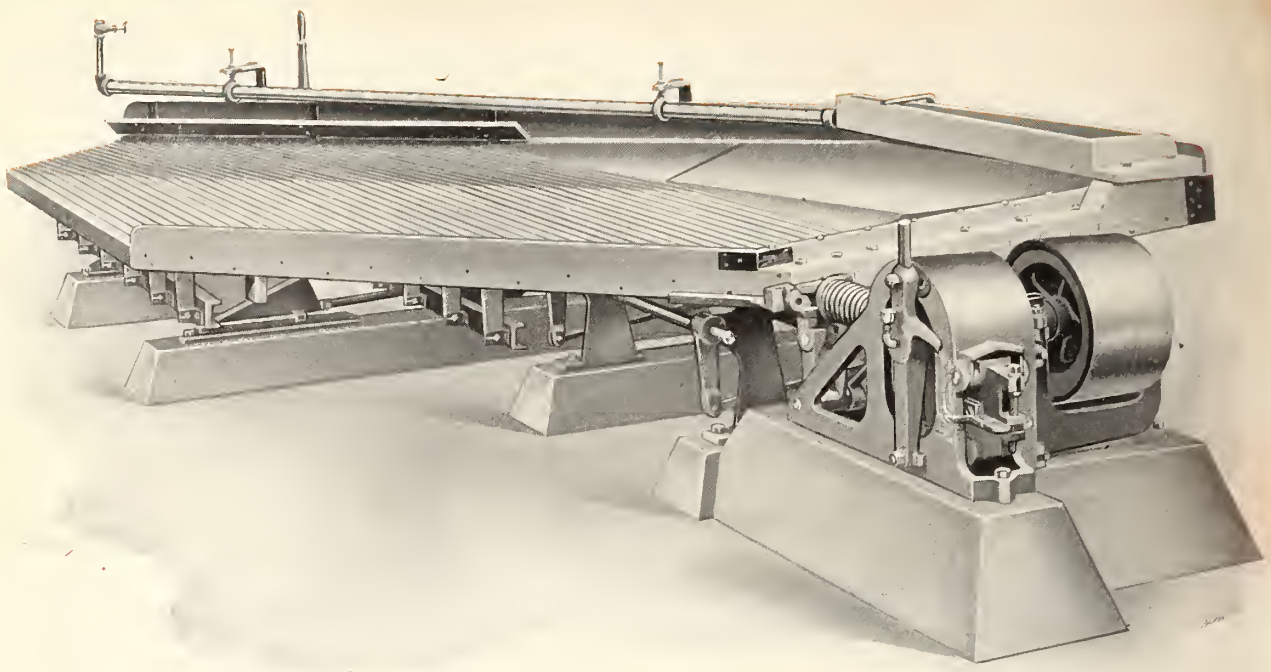

In a sixty day competitive test in the Coeur d' Alene District, the James No 2 Sand table made a 20 per cent better extraction on the fine table feed than its four competing machines. We refer you to the Morning Mill, Wallace. Idaho; the Lead Silver Mining Company, Wallace, Idaho; the National Ore Concentration Company, Joplin, Mo, Cobalt Central Mill, Cobalt, Ont.; Nipissing Reduction Works, Cobalt, Ont.; Buffalo Mill, Cobalt, Ont.; Temiskaming Mill. Cobalt, Ont.; Trethewey Mill, Cobalt, Ont.; Hudson Bay Mine, Limited, Cobalt, Ont. Also the Balbach Smelting & Refining Company of Newark, N.J

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The Condenser is as old as the steam engine itself, but has until very recently received far less consideration and has been treated as an anxillary, the reliable working and efficiency of which had but little bearing upon the economy of the plant as a whole.

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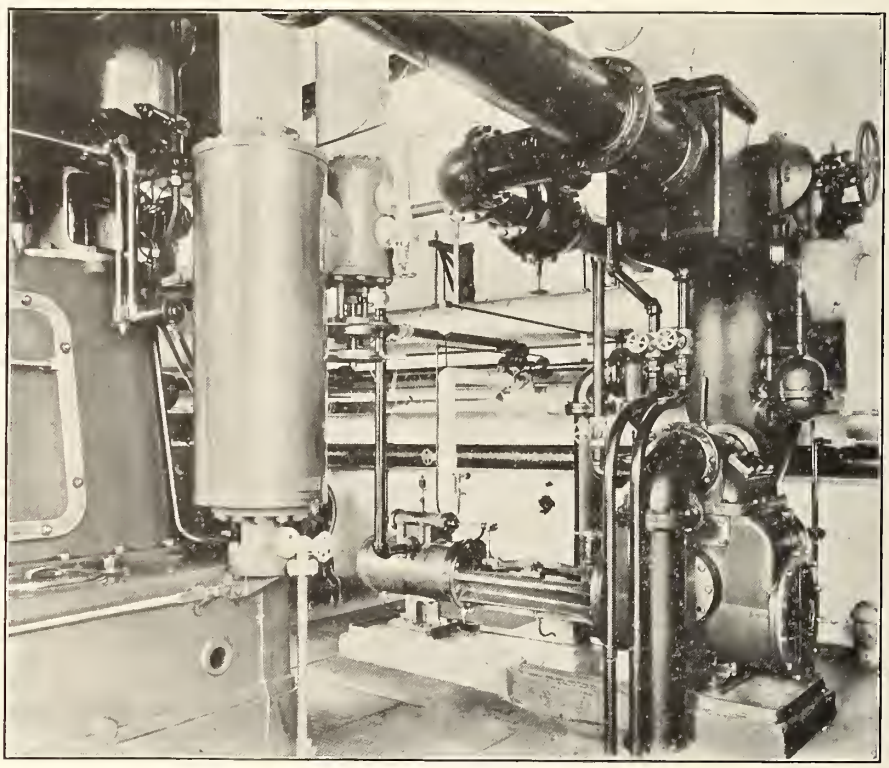

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Renold Patent Silent Chains

What Users Think

MONTREAL, Feb. 8, 1909.

Messrs. Jones & Glassco, Montreal.

RE RENOLD SILENT CHAIN DRIVE.

GENTLEMEN,—In reply to your enquiry of Jan. 30th, I may say that the Renold Silent Chain Drives we have installed are giving every satisfaction.

Our first drive was installed to replace a 12 in. belt which was giving us trouble on account of short centres; this chain has run continuously for four years without the slightest trouble.

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Our third drive was installed on a calendering machine after breaking two sets of helical gears and this has been so successful that we are now installing two more similar drives.

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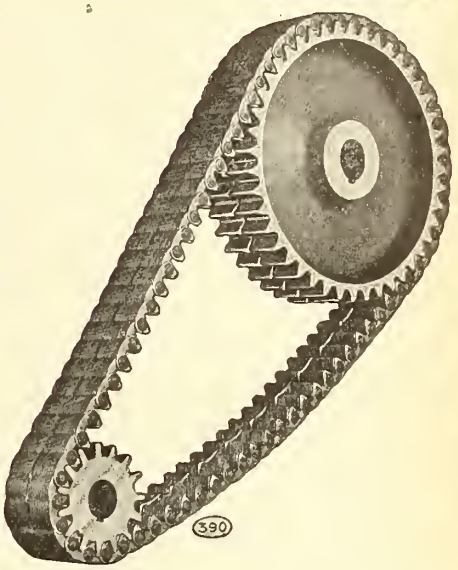
—The above comes from one of the largest manufacturers in Montreal and is signed by the Mechanical Superintendent. Up to the present (1911) these drives have not received repairs of any kind.



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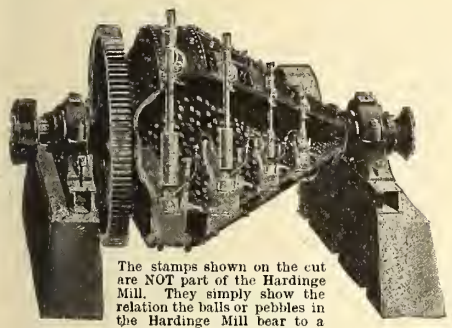

The stamps shown on the cut are NOT part of the Hardinge Mill. They simply show the relation the balls or pebbles in the Hardinge Mill bear to a number of stamps arranged for **Ideal Stage Crushing.**

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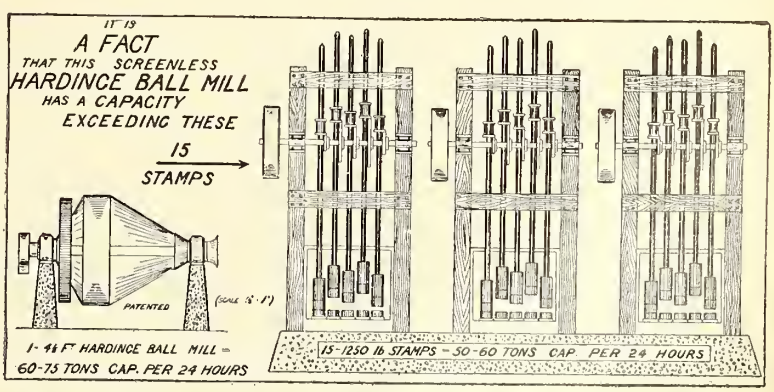

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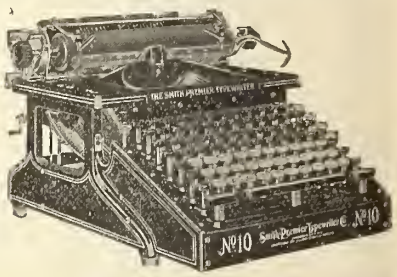

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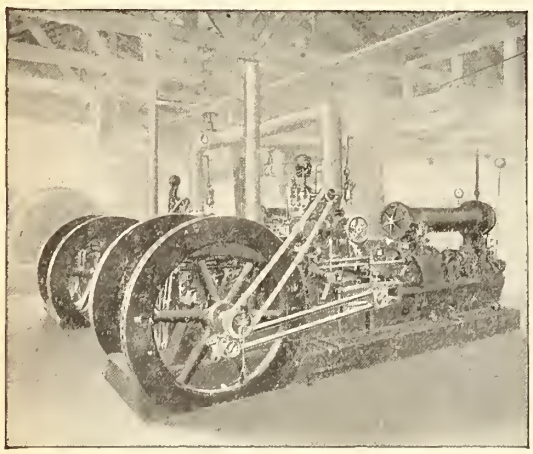

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New Bulletin No. 658-J.

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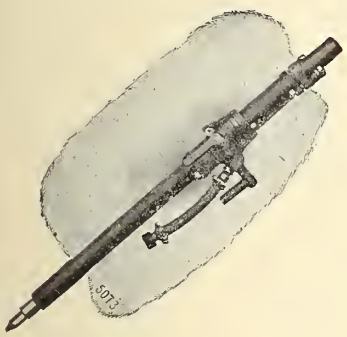

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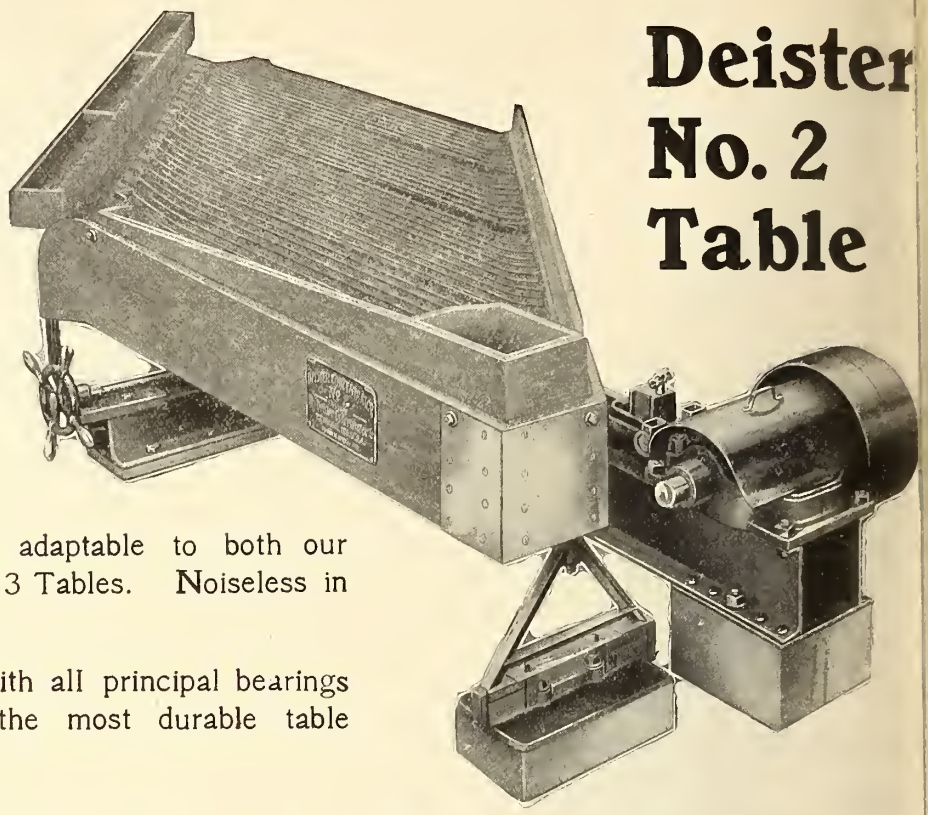

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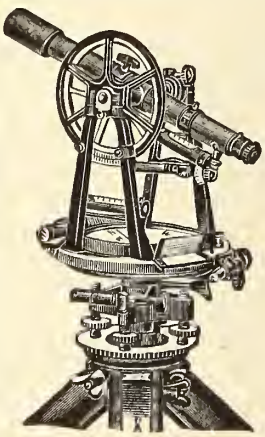

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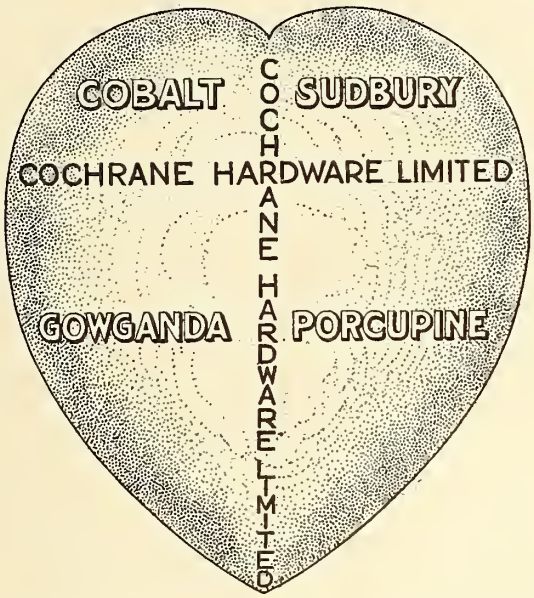

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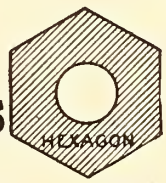

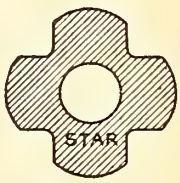

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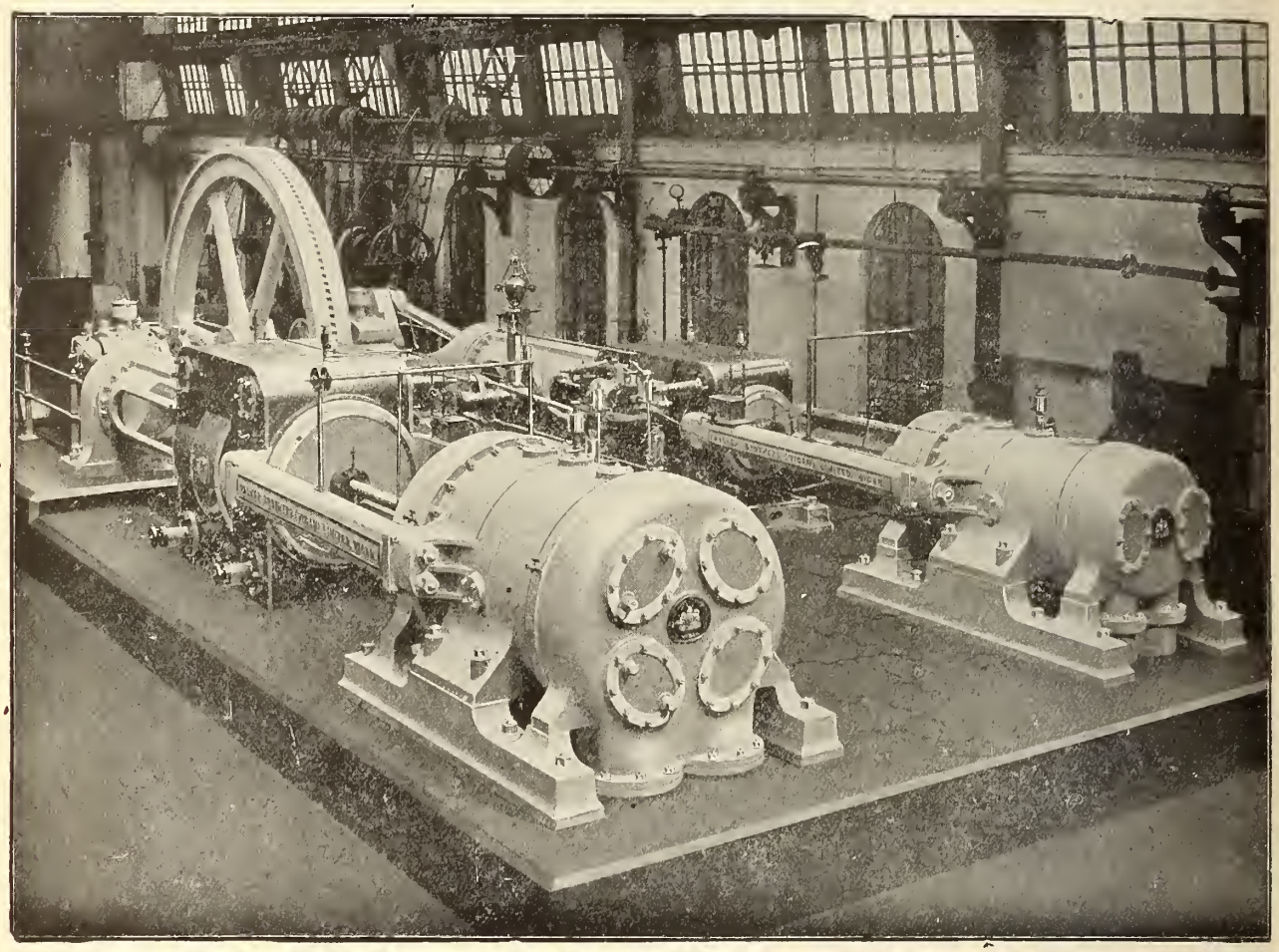

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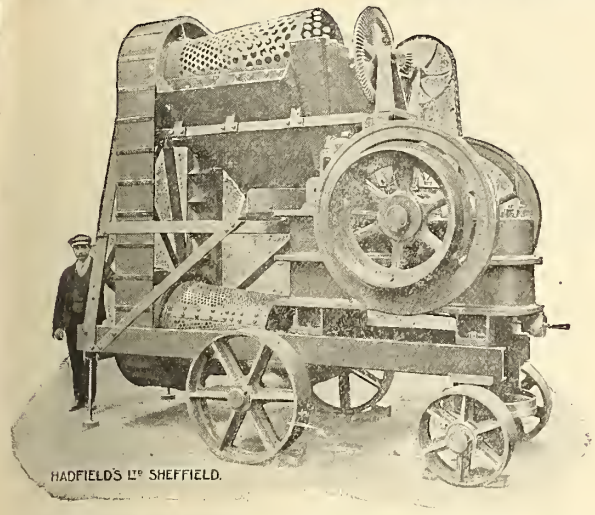

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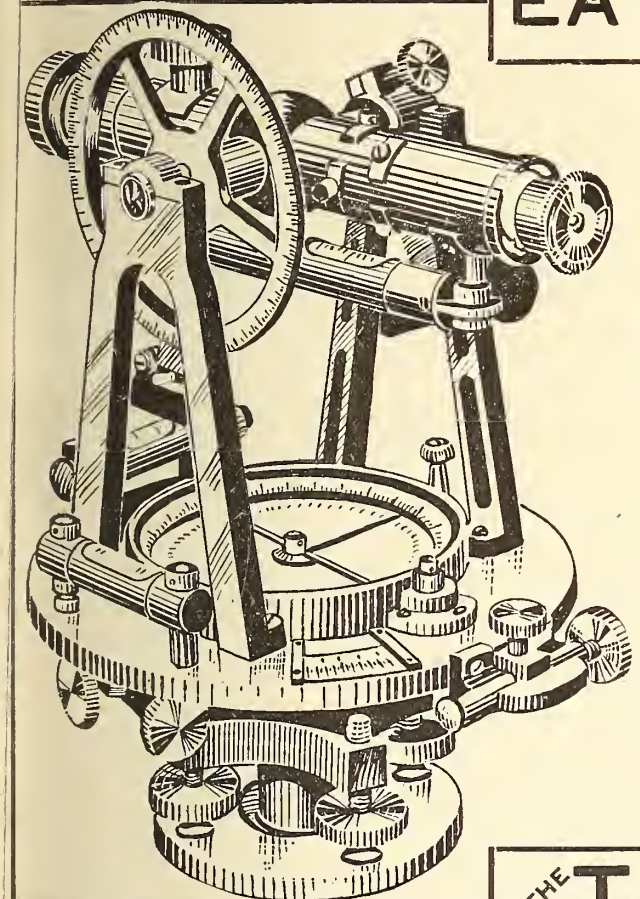

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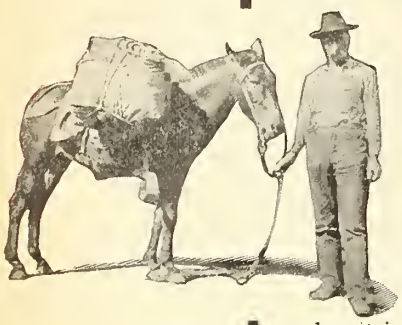

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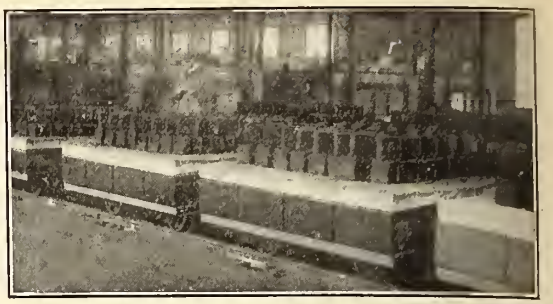

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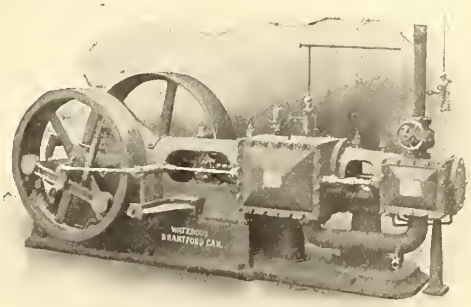

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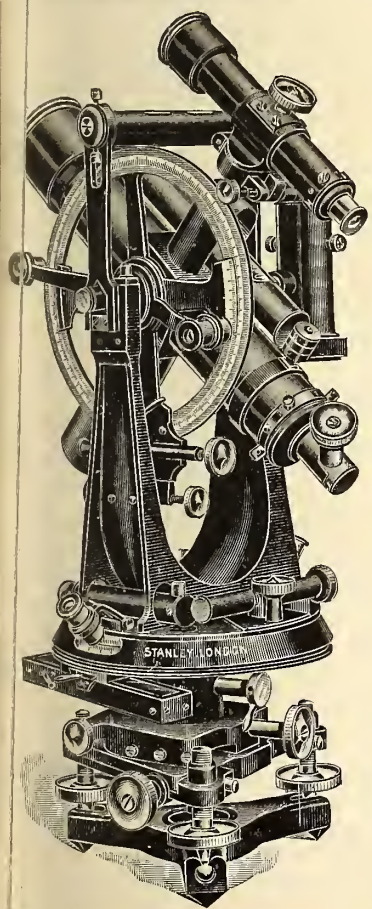

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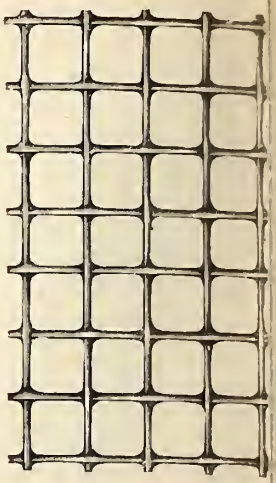

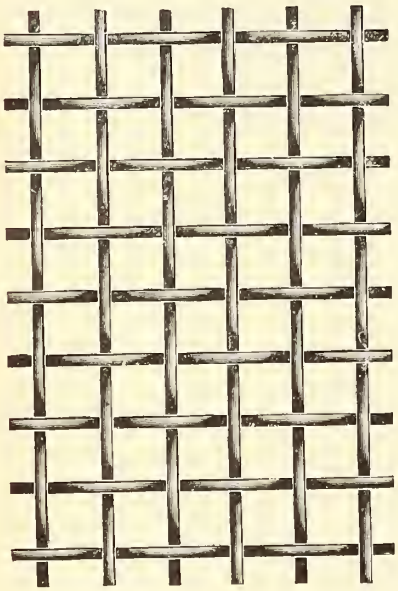

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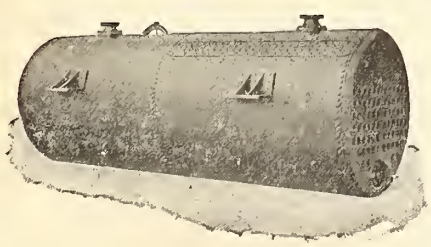

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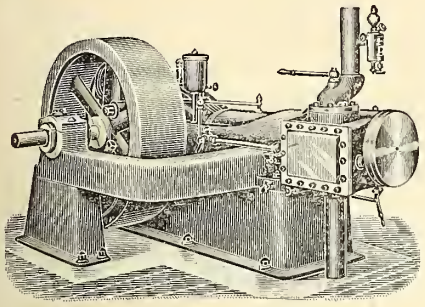

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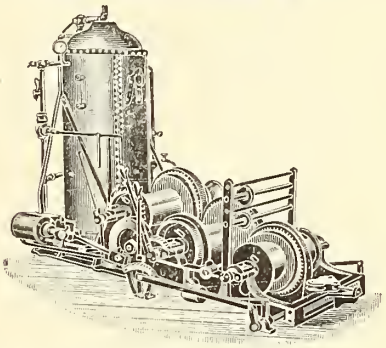

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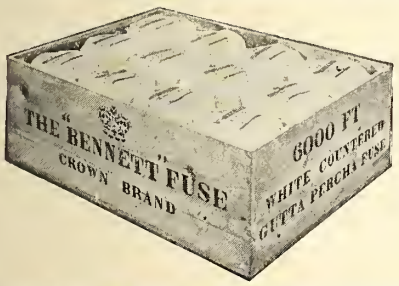

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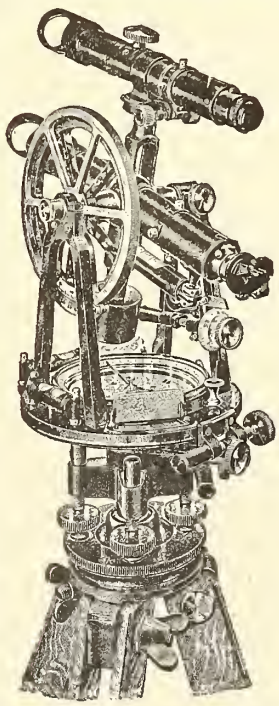

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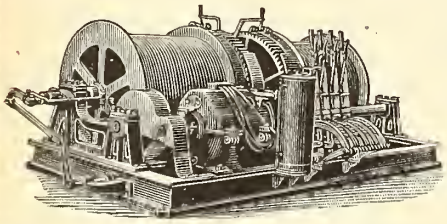

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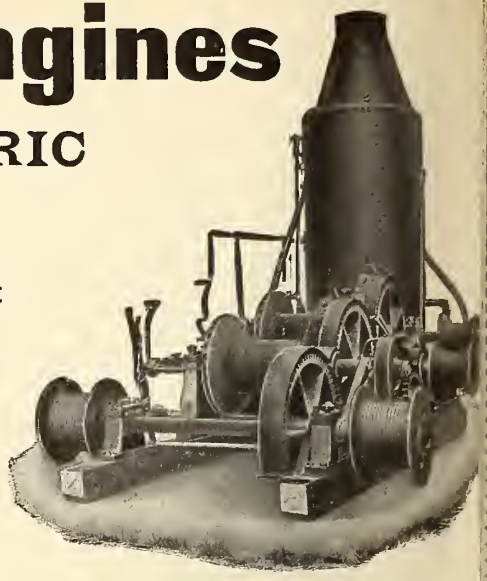

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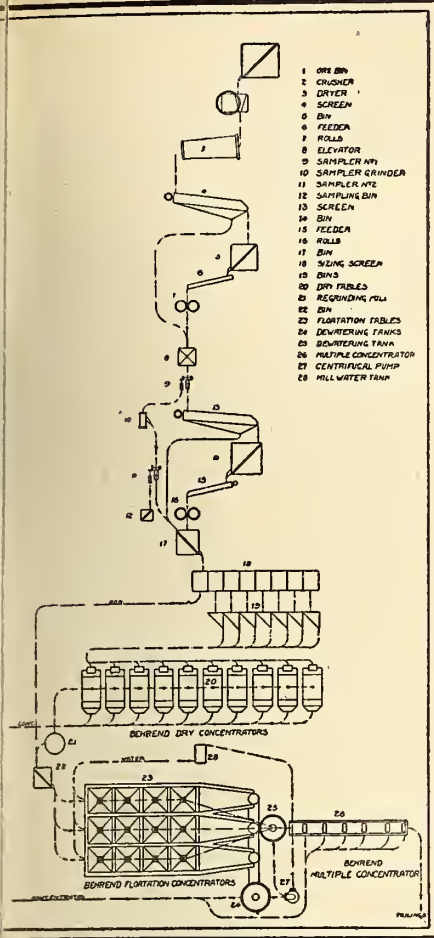

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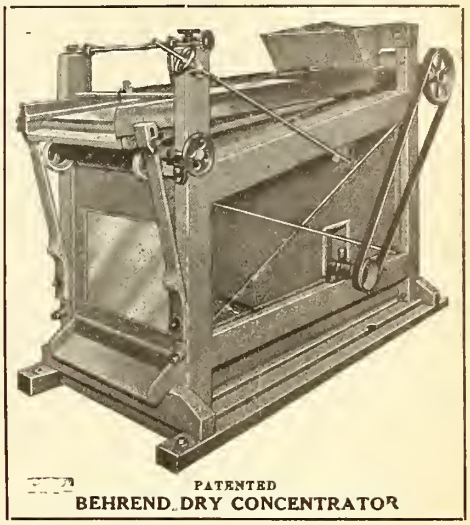

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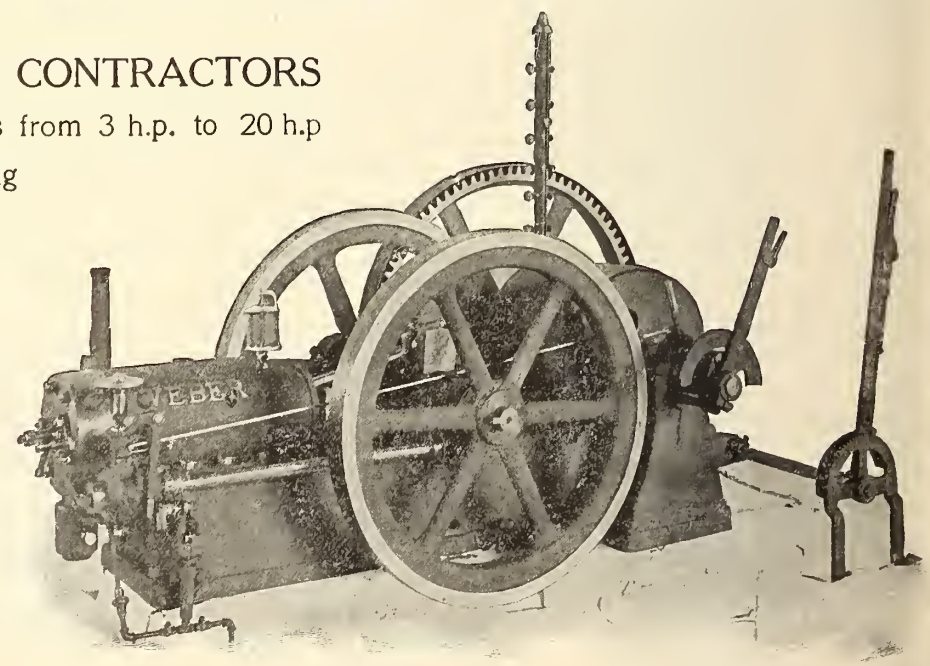

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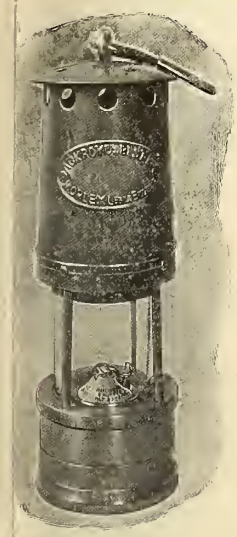

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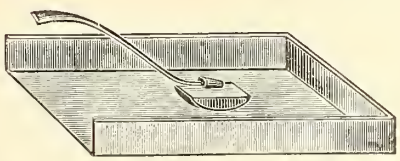

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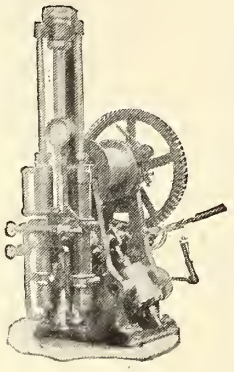

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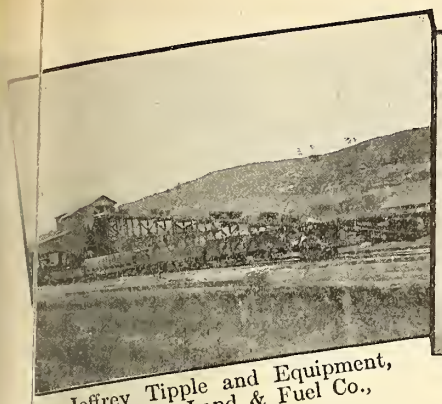

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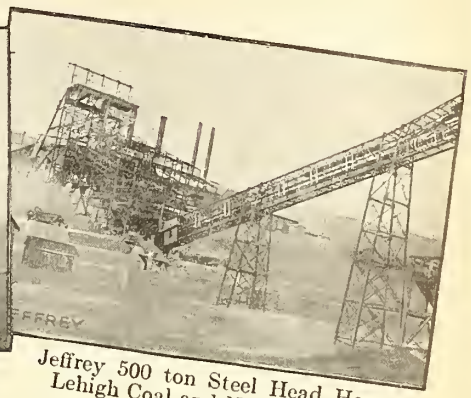

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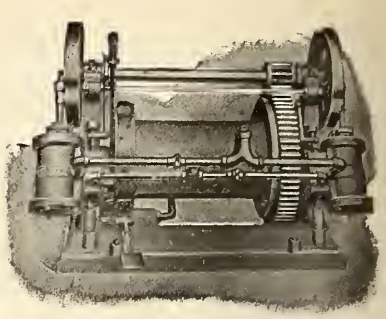

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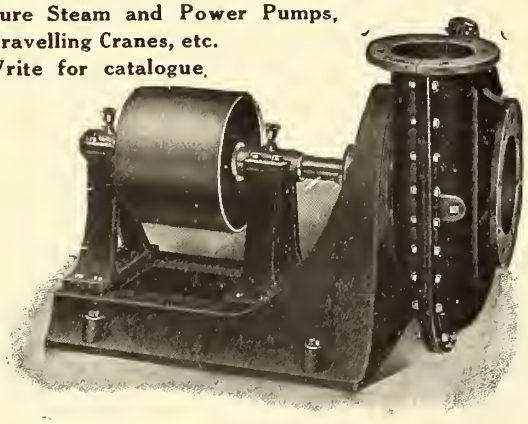

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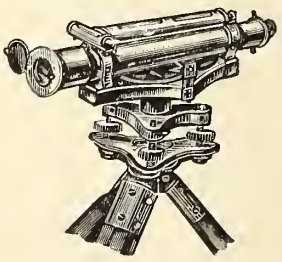

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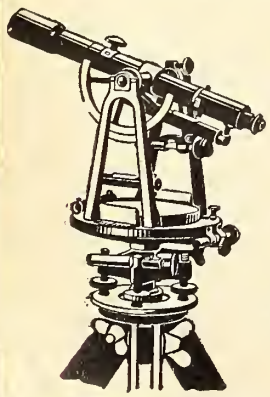

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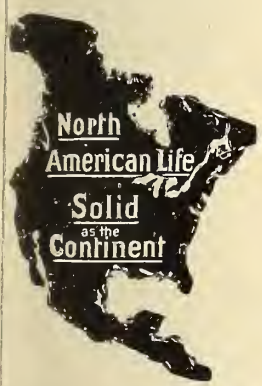

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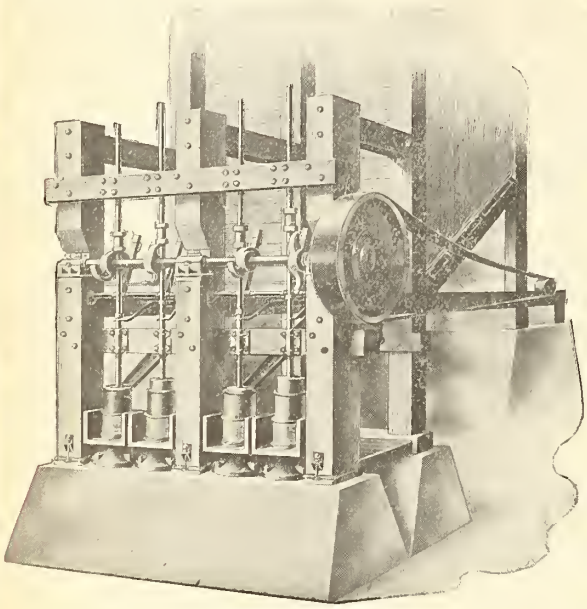

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OPPORTUNITIES.

At risk of wearying our readers we intend once again to draw attention to little-known fields for mining investment in Canada.

In our last issue we referred to the beneficial effect that certain prosperous mining camps have had upon the country generally. There is, however, another side to the subject. The excitement that attends the development of new mining regions is apt to give to outsiders the impression that these regions are the only profitable channels of investment. To many Englishmen, Americans, and Europeans. Cobalt and Porcupine embrace all of Canada that is worth while looking at. This is one of the misconceptions that must be patiently corrected. And it is for this purpose that we are guilty of reiterating the following facts.

We shall preface what is to be said by the remark that the most numerous chances for profitable outlay of money do not lie in camps that are being boomed. The mere fact that a mining camp happens to be the focal point of public interest creates conditions that militate against equitable terms of purchase and operation. This is so obviously a truism that it requires no demonstration.

On the other hand, deposits of such minerals as iron pyrites, scheelite, chalcopyrite, pyrolusite, graphite, gypsum, barite, magnesite, and so on, are lying undeveloped in many parts of eastern and western Canada. Not a few of these deposits can be easily and quickly proven. Many of them are already known to be commercially workable. The growth of our own markets alone demands that they be exploited. The possibilities of the foreign markets lend additional inducement.

Even more attractive are the chances that offer in the older gold fields. Study of Provincial and Federal reports shows that some of the gold discoveries of from thirty to fifty years ago were as rich as anything of recent times. But not until within the memory of this generation have circumstances been such as to encourage a large measure of enthusiasm. The limiting conditions were the lack of means of communication, and the absence of adequate media of information.

Times have changed. It is now possible to work to advantage all kinds of mineral deposits throughout the length and breadth of the Dominion. To the disappointed searcher for cheap bonanzas in Porcupine we would suggest that he read up the mining history, not only of Ontario, but also of British Columbia, Quebec, and Nova Scotia; and that he take steps to ascertain for himself the merits of forgotten districts.

THE SAMPLING OF COAL IN THE MINE.

Under this caption the United States Bureau of Mines has brought out its first technical paper. The subject is one of vast commercial import, and, hence, of high technical interest. Dr. Joseph A. Holmes, the Director of the Bureau, is the author. The purpose of the paper is to describe the methods followed by the Bureau and the Survey in taking commercially representative samples of beds of coal.

After describing an ingenious and compact mine sampling kit, Dr. Holmes gives preliminary details, and proceeds to describe the method of sampling. Much emphasis is laid upon the necessity of cleaning thoroughly the face to be sampled, and of including in the sample all material that is usually comprised in the daily shipments. Only such material as is ordinarily discarded by the miner should be omitted.

Specific instructions follow as to the precise method of sampling a working face. First, the floor is to be cleaned and the sampling cloth spread close to the face. Next, a perpendicular cut 2 inches deep and 6 inches wide, or 3 inches deep and 4 inches wide if coal be soft, is made from roof to floor down the side of a foot-wide cut previously made. The cut should be uniform in width and depth. Enough coal should be chipped off to make a sample weighing at least six pounds for each foot of the width of the seam.

The sample is put through a ½-inch or ⅜-inch screen, and is mixed and quartered as usual. A suitable sample can is then filled completely and sealed. It is important that the entire series of operations be carried on in the mine. If this precaution be disregarded, errors will creep in. Exposing the coal to the outside atmosphere is found to introduce abnormal factors.

Investigation of the loss of volatile constituents when coal is freshly mined, and knowledge of the effects of weathering upon many fuels, have led the Bureau to devise and distribute exceedingly complete blank forms whereupon is transcribed the history of any given sample. These forms embrace details of the physical features of the mine, of the equipment, of the humidity report, of the explosives used, of general mining and marketing conditions, and of the sample itself. Thus the sample and the final analysis are given a value that they could not otherwise have. And herein is the point of the whole matter. There are available thousands of analyses of Canadian coals, analyses that are either misleading or meaningless because of the fact that there is no authentic record of how, and why, and when they were taken. Modern commercial engineering will not tolerate that slipshod professional work. Time was when laboratory results were accepted at their face value. Now, however, it is being more and more widely recognized, even in lay circles, that sampling is one of the most difficult and responsible tasks, and that few men are temperamentally fitted to do it fairly. But, no matter with what skill the sample may be taken, it cannot be accepted commercially without full data as to every item of its history.

SCIENCE vs. GREEK.

In many respects the educational systems of to-day are medieval. Of the number of compulsory subjects of study that are inflicted upon our youth, many have no relation either to real life or to real culture. This fact is being impressed more and more deeply upon British educationists. No one has put the case more cogently than has Sir Rae Lankester. Writing in "The Nineteenth Century and After," Sir Rae, whilst disclaiming any desire to see natural science take exclusive possession of the educational field, condemns strongly the domination of that field by Latin and Greek. The whole system of instruction and of competitive examination he scores as being an injurious perversion. He declares that "the school-teaching of the old knowledge has become sadly unreal, perfunctory, and slow . . . . The husk of it is mistaken for the kernel, the letter for the spirit, mere dexterity in verbal acrobatics for true learning and sound mental discipline. We can in the future retain some study of ancient history and literature, and even one of the classical languages—namely, Latin—while giving serious our attention to the new knowledge—the natural science of our present Renaissance."

This pronouncement is all the more interesting as Sir Rae was, in his youth, a product of the system that he criticizes. At St. Paul's he was the head-boy and prize-winner in successive classes of the Latin and Greek curriculum.

The cardinal point of the article is presented thus: "It is the business of the 'educator' to ascertain the various degrees and kinds of 'educability' in the young and to adapt the course of education administered to them to their varying aptitudes." The youth of to-day must not be over-burdened with useless information. But his intelligence must be so trained as to open for him all desired branches of knowledge. The effect of proper study of the sciences is lasting and practically beneficent; the effect of unnecessary study of the dead languages is entirely mischievous.

Amongst the sciences to be taught, Sir Rae includes chemistry and geology. He recommends that these subjects be carried farthest. This is something for Canadian educationists to take to heart. A sweeping change must soon be brought about. Our young men should learn at school and at college more about nature, more about commerce, and less about the amours of heathen gods.

Each reading man can acquire a knowledge of the humanities after his formal education is complete. Every Canadian citizen should be possessed of a sound grasp of the fundaments of natural science.

GOVERNMENT DRILLING IN NOVA SCOTIA.

The Government of Nova Scotia adopts the liberal policy of keeping and operating seven core drills for the benefit of the mining community. During the year 1910 five drills, of which three were diamond drills and two calyx drills, were kept in commission. The total footage drilled was 5,222 feet. Of this footage, 4,50[illegible] feet were done by diamond drill. In all fifteen holes were sunk, and in every case coal was the mineral sought. The strata drilled included sandstones, shales, conglomerates, clays, and grits of many varying degrees of hardness, and of every kind of texture.

The average cost per foot of diamond drilling is reported at 93 cents; whilst the corresponding figure for the calyx is $1.44. The deepest hole bored was sunk with a 2-inch diamond drill. The depth attained in this instance was 1,217 feet; the cost per foot, 72 cents; the highest rate of boring per hour, 5 feet 3 inches; and the average footage per hour 1.2 feet. It is interesting to compare these figures with the performance of a 6-inch calyx. The calyx hole was sunk to 566 feet. The highest rate of boring per hour was 6 feet 4 inches; the average footage per hour 1.27 feet; and the cost per foot $1.44.

It is not intended to institute comparisons between the two types of drills. The figures above are quoted merely because of their intrinsic interest. Incidentally it is noteworthy that the coal operators are the only persons securing the drills. It is surely worth while for a few of the gold-mine operators to put in a claim. Under proper control the diamond drill, which probably would do better work in the gold measures, could be utilized to great advantage.

DEEP WELLS.

The deepest well ever bored was started nineteen years ago near Rybuick, Upper Silesia, Germany. It was completed in one year and a half. The depth attained was 6,572 feet, and the diameter was from 3.6 inches to 2.7 inches. The total cost was $18,241. The mineral sought was coal.

Another well, probably the fourth deepest, was drilled near Leipsic, Germany. The diameter of the core in this case was 11 inches to 1.3 inches. The total depth was 5,735 feet, and the cost $53,076. The object sought was also coal.

The second deepest well was completed in 1905, after nine months' work. This was a diamond drill hole, sunk near Johannesburg. The depth reached was 5,752 feet, the core 2 to 1⅜ inches.

A remarkable well, the deepest ever drilled with a cable, was sunk near West Elizabeth, Pa. With a 10 inch to 6¼-inch core, this well attained a depth of 5,575 feet.

Very deep wells, in some instances exceeding 5,000 feet, have been drilled in Australia for water. From one well in Queensland a flow of 1,600,000 gallons of water a day, having a temperature of 202 deg. F., was obtained.

TITLES AND THINGS.

In the eyes of Canadians nothing could well detract more from the dignity of Coronation week than the announcement that the organizer of the Cement Merger had been decorated with a Knighthood. Of itself this might be a matter of congratulation. But when our most eminent economist, our leading educationist, and several other distinguished public men are awarded trifling honours; and upon a young man, whose business reputation is not yet cleared of a serious stain, a knighthood is bestowed, it is time to call a halt.

Knighthood and other forms of royal recognition are the rewards of outstanding service to the public. Sir Max Aitken has performed no such service. His claim to distinction is based upon a remarkable facility in organizing mergers, in persuading the public to buy securities at an enhanced price, and in reserving for himself a disproportionate share of the spoil. His spectacular irruption into English politics gave him advertisement. More advertisement, of a different nature, was given him when Sir Sandford Fleming accused him publicly of unhallowed practises in the realms of high finance. And now his name stands upon the list of those whom our King delights to honour! It is to laugh, or to weep!

"DATA."

We rise again to defend a cruelly bullied and maltreated word. "Data" is the plural form of "datum." In no circumstances is it permissible to use the word in the singular.

The writers of mining reports constantly err in this respect. An example will soon have to be made of someone. Condign punishment should be meted out to all and sundry who misuse a defenceless but extremely useful word.

EDITORIAL NOTES.

The prestige of Sir Max Aitkin has apparently suffered no abatement. Knighthood followed hard upon the heels of what promised to be a lively scandal in cement. It will be interesting if the critics of Sir Max put a daub or two upon his fresh title.

Somewhere about 11,000 sovereigns, representing $55,000 worth of gold, have been minted recently at Ottawa. The metal came from the Hollinger mill.

Practical encouragement has been offered in the shape of $5,000, for the production of safe and satisfactory types of electric lamps for colliery work. Full particulars may be obtained from the Department of External Affairs, Ottawa.

It has been stated that, if working costs remain as at present on the Rand, the end of profitable mining will be reached at or before a vertical depth of 5,000 feet. Future economies will affect new mines rather than established concerns. In six years total average costs per ton have been reduced from 29s. to 21.5s., but average profits have fallen from 6.03s. to 5.85s. The probable net profit from ore extracted at a depth of 5,000 feet is estimated at 1.575s.

The output of gold from Transvaal gold mines during May exceeded all previous monthly records. It amounted to the magnificent total of 685,951 ounces, which, interpreted in terms of our own currency, means nearly fourteen million dollars. Facts like this should squash effectually the purveyors of torrid atmosphere who compare Porcupine with the Rand. There is a long hard row to hoe yet.

BOOK REVIEW.

THE DREDGING OF GOLD PLACERS, BY JOHN ERNEST HODGSON, F.R.G.S., MANAGER ASHANTI RIVERS AND CONCESSIONS, LTD. — 65 PAGES — ILLUSTRATED— PRICE, $1.50 NET — PUBLISHED BY SIR ISAAC PITMAN & SONS, LTD., No. 1 AMEN CORNER, LONDON, E.C., 1911.

There is a marked paucity of literature on dredging for gold. We therefore feel inclined to welcome any addition to the meagre list of books dealing with this subject.

Mr. Hodgson's book purports to be "a practical guide for company directors, property managers, prospectors, and those of the investing public who have acquired, or think of acquiring, a share interest in a gold-dredging concern." This, we fear, is too large a claim. The book is an interesting, but extremely one-sided, essay. It is tenuous, incomplete, and typically English.

By that last phrase we mean that the author exhibits the characteristically lofty British disregard of practice other than his own. His references to the Yukon and to California are meagre and insufficient. He is satisfied that English dredging represents the last word in modern placer-working. In this, of course, he is hopelessly wrong. There is a great gulf fixed between the adaptable, efficient, and highly sensitive American dredge (or "dredger"), and the clumsy Engdish and German machines. Also, there is decided difference between working costs on this continent and those obtaining in other countries.

Yet, despite its manifest faults, and in some instances because of them, Mr. Hodgson's book is edifying. It reads well, it is consecutive, it is clearly printed and well illustrated.

Personal and General

Mr. A. B. Willmott, mining engineer, Lumsden Building, Toronto, has recently completed examinations of mine properties near Fort Frances, Ont., and near the Maine border, in Quebec.

Mr. H. H. Sutherland, formerly of Nova Scotia, has taken an office in the new Standard Bank Building, corner of Jordan and King Streets, Toronto.

Mr. Myles Flynn, of New York, is in London, F land.

Mr. George R. Rogers, mining engineer, of Toronto now in Porcupine at the Prince George Hotel. Rogers is conducting several examinations and will in Porcupine for some weeks. One of his mission to investigate probable methods of ore treatment.

Mr. J. B. Tyrrell has returned from the Swas region.

Mr. R. B. Lamb, consulting engineer to the Swas Mining Company, is in Toronto.

Mr. Kent Johnston, of London, England, is at Albany Club, Toronto.

Mr. Stanley Leeky, of G. G. S. Lindsey and C pany, Toronto, has returned for a visit to western tario.

Mr. Clifford Smith, mining engineer, of Brockv Ont., is in Toronto.

Mr. Eugene Coste is moving to Calgary, Alberta.

For the reconstructed Jupiter Mining Company, P cupine, in which the Messrs. Drummond, of Montr have a heavy interest, Mr. J. H. Rattray has been pointed manager and Mr. R. W. Brigstocke consult engineer.

Mr. A. H. Brown, of Cobalt, has lately been visit mining camps in the Boundary district of British lumbia.

Mr. R. H. Chapman, of Washington, D.C., one of topographers of the United States Geological Surv will again do topographical survey work on Vancou Island, B.C., for the Canada Geological Survey. T will be Mr. Chapman's third field season in that par British Columbia.

Prof. Francis A. Thomson, head of the Department Mining Engineering, State College of Washing Pullman, Wash., U.S.A., with a class of senior stude in mining engineering and metallurgy, has been visit mines and smelteries in Boundary and Trail Cr districts, B.C.

Mr. James Anderson, manager of the Ruth-H group and other silver-lead mines in West Kootenay, returned to Kaslo, B.C., from a visit to England a Scotland.

Mr. Norman Fraser has resigned the position superintendent of the Crow's Nest Pass Coal Compan Michel colliery to accept that of manager of the G man Development Company's coal mining property Brazeau, Alberta.

Mr. G. E. Farish, of New York City, is stated to h been appointed manager of the Summit mining p perty, in Sheep Creek camp, Nelson mining divisi control of which is stated to have been purchased lat by Montreal and New York men.

Mr. W. G. Norrie, of Mr. Andrew G. Larson's offi Vancouver, B.C., will superintend mining operati at the Ikeda mine, Moresby Island, of the Queen Ch lotte group, under Mr. Larson, who is the owning co pany's consulting engineer.

Mr. W. B. Thompson, of the firm of Thompson, Tov & Co., New York City, has been appointed a direc of the British Columbia Copper Company, Ltd., in s cession to Col. J. C. Reiff, deceased. Mr. Thompson connected with several large mining companies oper ing in North America, among others as president of t Inspiration Copper Company, of which Mr. W. Aldridge, formerly managing director of the Cons dated Mining and Smelting Company of Canada, Lt is now managing director, and which owns a large c per mine in Arizona.

STANDARD METHOD OF WELL DRILLING.*

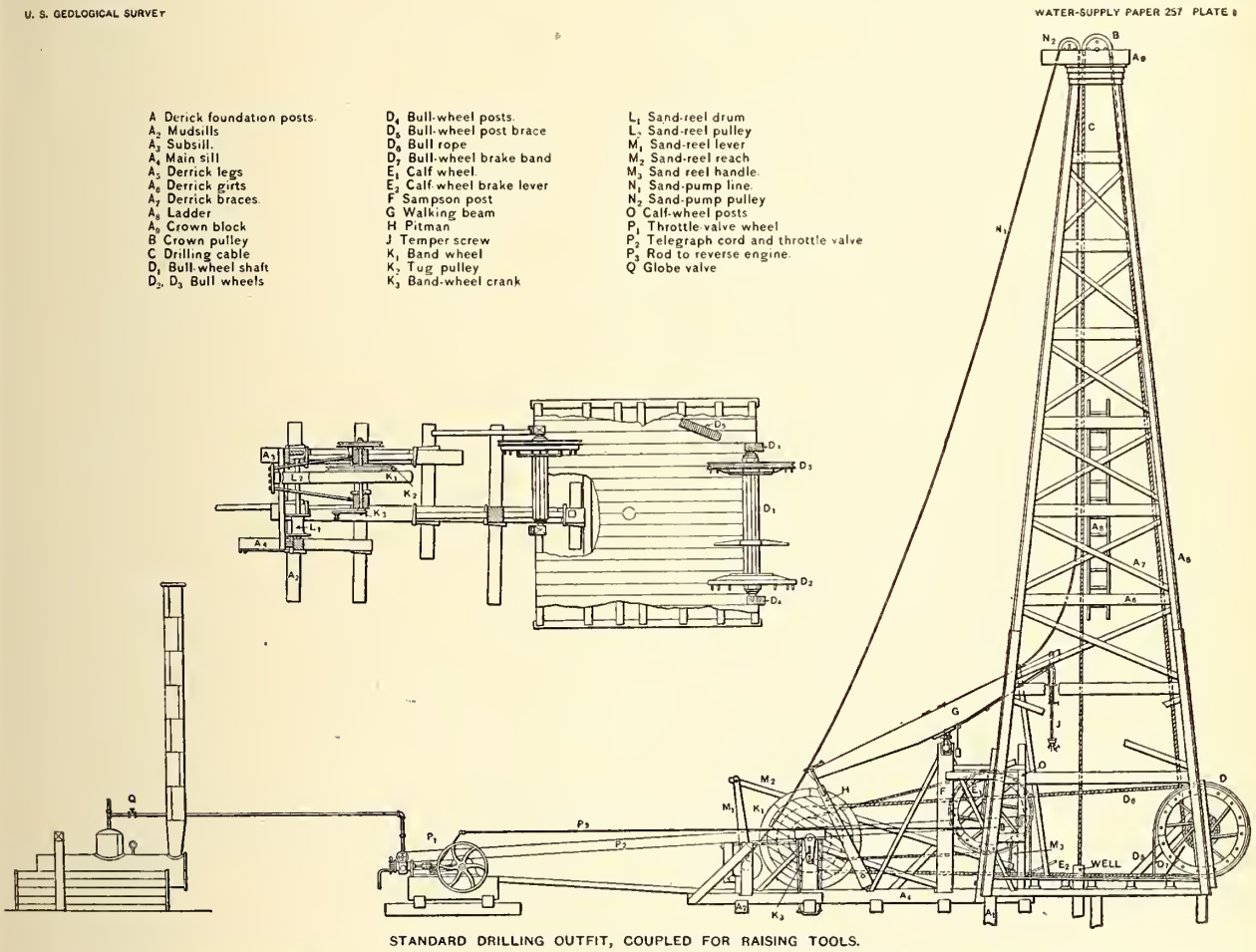
By Isaiah Bowman.

The largest and deepest wells put down art those sunk to obtain oil, and the heavy standard outfit, now so extensively used, acquired its essential characteristics in the development of the oil industry in Pennsylvania. In overcoming the difficulties encountered in drilling deep holes the tools have been enlarged and the several parts of the outfit have been modified and improved until the size and weight of the tools and the ease with which they are handled surprise those unfamiliar with this class of machinery.

Standard outfits differ little in essential features, but hardly two can be found alike in every detail; the slight variations that exist are due not to some fancy or whim of the driller, but to the need for adapting the outfit to special conditions.

The derrick consists of four legs, steadied by girts and braces and surmounted by a crown block. In this block is set the crown pulley, over which the drilling cable passes. A ladder extending up one side of the derrick provides access to the crown block. The weight of the derrick rests on foundation posts, which are set deep in the ground to render the structure firm.

At one side of the derrick are the bull wheels. This part of the rig consists of a reel, on which the drilling cable is wound, at each end of which is a wheel, usually built up of wooden arms and segments, fastened together with wooden pins. These parts are known to the trade as arms, cants, and handles. The whole is sent firmly into the bull-wheel posts and strengthened by the bull-wheel post brace. The wheel at the farther



STANDARD DRILLING OUTFIT, COUPLED FOR RAISING TOOLS.

Outfit—Rig.

The most noticeable part of a standard outfit is the derrick, a pyramidal framework, 30 to 90 feet high, erected over the well. In summer the derrick is usually left open except on one side, which is boarded in to form a shed for storing tools and workmen's clothes and to protect the forge — a part of the outfit that is in more or less constant use. In winter the lower part of the derrick is temporarily closed to protect the workmen. In a new territory drillers sometimes close the derrick, even in summer, to keep the results of the drilling secret.

*Abstract from bulletin issued by the U. S. Geological Survey.

end of the reel in the illustration (Pd. I, D_3) is grooved to receive the bull rope, which acts as a belt to operate the reel. The brake by which the reel is controlled passes over the near wheel of the illustration and is controlled by a lever. In the early rigs this brake consisted of rope or a piece of old rubber belting. When the tools were lowered the rope would burn and smoke, and the rubber would emit a very disagreeable odor. In present rigs an iron brake band is used.

In the California style of standard rig a second reel, known as the calf wheel, is placed on the side of the derrick opposite the bull wheels. It carries a cable that is used in lowering and in pulling casing. It is claimed that in deep drilling it saves much time as it

obviates the necessity of disconnecting the tools from the drilling cable for these operations.

Opposite the bull wheels is the samson post, usually about 14 feet long. This post is strongly braced and supports the walking beam. The derrick end of this beam is directly over the well and carries the temper screw to which the tools are fastened and by which they are fed downward. The other end of the beam carries a pitman, which is connected with the crank of the jack or band wheel by a wrist pin. This band wheel is supported on jack posts and transmits power to the several parts of the rig — to the walking beam by means of crank and pitman, and to the bull wheels through the tug wheel and bull rope. In the California rig the calf wheel is also operated by the band wheel through a second tug wheel and rope belt. The operation of the calf wheel is usually controlled by a lever and clutch, and the bull wheels are usually thrown in or out of gear by putting on or removing the bull rope.

The sand reel is just behind the band wheel and is operated by the latter through a friction pulley. This reel is mounted on a knuckle post and is controlled from within the derrick by means of the sand-line pulley, and, as its name indicates, it is used in handling the sand bucket or bailer.

The part of the rig that extends beyond the derrick rests on mud sills, which are usually sunk in trenches and have gains cut in them to receive the subsills and main sill, and the whole foundation is carefully levelled up and firmly keyed together.

The headache post, also called the life-preserver, is a comparatively recent improvement. As its name implies, its purpose is to save the driller from injury to the head if the wrist pin breaks or the pitman is thrown out of adjustment while drilling, as it prevents the derrick end of the walking beam from dropping and injuring anyone who may be beneath it. This post is usually a piece of heavy timber set on the main sill directly under the walking beam, so that in case of accident the walking beam can fall only a few inches. It is also useful when repairs are necessary to the pitman or the band wheel and crank, for a block may then be placed between the headache post and the walking beam, and the pitman relieved of its weight and slipped from the wrist pin without making it necessary to disconnect the tools from the temper screw.

Variations in the size of the parts of a rig depend on the amount and difficulty of the work to be performed. At Bradford, Pa., where few of the oil wells are more than 2,000 feet deep, the derricks are 72 feet in height; at Kittanning, where wells between 2,000 and 3,000 feet deep are common, the derricks are 82 feet high. An increase in the length and weight of the tools used is always accompanied by an increase in the size and strength of the derrick. The stems alone of the drills used at Kittanning are 39 to 42 feet long, and the sand buckets used with some outfits are 60 feet long. The walking beam used in this field is also larger than usual, being 24 feet long, as compared with 16 feet at Bradford. At Kittanning the hemp drill rope is 2¼ inches in diameter; in the Bradford field it is 1¼ to 1½ inches. These figures show the structural changes that follow a change in the amount of work to be done.

For a 72-foot derrick about 13,000 board feet of lumber are required for the framework and wheels, and, if the derrick is closed in, about 3,000 feet of siding. In places where it is difficult to get skilled rig builders, as in the Philippines or in newly developed oil regions, bolted wood derricks are very serviceable. The timbers are all framed and distinctly marked so that the derrick can be easily erected.

Steel derricks have not found much favour, though they are easily taken down, transported, and set up again, and offer slight resistance to the wind. The driller objects to them chiefly because of the delay and expense entailed by the necessity of sending to the supply house for repairs when a part becomes broken or twisted, whereas repairs on wooden derricks can be made quickly by unskilled labour and with cheap material. The loosening of bolts — a serious defect of the steel derrick — has been overcome, at the expense of considerable additional time in erection, by using a guard nut on each bolt.

A bolted wood or steel derrick may be set up in two or three days. Three or four skilled workmen can put up an ordinary nailed derrick in from three to five days, the time depending on the size of the rig and the quality and accessibility of the lumber; but after a nailed derrick has been used for two or three jobs it becomes too badly worn and racked to be set up again.

Where oil wells are drilled close together, or where on account of trees or buildings, there is limited space for operation, a rig with a short walking beam is sometimes used. This rig occupies a plot about 20 by 30 feet in size, and is very compact and serviceable.

Engine and Boiler.

Beyond the derrick and other parts of the rig is the engine, which furnishes power to the band wheel by a belt. Steam power is almost universally used and is supplied by a boiler placed a short distance from the engine. The throttle of the engine is controlled from the derrick by a double line of telegraph wire passing over small pulley wheels, and the reverse lever is operated by a rod that extends from the engine into the derrick.

The boiler used in connection with the standard rig ranges from 15 to 40 horsepower and the engine from 12 to 30 horsepower. Boilers are of two general types —horizontal and upright. The horizontal — called the oil-country boiler (see Pl. I. Q)—is in most general use. The upright boiler differs from the horizontal mainly in shape, but is smaller than the oil-country boiler, and is more easily moved and set up. It is used in some parts of the California fields, where it is closed in with natural adobe instead of brick. In many oil and gas fields either oil or gas may be obtained from other wells for fuel under the boiler.

Engines of various styles are used even in the same locality, but all are usually so fitted that they can be controlled from the derrick and are otherwise adapted to the particular needs of the work.

Steam may be supplied to the pump through insulated pipe led from the boiler, or a gasoline engine may be set up near the pump. Gasoline engines are used with many outfits in Indiana and Pennsylvania and are said to be more economical and to require less care than steam.

Where there is no near-by well or stream from which a water supply can be obtained, a water well is sunk by means of the outfit before work on the oil well can be begun. The water well is usually put down immediately beneath the walking beam, about 3 feet back from the point where the deep hole will be drilled, in order to lessen the labour of drilling it and

pumping the required water. Water for drilling well and for the boiler is hauled from the nearest lable source. After a water supply has been obed a pump is so installed that it can be connected the walking beam, by which it is operated when wa er is needed.

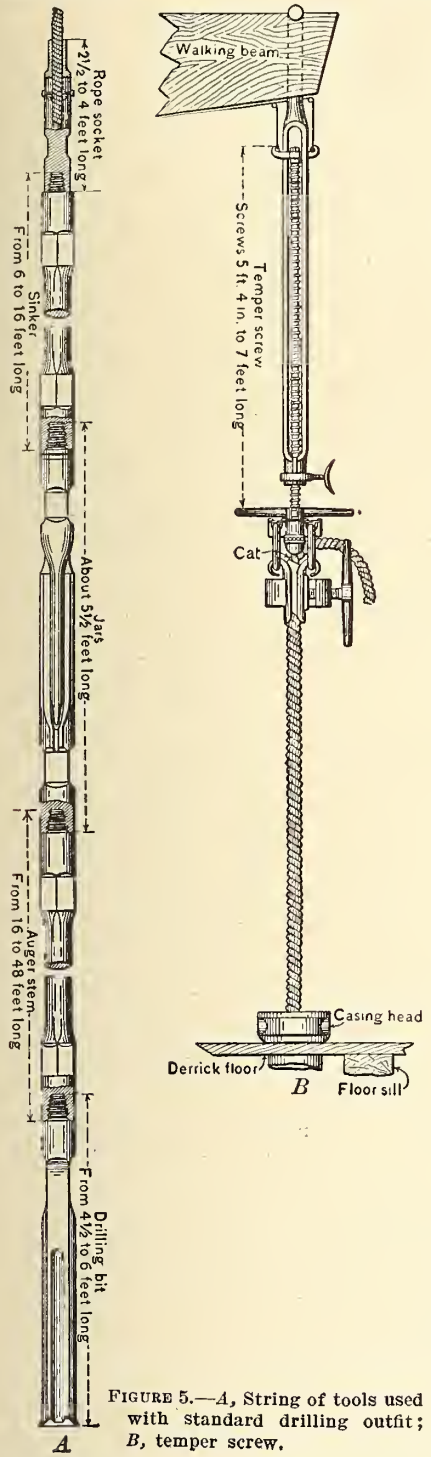


FIGURE 5.—*A*, String of tools used with standard drilling outfit; *B*, temper screw.

n the vicinity of Bradford, Pa., water is obtained fr m wells about 60 feet deep in the valleys and 200 to 300 feet deep in the hills. The cost of sinking water wells adds considerably to the expense of putting down o wells.

Tools.

The string of tools used in deep drilling consists of several parts, all of which have certain definite functions and are the outgrowth of years of experience. A full string (fig. 5, A) comprises rope socket, sinker bar, jars, auger stem, and bit. Whether or not the complete string is used depends on the conditions under which drilling is done.

The socket may be fastened to the drilling rope in several ways. It may have a tapered hole in which the rope is secured by knotting; the rope and socket may be riveted together, or the rope may be threaded back and forth through several holes in the socket and secured by wedging.

The sinker bar is a long, heavy bar, which is used to add weight and length and thus aids in keeping the hole straight. It was formerly thought to be an essential part of the string, but it is now seldom used unless a wet hole (one partly filled with water) is being drilled. It then assists in sinking the cable rapidly. If it is placed between the jars and the bit, it adds force to the blows of the latter.

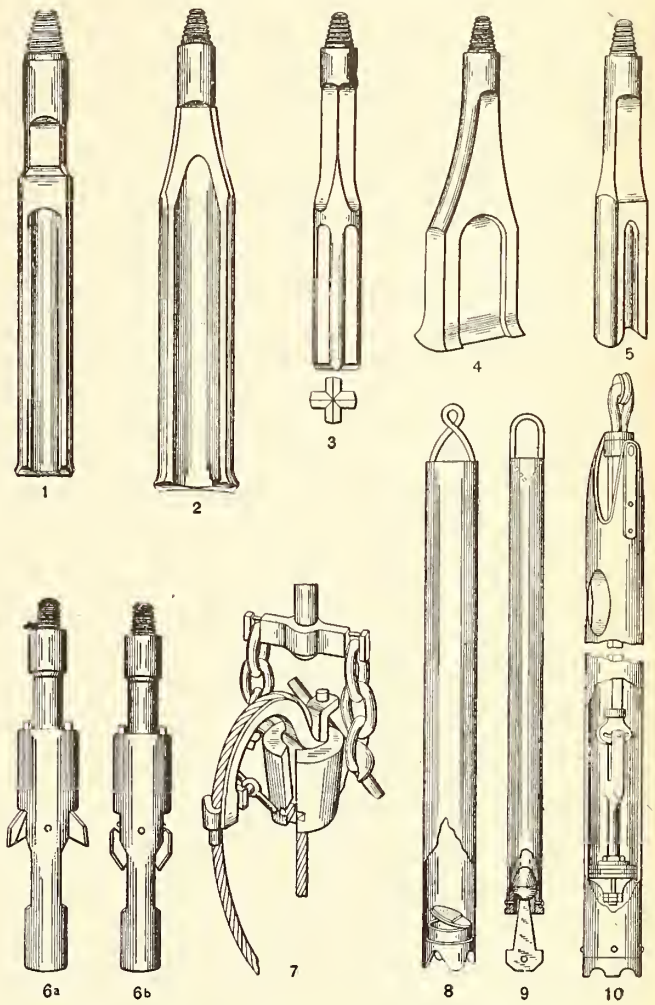


Figure 6. Drilling tools used with standard drilling outfit. 1-5, Bits; 6a, 6b, reamers; 7, rope clamp; 8-9, sand bailers; 10, sand pump.

The jars, as previously stated, consist of a pair of linked steel bars. When drilling in rocks in which the bit is apt to stick they are necessary to "jar" the drill loose. The drill responds to the powerful upward blow of the jars as they are jerked violently together by the stroke of the walking beam when it will not yield to the slow and relatively steady pull of the rope. In ordinary brittle rock the jars are now almost universally discarded, but they have a very important use in "fishing" for lost tools; those intended for this purpose are made longer than jars used in ordinary drilling.

The jars in no sense act as a maul to drive the drill into the rock, as many people suppose. In fact, a good driller so adjusts the cable that it is impossible for the upper jar to strike the lower one except when the cable is raised. The only weight which adds effectiveness to the blow of the drill is the weight of the lower jar, the auger stem, and the drill. The weight of these three parts, or of the two last-named parts, makes up three-fourths to seven-eighths of the total weight of the string of tools. This weight, falling through a distance of several feet, is all that the drill can bear. Some inexperienced drill men give the drill too much rope, so that the bottom of the upper jar strikes into the bottom of the slot of the lower jar at each downward stroke, and in a short time the links are seriously damaged. The stroke must be carefully adjusted to the play of the jars, taking into account the stretching of the rope.

The auger stem gives additional weight to the blows that are struck, and also, by increasing the length of the drill, helps to maintain a straight hole. It is of the same shape as the sinker bar, but is considerably shorter.

Various patterns of drilling bit are used, according to the character of the rock that is being penetrated. The shape illustrated at the bottom of the string of tools in figure 5, A, is used in moderately hard rock; the "Mother Hubbard" pattern (fig. 6^1) is a similar, but thicker, drill that is used in hard, fissured rock; the California pattern (fig. 6^2), which is concave on the bottom, is much used in the shales of the oil districts in that State. A shorter, lighter bit (fig. 6^3) is used in "spudding" at the beginning of drilling. Star bits (fig. 6^4) are sometimes used in crevieed rock that dips steeply, and more complex shapes are used in reaming and in other special operations.

All joints of the string of tools have taper screws, so that only a few turns are required to fasten them together. They are screwed up tightly by heavy wrenches on which great leverage is exerted by means of a ratchet floor circle and jack (fig. 7, A), or by a simpler arrangement (fig. 7, B) in which the floor circle is an arc of band iron with holes punched in it every 2 or 3 inches. These holes give footing to a bar by which the upper wrench is forced around. The great stress that is thus brought on the screw joints binds the string of tools together. When first assembled and screwed together tightly each joint of the string may be marked by a cold chisel cut that extends across it, and each time a joint is put together care is taken to see that it is screwed up as far as or a little farther than it was before If the two halves of the chisel mark fall short of coinciding, sand or mud in the threads may be the cause, and if this material is not removed and the joint screwed together tightly, the sand may work out, leave the joint loose, and cause loss of all tools below the joint.

Temper Screw.

The cable supporting the string of tools is connected to the walking beam by a temper screw (fig. 5, B), which allows the drill to be fed downward as the drill hole is deepened. The temper screw consists of a frame or reins, at whose lower end is a split nut held together by a yoke clamp. Through this nut the main screw passes, and to its lower end is fastened a handle, by which it is turned. Below the handle is attached a ball-bearing swivel, from which depend the rope clamps by a C clamp and is prevented from slipping by means of a "cat," made of strands of ravelled rope or strips of coarse cloth, loosely plaited or twisted so as to form a cord about as thick as a man's finger in the middle, and tapering toward each end. The "cat" is wound about the cable at the point where the clamps are attached, and the set screw is then turned so as to bring the rope clamps firmly against it. Slightly different forms of clamp (fig. 6^7) are sometimes used with wire rope.

When the screw has been run out its full length, and it is desired to bring it up again, the slack of the drilling rope is taken up on the bull-wheel shaft, the pitman of the walking beam is disconnected, and the C clamp is loosened. The yoke clamp is then loosened, the main screw is drawn up through the split nut, the yoke clamp is again tightened, and the temper screw

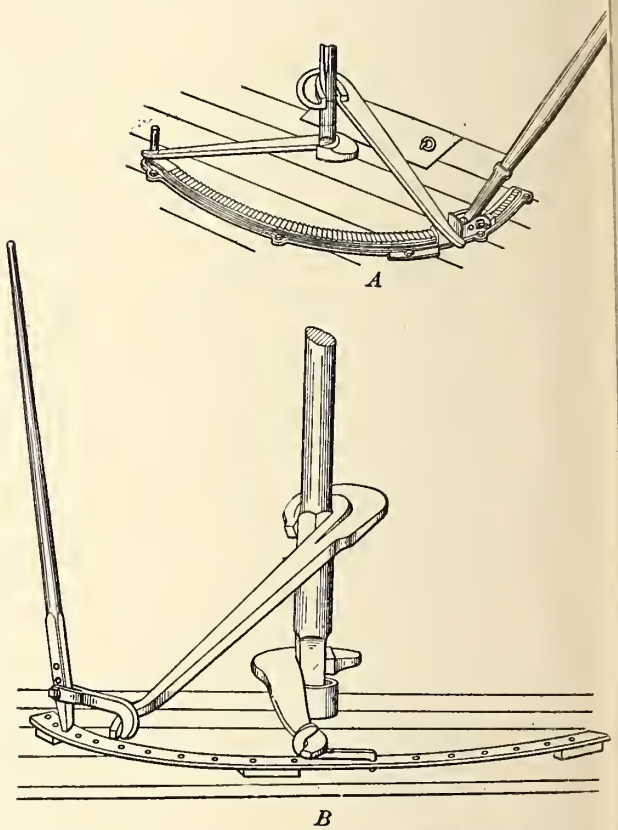


Figure 7. Floor circles; A, Rachet and jack; B., bar and perforated arc.

clamped to the cable. Small ropes are fastened to a short crossbar, or elevator, at the upper end of the main screw, and by pulleys on the under side of the walking beam a counterweight is hung beside the samson post. This weight balances the temper screw and renders its raising easy.

Cable.

Both hemp and steel-wire ropes are now used for drilling cables, the steel wire having come into more general use during the last ten or fifteen years.

The best quality of hemp rope is that made of manila hemp (not common hemp nor sisal) and is hawser laid, that is, it consists of three ropes of three strands each, twisted together into a single rope. In its manufacture a "nap" is formed, of the ends of hemp fibres, nearly all of which point toward one end of the rope. The rope socket should be fastened to the end toward which the fibres point, for although when the tools are attached to this end the fibres spread out and retain

e downward stroke in a hole that is partly filled th water, they protect the rope better from being yed by rubbing against the casing on the upstroke.

Steel-wire drilling cable is composed of several sands wound about a hemp centre, each strand being fmed of several wires. Rope consisting of six strands o seven wires each is a style commonly used.

The advisability of substituting steel-wire cable for hmp cable in drilling deep wells has been much dissed, some maintaining that hemp can never be reced by steel, and others that steel will shortly be ed altogether. The importance of the substitution o steel for hemp is better appreciated when it is known t at a hemp cable ordinarily can not be used to drill re than one or two wells, but the hemp cable possses certain important qualities which are not found i the steel cables and which must be considered in caling with the problem. The careful driller never aows his tools to fall as a dead weight on the rock vich he is drilling, but so adjusts the rope that the tols will stretch it in reaching the bottom of the hole. Te nature of this action may be illustrated by susnding a weight by a piece of rubber elastic a little aove a table or other surface. It will be found that b giving a slight reciprocal motion to the rubber the veight may be made to strike the surface with conserable force. Manifestly, the force of the blow is dminished by this arrangement, but in drilling this ls of force is more than compensated by the springig blow that is struck; and if the rock is easily cut b the drill this rebound is essential, as otherwise the dill will be imbedded so firmly as to make it difficult t remove except by jarring.

In drilling a deep well the stretch of the rope is often uderestimated, and it may happen that the tools are fling when the walking beam is rising, thus bringig a great strain on the cable and making the blows o the drill very ineffective. The operation of the tols is rendered still more difficult when the hole contns several hundred feet of water, which interferes vth the free upward and downward motion of the cole.

Steel cable, with its smaller diameter and greater veight, has the advantage of passing comparatively feely through water which may stand in the drill hle, the water friction being much less than on a hmp cable, and the water also reduces the shock of te steel cable by acting as a deterrent to the rapid cop of the tools. On the other hand, steel cable has vry little elasticity, and drilling by the stretch of the rpe is hardly possible. Every blow that is struck b the drill is a dead blow, as there is no compensating rbound and the upward stroke causes severe strain, lth on the derrick and on the cable itself where it is atached to the tools at its lower end and to the temr screw at its upper end. The difference in stretch c the two kinds of cable is shown by the fact that vth a 5-foot temper screw 7 or 8 feet may be drilled vth hemp cable, while at best a distance of only 5½ fet is possible with steel cable. Some drillers use 150 c 200 feet of hemp rope between the tools and the seel rope, and this gives some elasticity to the cable ad rebound to the tools.

The use of the steel cable was considerably increased dring the Spanish-American war by the fact that the pice of hemp cable became so high that its use seridsly increased the cost of a well.

In the last few years at least half of the oil wells pt down in the California fields, where the wells are ually drilled "wet," have been drilled with steel cables. In other oil fields a very small proportion of the drilling is done with steel cables. For cleaning wells, however, it has largely supplanted hemp cable throughout the east, as in this work it is not necessary to use such a rapid strike, and hence steel cable may be advantageously employed.

The standard well-drilling outfit with steel-wire drilling cable has been used to some extent in the Baku oil region of Russia, where it was found that only a very limited amount of rotation could be imparted to a wire rope without damaging it, because of the untwisting and kinking of the strands. To overcome this disadvantage a special kind of wire rope was employed, consisting of left-hand and right-hand strands plaited together. It is said that this rope worked satisfactorily in the hands of a skilful attendant, but it had to be disconnected from the main drum at each change of operations.

Drilling Operations—Spudding.

The term "spudding" is often misunderstood. By some people it has been thought to mean the preliminary part of drilling, without reference to the way in which the drilling is conducted; by others it has been interpreted to mean drilling in rock of unusual hardness. Properly, however, the term is applied to drilling without the aid of the walking beam — the method nearly always used in sinking the first 75 or 100 feet of a well, as the string of tools is too long to be operated from the walking beam in beginning work. It is possible to attach the tools to the drilling cable before the hole has been drilled to this depth, but owing to the short length of cable between the tools and the walking beam there is very little "spring" in the rope, and the hole must be spudded to a sufficient depth to allow a considerable length of cable to come between; otherwise the blow of the drill will be "dead" and the rope will be likely to break.

For spudding a short cable is run through the crown pulley at the top of the derrick, one end being attached to the bull-wheel shaft and the other to the rope socket, to which are usually screwed only the auger stem and spudding drill. The drill may be given an up-and-down motion in two ways: In the first method the rope is carried around the bull-wheel shaft in two or three turns, its end being left free. A man standing in front of the bull wheels grasps this free end of the rope and gives a slight pull, causing the coils to tighten and grip the revolving shaft, and by this means raising the tools; when the rope is slackened the tools fall. By alternately tightening and slacking the rope the operator may raise and drop the drill. The second method has come into use comparatively recently and is much more effective than the other. In this method, which is self-adjusting, the drill rope is wound firmly about the bull-wheel shaft and passed through the crown pulley, and from its end the tools are suspended in the drill hole. A rope called the jerk line is attached to the wrist pin of the band-wheel crank, brought inside the derrick, and attached to the part of the drilling cable which extends from the crown pulley to the bull-wheel shaft by a curved metal slide called a spudding shoe. (See fig. 8). By carefully adjusting the length of this rope each revolution of the band wheel results in a pull on the line and its subsequent release, and a corresponding rise and fall of the tools. As the hole is deepened the cable is let out by giving the bull-wheel shaft a partial revolution, and the spudding shoe is slipped farther and farther down,

for this downward sliding of the spudding shoe increases the length of the pull on the drilling cable and hence the distance through which the drill drops. The sliding motion is imparted by the driller's assistant, between the jerks of the line, by means of a crooked stick long enough to reach the spudding shoe from the floor of the derrick.

Spudding is much harder on the derrick than is ordinary drilling, as the strain is brought on the top of the derrick where there is the greatest leverage. In drilling with the walking beam the weight comes on the samson post, which is not directly connected with the derrick, and the strain comes on the derrick only when raising or lowering tools or casing and when using the sand bucket or the bailer.

Drilling with the Walking Beam.

After the hole has been sunk to the depth required for the string of tools a heavier drilling bit is attached, the drill rope is suspended from the walking beam by the temper screw, and regular drilling by means of the walking beam is begun. To allow freedom of motion to the walking beam, 20 or 30 feet of the drill rope are unwound from the bull-wheel shaft and loosely coiled on the floor. The pitman of the walking beam is then

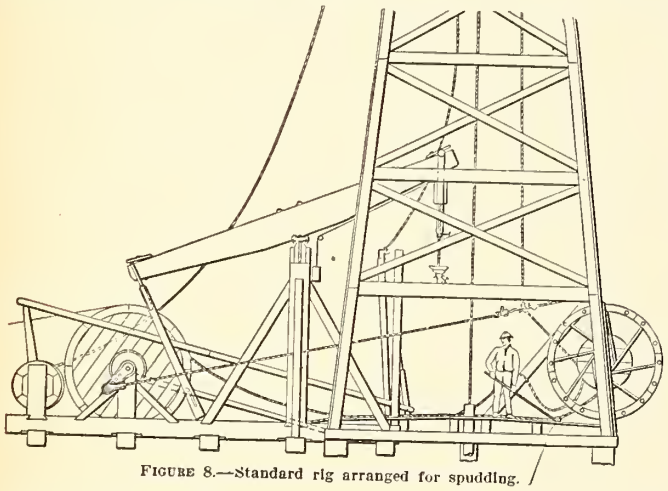


FIGURE 8.—Standard rig arranged for spudding.

fastened to the wrist of the band-wheel crank. The crank is provided with a number of holes, so that the length of strike can be adjusted to the depth of the well, a short stroke being used near the surface, as the strain would otherwise be too great for the rope to bear. The engine is then started and the walking beam begins rocking up and down, raising and dropping the tools at the rate of about 25 strokes a minute.

Until within the last few years it was the custom to revolve the drill by inserting a stick in the rings below the temper screw and slowly turning the rope first in one direction and then in the other. This was thought to insure a round hole by causing the drill to strike each time in a different place. One day a tired workman, who wondered if this operation was necessary, neglected this precaution and found that the drill still made a round hole, a fact that had often been inferred by drillers who had seen the tools revolve and bring the drill in a new position for each stroke. The drill is jerked free from the rock unevenly, and the torsion of the drilling cable under the lifting strain has the effect of rotating the tools in one direction on the upstroke and in the other on the downstroke. This action, however, takes place to a notable degree only when there is a sufficient length of rope between the tools and the walking beam; until a considerable depth is reached it is often necessary to turn the cable by hand, otherwise the drill may strike successive blows in the same place, but it is now rightly considered that after the hole is 200 or 300 feet deep it is needless to turn the rope while drilling.

The skilled workman takes hold of the rope or swivel often, for by the feel of the rope he ascertains whether the string of tools is intact and the drill is cutting the rock. When the drilling bit strikes the bottom of the well, the cable is drawn taut and conveys the vibration to the driller's hand; by this means he soon learns when to adjust the temper screw. In the same way the operator learns whether or not the jars open and shut at each blow of the drill.

The proper tension of the cable can be determined only by practice. An old cable has more spring to it than a new one; and the weight of the drilling tools, the depth of the hole, and the speed at which the machine is running must also be taken into consideration. Ordinarily the engine should be speeded up until the cable tightens slightly in advance of the stroke of the drill, not so as to retard its fall, but so that when the drill touches bottom it will be instantly lifted, with no time either to settle or stick. This careful adjustment of the stroke is absolutely necessary for rapid and skilful work. If the drill touches bottom when at rest there is too much rope out and it should be taken up with the temper screw, for the downward stroke of the drill will stretch the rope sufficiently to let the bit strike the bottom of the hole.

The motion of the drill will be greater than that described by the walking beam, unless too much cable is let out, in which event the stroke of the drill will be less than the stroke of the walking beam, the strain on the cable will be greatly increased, and little or no progress can be made. One of the hardest things for a beginner to learn is that he can not make the drill cut faster by letting out more cable. With a heavy cable, at a depth of about 50 feet, when the drilling tools are at the lowest point in the stroke, the point of the bit should hang 2 or 3 inches above the bottom of the hole. At 100 feet it should be 4 or 5 inches; at 200 feet it should be 6 to 12 inches; and at greater distances with greater depths. An unskilled driller will sometimes allow the full weight of the tools to fall on the drill rope, the drill actually being stopped in its descent a short distance above the rock in which it is supposed to be cutting. The likelihood of such an occurrence increases with the depth of the hole, for the increasing weight of the drill rope, added to the weight of tools, often several tons in all, makes it difficult to detect by the "feel of the rope" whether or not the total weight is decreased at the end of the stroke by the weight of the tools below the jars.

As the drill cuts deeper it is necessary to let out the drill rope gradually, so that the drill will strike bottom at each stroke. This is done by loosening the yoke clamp a little, and running out the temper screw a turn or two. At the end of from half an hour to several hours the temper screw has been run out its length of several feet and the drill has advanced an equal or greater distance. The tools are then withdrawn, the waste that has accumulated since the last bailing is removed with the sand bucket, and, if necessary, a sharpened bit is substituted.

The withdrawal of the tools is accomplished by first taking up the slack cable on the bull-wheel shaft, thus transferring the weight of the tools to it through the crown pulley. The rope clamp is then loosened, the temper screw is disconnected, and the pitman is thrown

rom the band-wheel crank pin, as in figure 8. By ting the bull-wheel shaft with the engine connec- the tools may then be raised or lowered at will. h part of the work demands skill, for if the bull- wh el brake should not be applied as the tools reach the surface, the crown block and pulley would be torn loo and the tools would fall on the workmen beneath. Af r the tools are clear of the hole, they are swung to ne side and caught in the loop of a quarter-inch ro fastened to a leg of the derrick.

he operator is now ready to bucket the drillings fro the well. The sand bucket, or bailer, consists of a s ction of tubing 15 to 60 feet long and somewhat sm ler than the well. It has an iron valve at the bot- tor either of the flat pattern, or the ball and tongue pa ern. (See fig. [8 9].) In some materials in which the dr ings are thick and heavy and do not readily enter the bailer, a sand pump (fig. 6[10]) is used. In addition o e bottom valve this has a plunger which is worked lik that of a water pump, and thus sucks the drillings in t the tubing. The bucket or pump is suspended fro a wire cable that is wound on the sand-line reel an carried through the sand-line pulley. The reel is ope ated from the derrick by a lever, which brings its fri ion pulley into contact with the band wheel. The san -bucket line is thus wound up and the sand bucket is s ung over the hole. The friction bearing on the ear wheel is then released and the bucket is lowered int the well at any desired speed. As the drillings 'or a thin mud, owing to the addition of water from tim to time by the driller, they rise into the sand buc et, are retained by the valve in its bottom, and are hen removed. The bucket is emptied by lowering it on an upright stake or pin beside the well, thus ope ing the valve.

The liquid condition of the drillings often makes it pos ble to drill 5 or 6 feet without bucketing; other- vis the drill would become ineffective at the end of a v y short time, by striking into its own cuttings, and the ecessity for frequent bailings would greatly in- rea e the work and cost of drilling. Water is usually add to the drillings by the bucketful at the well nea Sometimes it comes into the well from water- ea ng strata that have been penetrated by the drill in a quantity sufficient to soften up the drillings, and yet ot great enough to interfere with the work.

I many localities water is added to the drillings by ea s of a barrel set at one side of the derrick, from the ower end of which a pipe extends within 2 or 3 feet of the drill hole; to this pipe is fastened, by a loos joint, another piece of pipe as long, at least, as the eight of the barrel and long enough also to reach fro the end of the horizontal pipe to the mouth of the rill hole. When the short length is dropped to a hor ontal position water flows from the barrel down into the hole; by raising the short pipe to a vertical pos ion the flow is shut off.

Dressing the Bit.

A the bit gradually becomes worn on the edges, its dia eter is constantly reduced — that is, it loses its gau e. When the tools are withdrawn, if the bit has bec ne noticeably worn, the screw joint connecting the it and auger stem is "broken" by means of the wre ches and floor circle, the bit is unscrewed and re- mov d by hand, and a freshly dressed bit is then sub- stit ed. During the first part of this operation the tool are steadied by keeping them partly in the drill hole At this time the whole string of tools is usually examined, and each joint is "set up" in turn, as the constant and tremendous jarring to which the tools are subjected tends to loosen the different parts. Before drilling is resumed the temper screw is also screwed up or "elevated" so that it can be fed down as the drill hole deepens. The tools are then let down again and drilling is resumed.

The worn bit is heated in the forge, the circular tool gauge is slipped over while it is hot, and the edges of the drill are hammered out to fit the gauge, which has a diameter one-eighth inch greater than the required diameter of the bit, to allow for contraction due to cooling. In heating the bit it should be turned occasionally to get an even heat, and brought to a cherry red for a distance 3 or 4 inches back from the end, so that in hammering it the outer part will not tend to spall off. It is usually spread with a sledge, working from the centre to the edges, to a diameter a little larger than the gauge, and then hammered down to proper size. The edge should not be made very sharp or it will tend to drill a three-cornered hole. In tempering the end is heated until it shows bright cherry red in the shade, then placed upright in 1½ or 2 inches of water so as to cool only the part to be tempered. After a minute or two, when the edge is cool, the bit is removed until the heat flows back into the end and causes it to pass through straw, orange, and purple to a blue colour. It is then re-immersed and allowed to cool. The treatment gives the proper temper for drilling moderately hard rock. If the bit is cooled at one of the colours that appear earlier, it will be too hard and brittle to work well, and if allowed to wait longer before tempering it will be too soft. The upper (threaded) end of the drill should be thoroughly cooled before it is screwed to the stem otherwise subsequent shrinkage may cause the joint to loosen.

As the bit becomes worn by continued drilling, the size of the hole is correspondingly decreased. In hard sandstone one-quarter to three-eighths of an inch may be worn from the width of the bit in drilling 3 or 4 feet, so that when a newly dressed bit is introduced it may find the last few feet too small, and may work hard or even stick for the first few strokes. A well-worn bit will cut a hole no larger than its shank, but a newly dressed bit provides clearance, like the teeth of a newly set saw. To prevent sticking the bit is run up and down a few times and turned constantly. It is thus prevented from forming a groove which it would tend to follow so as to direct the repeated strokes of the drill in the same place. When the rock is very hard and the bit is more rapidly worn, jars are necessary to prevent accident to the drill rope by the sticking of the drill.

Wet and Dry Drilling.

A "wet" hole is one in which water in excess of that required for the operations is present while drilling; a "dry" hole is one in which excess water is cased off during the sinking of the well. In oil fields these terms are applied in a different sense, a wet hole being a well which yields oil and a dry hole one which does not.

In a dry hole the drilling can be done faster, as the tools are not buoyed up by water; the rope lasts longer because it is not always saturated; small showings of gas and oil are more readily detected and their depths are more accurately determined; and if the tools are lost in the hole, they can be more easily recovered, as fishing tools are used to better advantage

in a dry than in a wet hole. At Bartlesville, Okla., three water-bearing sands are encountered in drilling for oil. Dry drilling in that field is regarded as so much more satisfactory than wet drilling that three strings of casing are inserted to keep the water out. Two of these are withdrawn when the well is completed, the last one that is inserted being kept in service to retain the oil and prevent the well from caving.

Wet drilling is usually cheaper (there being no outlay for additional casing), no time is lost in putting in casing and replacing the tools by a smaller set; and when the well is down, the charge of nitroglycerine used in shooting the well has much greater effect, as it is tamped by the heavy column of water. The greatest disadvantage of wet drilling is that the sides of the hole are kept so wet that some of the shales are reduced to a semi-fluid mud, which frequently caves. Another disadvantage is that when tools are lost there is danger of sand and mud settling around them, even if the sides of the well do not cave.

Casing the Well—Conductor Box.

In many places the surface material consists of loose sandy clay, sand, and gravel, varying in thickness (in the Pennsylvania oil regions) from a few feet on the hills to several hundred feet in the valleys. To restrain this material, which would otherwise impede the work of drilling, a conductor box, made of plank, circular, square, or octagonal in shape, and 8 inches to 20 inches across, is sunk to the bed rock. If the rock lies only a few feet below the surface the necessary excavating is done by hand; if the soil is deep, a large drilling bit is used to spud down a hole, into which the conductor box or a section of large iron pipe may be sunk as fast as drilling proceeds.

Casing and Drive Pipe.

After passing through the surface material the drill enters the "live" rock. As a rule this rock is made up of alternating layers of hard and soft, of very porous and slightly porous, of water-bearing and non-water-bearing rock that is encountered after passing through the water-bearing layer. This casing is set very firmly into the hard layer and shuts out the water. In order to continue drilling it is necessary to use a smaller bit which will pass, with clearance, inside the casing. If other heavy flows of water are encountered at greater depths, each flow must be cased off by a string of casing extending from the surface to the bottom of the water-bearing layer. As each string must slip inside the preceding one, a smaller drill must consequently be used after each casing operation.

The first well lining used in this country was in the celebrated well drilled by Colonel Drake on Oil Creek, Pennsylvania. Some of the early drilled wells of small diameter were lined with pipe made of rivetted or soldered sheets of copper. Before long this was superseded by drive pipe with soldered brass screw joints, such as is still used in the salt wells of Tarentum, Pa.

Several varieties of casing are now used. Sheet-iron rivetted pipe is extensively employed in the Russian oil fields, but it is little used in oil wells in the United States. It is rather short lived, and the corners of the bit are apt to catch on it in drilling and cause breaks. Another kind of pipe used, known as oil-well casing, ranges in usual sizes from 4 to 12 inches, inside diameter, and is made in several weights. A third kind, called steam pipe, is also made in sizes up to 12 inches and in three grades—standard, extra strong, and double extra strong. Still another kind of lining is the regular drive pipe, which is made very heavy in order that it may be driven to great depths. The ends of the pipe are cut off smoothly and squarely in the middle of the sleeve coupling (fig. 1). In this way the whole strain in driving comes not on the threads, but on the pipe; otherwise the joints would be disabled before reaching any considerable depth.

If a cheap well is desired, heavy wrought-iron

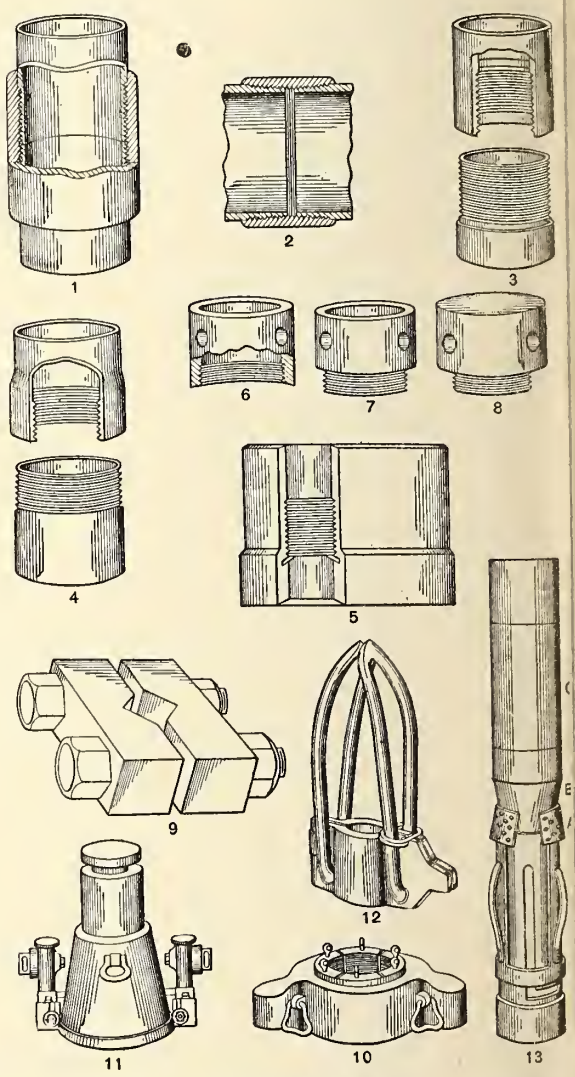


Figure 9. Couplings and casing attachments. 1, Sleeve coupling; 2, Tapered sleeve coupling; 3-4 Sleeve and inserted joint couplings; 5, Shoe; 6-7-8, Drive heads; 9, Drive clamps; 10 Pipe ring; 11 Hydraulic jack; 12, Elevator; 13, Gas packer.

is driven to rock, and the well is finished by drilling to the required depth. A casing made of sheet iron, one-sixteenth inch thick and one-half inch smaller than the drilled hole, is then used. If it is necessary to shut off sand the bottom of this pipe may be flanged outward a little. After the sheet-iron pipe has been placed in the well the heavy pipe may be pulled out and used again. If the depth to rock is not more than 50 or 75 feet and the material is all clay or earth which will not cave, the heavy pipe may not be used at all, the sheet-iron pipe serving in its stead, though its use in this way is attended by considerable risk

sing is usually a lighter and cheaper pipe than pipe, as it has little outside pressure to with-. A tapered sleeve coupling (fig. 9[2]) is often with it. In this form of coupling the last thread tube is the weakest and most likely to break in f accident, and the pipe is easier removed than if hole thread remained in the tube. Flush joint nserted joint couplings (fig. 9 [3 4]) are also used casing that requires little driving. After a few well have been sunk in a district the approximate nt of casing that will be required for a well can ly be estimated, since the depth to troublesome -bearing formations is then roughly known.

In gas wells, where dryness is essential, all the gs of casing are usually left in the well to prevent near the surface from sinking to the lower end the last casing, where it would be under great head night force its way through a weak spot at the of juncture of the casing with the rock. As a foot of water weighs about 62½ pounds, the ure, in pounds per square inch, of the column of in the drill hole is equal to the height of the n in feet, multiplied by 0.434. Therefore at the m of a well 1,500 feet deep water that enters and t up to the 500-foot level exerts a pressure of 434 ds per square inch. This is the crushing stress on ipe provided there is no internal column of liquid unterbalance the external column, as, of course, is not in a producing gas well.

In deep drilling, where caving material may be en-ered, it is customary to sink casing, or drive as fast as drilling proceeds. For this purpose heavier than the usual casing is employed, and ger joints are made generally by heavy sleeve ings (fig. 9[1]). On the bottom of the lower joint is screwed or shrunk a shoe of tempered steel 9[5]), which will stand heavy driving without in- and which gives clearance for the pipe and ings. The ordinary pipe would be greatly dam-in driving long distances if it were not protected is shoe. To prevent the top of the pipe from be-battered, a drive head (fig. 9[6 7]) is screwed or d on it. In some places the material is so loose the tubing will follow the drill for some distance ut requiring to be driven: but when driving be-s necessary drive clamps (fig. 9[9]) are bolted to in square of the upper end of the auger stem. The inery is then coupled as for spudding, and 50 or ows a minute are delivered by this driving clamp drive cap on the top of the pipe. The pipe may e driven by a heavy wooden maul attached to the rope. In this case a solid drive head (fig. 9[8]) is and proper direction and effectiveness are in- to the blows by means of temporary guides set n the derrick.

Sometimes in drilling through a compact foundation, as clay, the pipe becomes lodged, owing to the ction of the couplings. When this happens a cap ewed to the drive pipe, and water is forced down as to come up outside of the pipe and loosen the rial about the coupling.

When the pipe has been driven as far as practicable ng is resumed. The driller endeavours to keep the sunk a few feet ahead of the casing, for in this way the casing is let down straight, whereas if the is driven ahead of the drill, it may be deflected its course by changes in the hardness of the ma- or by encountering a boulder or a layer of coarse el.

This method, however, can only be used where the material will stand up for some distance without the support of the pipe. Quicksand will flow around the bit and even rise in the pipe, and in this material the pipe must be driven down to the bottom of the hole and kept ahead of the drill. If the bed of quicksand is not thick, the difficulty of drilling through it will be slight, but where beds 50 or 60 feet in thickness are encountered, some of the greatest difficulties known to well engineers have to be met and overcome.

When long and difficult strings of casing or drive pipe are to be withdrawn or "pulled" from a well, as on completing or abandoning it, a pipe ring (fig. 9[10]) is placed over the upper end of the pipe; this ring grips the casing firmly by means of its corrugated iron wedges and is then subjected to upward pressure by specially designed hydraulic lifting jacks. (Fig. 9[11].) When short or easily pulled lengths are to be removed, wrought-iron elevators (fig. 9[12]) are clamped to the upper end of the last length of pipe, are caught by a hook suspended from the derrick, and are tugged upward by means of pulley sheaves.

Several machines for pulling casing are on the market. For pulling casing from abandoned wells they have the great advantage of portability, and they are cheaper and more efficient than a derrick erected over the well.

CONSOLIDATED M. & S. CO.'S RECEIPTS.

The following figures show the tonnage of ore received at the smeltery at Trail, British Columbia, of the Consolidated Mining & Smelting Company of Canada, Limited, during the expired nine months of the company's fiscal year to April 1; also the quantity of ore smelted each month, the approximate gross value of the metals contained in the same, and the percentage of gold included:

Month.	Tons.	Tons	Approximate	Percentage
1910—	Received.	Smelted.	Gross Value.	of Gold.
July	35,641	35,138	$384,000	62.7
August	33,453	32,301	420,000	49.5
September	33,333	31,105	288,000	57.5
October	34,356	34,132	430,000	47.2
November	35,053	36,066	421,000	56.5
December	35,310	36,364	351,000	53.4
1911—				
January	34,505	32,958	349,000	57.7
February	32,323	32,315	328,000	57.8
March	35,096	34,208	365,000	54.8
Totals	309,070	304,587	$3,334,000	55.2

Of the total quantity of ore received, as above, 46,755 tons was custom ore and the remaining 262,315 tons came from the company's own mines, as under:

	Tons.
Centre Star group, Rossland	139,972
Snowshoe, Boundary	83,201
Sullivan, East Kootenay	25,362
St. Eugene, East Kootenay (concentrate)	6,129
Richmond-Eureka, Slocan	2,476
Queen Victoria, Nelson	1,984
No. 7, Boundary	1,718
Phoenix Amalgamated, Boundary	1,143
Molly Gibson, Nelson	330
Total output for nine months	262,315

The greater part of the ore from the company's mines was gold-copper, namely, 228,018 tons; the remaining 34,297 was lead-silver ore and concentrate.

SPARKS AND BRAKES

Safety in Mines.

(Reprinted from the Engineering Supplement of The Weekly Times, London.)

Among the various causes that are assigned to recent explosions in mines it is usual to include as a possibility the ignition of inflammable gases by sparks arising from mechanical friction in belts or gearing associated with the haulage plant or with the brakes used for controlling the speed of haulage. It is also suggested that with the modern tendency to speeding up the machinery used in mines this risk of ignition is increasing. The question is one for investigation rather than for dogmatic expression of opinion, and it is desirable that the evidence so far available should be examined, and that the matter should be made the subject of organized experiment.

Since Bochet in 1861 published his remarkable treatise regarding his "Recherches Experimentales sur la Frottement de Glissement" the theory of sliding friction has advanced but little. Rochet showed how tests should be made, and he indicated how results could be usefully compared by deducing certain coefficients of friction from the observations. Moreover, he determined the coefficients for various woods, leather, gutta percha, and metals, investigated the effect of moisture upon the rubbing surfaces, and generally laid the foundations of present knowledge of the subject. In the meantime a vast amount of information has accumulated regarding the energy frittered away as heat arising from friction and in regard to mechanical devices for reducing frictional losses; but we have learned very little in respect to the formation of sparks generated mechanically by abrasion. The flint and steel and its precursors have grown up with the human race, with the result that sparks are naturally regarded as fire originators. The power of the spark to cause ignition is, however, a question of degree, and what is now required is an investigation of the circumstances in which it becomes potent in causing explosions.

There is general agreement that sparks from brakes are the result of friction, but the term "friction" is often used vaguely, as though it were a constant quantity for two given surfaces, such as those between a given brake-block and a given wheel-rim. Friction is measured by the proportion which the sliding force—tending to cause relative movement between the two surfaces—bears to the pressure between those surfaces. If the sliding force and the pressure are adjusted so that the surfaces are about to move relatively upon one another, without actually moving, the proportion between them, or the "static friction," is greater than when the forces are adjusted to permit of decided movement, which corresponds with "kinetic friction." Friction, therefore, varies with the speed, and for a given pressure it is greatest at low speeds. It is usual to assume that it depends upon the total pressure, and that for most purposes it can be assumed to be independent of the area of contact. Where the heat problem is concerned, however, the question of area of contact would certainly require to be taken into account. In order to slow down a piece of mechanism the brake must rob the moving masses of energy; and with our present crude methods of retarding moving masses the whole of this stolen energy must appear as heat at the brake surfaces. materials used for brake-blocks must therefore be s as to get rid of the heat as quickly as possible, they must be able to withstand high temperatu Again, it has to be remembered that with band-br devices the friction may differ considerably at dif ent points throughout the length of the band, ow to different radial pressures, and that heating consequently be of a local character.

Temperature and Ignition.

The process of abrasion may be pictured as a se impacts distributed over the surfaces in frictional tact, and succeeding one another with a degree rapidity depending upon the rate at which the bing surfaces move with reference to one another. any selected small area of the surface, these imp —which are for the most part tangential—may be garded as a succession of glancing blows struck b hammer upon an anvil. The energy of the blow is solved into (1) the energy required to shear off abraded material; (2) the energy that heats the h mer and the anvil; and (3) the energy that heats abraded particles. It is thus seen that the initial t perature of the particles is due to the hammer and vil process. The subsequent temperature of the ticle may arise from rapid oxidation at its new faces, assisted by the initial heating. Thus it probable that the temperature of the particle at spark stage depends upon the magnitude of the pact, the specific heat, the thermal conductivity, tenacity constants and the coefficients of friction the substances in contact, and the nature of the rounding air or gas. These temperatures, in the of such a material as iron, might be roughly estima in certain cases from the colour and brightness of sparks. It has been stated that the temperature ignition of coal dust is 180 deg. C.; and one obser who heated coal dust in an air bath succeeded in niting it at 140 deg. C. Consequently, as the t which nevertheless ignite those gases because of extremely high temperature of their flames. Agai spark is certainly not a detonator, and the investi tion would have to be extended to examine the perature of a spark struck off an iron wheel may ture of the ignition, if any, that it produces in resp anything up to about 1,000 deg. C., there is a c prima facie case against sparks—provided that t perature at a single point and apart altogether fr considerations of time and heat capacity is al taken into account.

It is well known, however, that the temperature ignition in the case of explosive mixtures is a comp function of the time and possibly of the volume. exploding process is chemical as well as physical, the initiation and propagation of the chemical act is not necessarily instantaneous. This principle is basis of the theory of the so-called "safety" exp sives for shot-firing in mines. In the ignition of g powder, for example, the flame and the gases rounding the flame are held for a comparatively l time in contact, with consequent great danger of

sion of mine gases; and for this reason the use of powder for blasting purposes in mines has had to be abandoned. It must be remembered, however, that at the other end of the scale there are explosives which, when detonated, provide very short contact between their flame and the surrounding gases, and to the rate of combustion of the gases in the immediate vicinity.

Absence of Positive Evidence.

In the more recent Home Office reports upon mining disasters resulting from explosions and fire there seems little positive evidence to support the spark theory of ignition. The Hamstead Colliery fire, which occurred in March, 1908, happened while the winding engine had broken down, leaving 250 men below ground, who had to be drawn up slowly. In the words of the report, "the pit was laid off actual coal-producing work, and was in this condition at the time of the accident." As, in addition, the evidence is definite that lighted candles were used in the mine, it is entirely unnecessary to consider the effect of mechanical friction in this instance.

In the case of the explosion in the workings of the West Stanley Colliery in February, 1909, the evidence was so conflicting that it was difficult to arrive at any conclusion regarding the cause. The official report is to the effect that at first it seemed as though the place of origin was in or about the hauling engine-house, and that to some investigators it appeared possible that it might have occurred in the engine-house itself. Finally it was considered more probable that it originated at a point in the workings where there was a heavy fall, burying beneath it the cable leading to the motor which drove the hauling drums. There was some doubt whether the set of tubs was in motion in the shaft or not at the time of the explosion, but there was agreement that dust was present, and that a full set of tubs had been hauled out against the intake air current. Among the possible means of ignition were considered open lights, shot-firing, electricity, and sparking from mechanical friction. The report concludes with a confession that it was impossible to say which of these causes initiated the explosion; but the mechanical friction theory was accounted to be untenable in view of the experiments carried out by a sub-committee of the French Firedamp Commission, who failed to ignite marsh gas and firedamp by the sparks from a mechanical drill working against hard stone, or by a dazzling arc or continuous shower of sparks formed by pressing a bar of steel against a rapidly revolving emery wheel.

The cause of the Wellington Pit fire which occurred in May of last year is not absolutely determined in the Home Office Report, but the conclusion is that "although there is every probability that it is attributable to a safety lamp—which may have been either in perfect or defective condition—there is not sufficient evidence available to enable any one safety lamp to be indicated." In an appendix, Mr. J. B. Atkinson states his opinion definitely that fire-damp was ignited by the flame of one of the safety lamps, and Professor Galloway says with equal certainty of expression that the fire-damp was ignited at a damaged or defective safety lamp. If the opinions of these experts are accepted the theory of ignition by friction-gear must in this case also be abandoned; but, nevertheless, the evidence and the plans that accompany the Report deserve examination by all who may study the problem of ignition in mines, for in this instance the mechanical haulage plant is described, and the position of the friction gear is shown. The fact that fire occurred in certain regions of the mine and not in others cannot, of course, be attributed to anything relating to the plant. This distribution was no doubt the result of the corresponding local chemical constitution of the mine gases, and the explanation is to be found in the Home Office Report of 1896 upon the causes of death in colliery explosions and underground fires, where it is pointed out that in most fire-damp explosions there must be, in parts of the explosion, insufficient oxygen for complete combustion.

Lines of Progress.

Thus on the whole the friction-gear theory of ignition lacks positive support, and all that can be said is that there is enough possibility of danger to justify reasonable restrictions against the use of imperfect brake mechanism. The systematic testing of metallic brake shoes for train wheels has been in operation for several years, and elaborate and powerful machines have been installed for testing at peripheral speeds up to 80 m.p.h. These machines are fitted with self-recording apparatus for giving diagrams of pressure and speed, and account is taken of the wear of the wheels and shoes in each test. Advance has also been made in the direction of providing materials which reduce sparking and dust, and it is claimed that some of the new brake-blocks possess these characteristics in a marked degree.

If a research should be undertaken regarding this question of ignition by mechanical sparks the investigators would probably find some help from analogies with what has already been achieved in respect to electric spark ignition, and at certain points the two sets of phenomena may converge. The relationship between electric spark potential and sparking distance with change of air pressure, the effect of slight impurities on the minimum sparking distance, and the change in the electric field caused by the spark itself are all suggestive of lines of research with mechanical sparking. Lastly, attention may be directed to the significant words of Bichel that "all explosives require some initial impulse in order to explode," and to the effect of detonation in accelerating combustion.

OBITUARY.

Mr. N. F. McNaught, who had been identified with mining in the Slocan district of British Columbia for eighteen or nineteen years, died at Silverton, Slocan Lake, British Columbia, on May 12. He arrived at Ainsworth, B.C., in 1892, and the following year removed to Silverton, where he had resided ever since, up to the time of his death. He was part owner of several well-known mining properties, including the Alpha, about Four-mile Creek; the Hampton, on Springer Creek, and the Kilo, on Lemon Creek, all in the vicinity of Slocan Lake. In his numerous mining activities he was energetic, and in several successful. One of his characteristics was the erection of substantial mine buildings in his several mining camps. His body was interred at Everett, Puget Sound, Washington.

The total exports from South Africa amounted in 1909 to £51,151,463. Of this total, the mineral industry contributed 80.8 per cent.

SUMMARY OF PRINCIPLES IN THE SEPARATION OF ASBSETOS

Extract from Monograph "Chrysotile Asbestos," by Fritz Cirkel, M.E.

Although the method applied in asbestos separation is practically the same in every mill, no two mills are built alike. The serpentine in the different localities varies in hardness and toughness; one quarry extracts Nos. I. and II. grade by hand; another only No. I. grade; while others have abolished hand cobbing entirely, and send the whole output of the quarry through the mill. In some mills two qualities are produced; in others four or sometimes five. These factors, combined with other minor considerations, dictate to a certain extent the course of the treatment which has to be followed, and the kind of apparatus to be employed.

In order to illustrate the working of the serpentine method generally adopted, a description of a typical mill is given, which, by reason of its simple construction, will, it is hoped, facilitate the study of the principles involved.

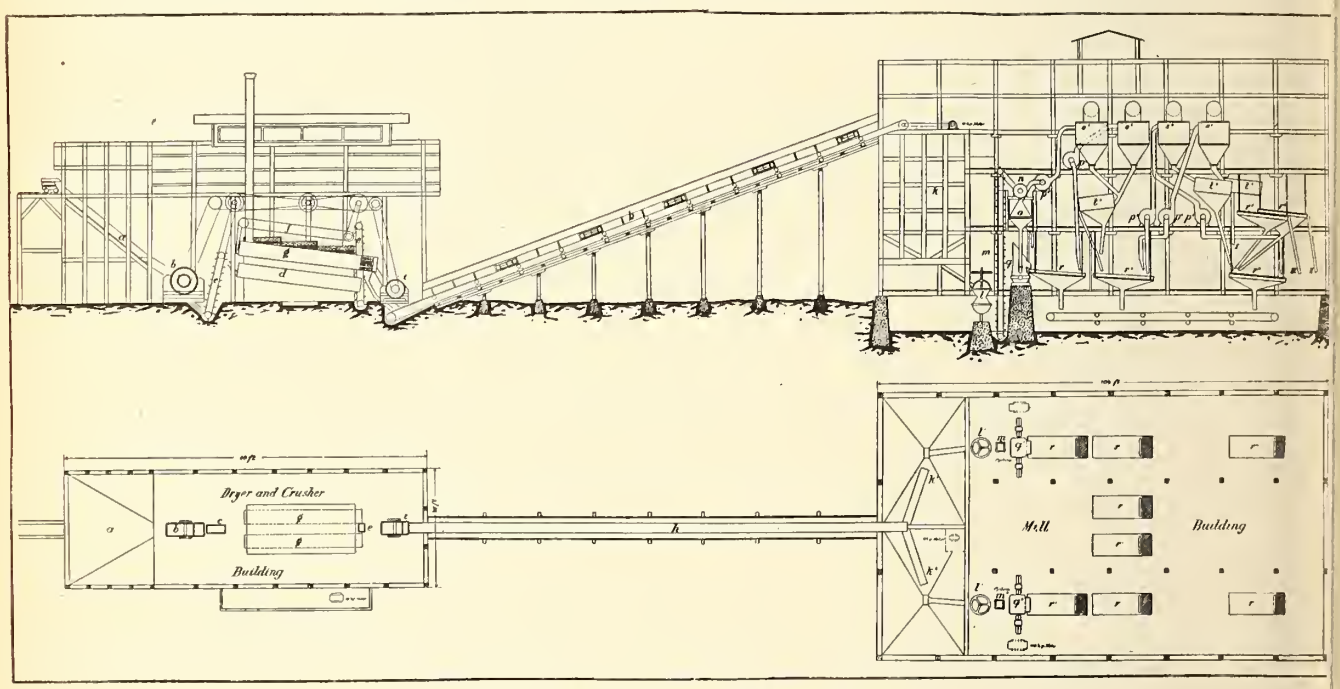


Fig: 36. Modern Asbestos Separation Plant.

A plan showing the arrangement of this mill is given in Fig. 36. No. I. and No. II. crude are hand-cobbed, and the balance of the asbestos material is sent to the mill for treatment. The serpentine used is massive, and of the usual hardness as found in the Black Lake and Thetford districts. Two qualities are made in the mill, with an additional grade out of the tailings of the shaking screens.

FIRST PART OF SEPARATION.

All the asbestos rock and fines produced at the mines are dumped into ore bin (a), then crushed in jaw breaker (b), raised by means of bucket elevator (e) to a chute, which empties into rotary dryer (d). A bucket elevator (e) raises the material to a belt conveyer (f), transporting it back to the other side of the dryer and delivering it to the second dryer (g). The end of latter is perforated, and effects a division of the r into "medium" and "rough." The "rough" is ag crushed in a second jaw breaker, while the "mediu or undersize falls directly upon the belt conveyer (which also takes up all the crushed material from breaker. The belt conveyer then delivers all the crus material to two ore bins (k^1) and (k^2), which discha through an automatic feeder to the Butterworth Low crusher (1). A bucket conveyer (m) dischar the rock into a fiberizer (n), and after thorough dimi tion the material falls on a screen (o), where a fan (takes up all the liberated fibre and deposits the sa into collector (s^1). The residue from screen (o) is delivered to cyclones (q); the discharge of the latter thrown on screens (r^1); here two separations of s and fibre are effected, the fibre being taken up by (p^2) and deposited into collector (s^2), the sand di pearing under the screens into a hopper, which emp on the sand conveyer (u).

SECOND PART OF SEPARATION.

All fibre extracted from the rock is now placed in leetors (s^1) and (s^2). From here, it passes throug grading screen (t^1), having arms within, moving in posite directions. In this screen two grades are m long fibre thrown on screen (r^2), and short fibre undersize) thrown on screen (r^3). These screens e a partial separation of the sand from the fibre; former falling on the sand conveyer (u) and the la being sucked up and placed into collectors (s^3) and From collector (s^3) the fibre is again screened in volving screen (t^2), the oversize constituting now

I., and the undersize being again treated on an os-ating screen (r^4) in order to get rid of the sand. atever fibre remains on this screen is taken up by a (p^5) and is deposited in collector (s^3).

he No. II. fibre which is in collector (s^4) goes ough the same process of clearing as the No. I. fibre, cribed above, and the final results are a Nos. II. and II. grade, in addition to the No. I. grade referred to.

he following chart, No. I., represents in graphic fom a summary of the foregoing descriptive outline of th various stages through which the longer fibre has to pss before it is ready for the market.

here are various other combinations, as will be seen fm the mill schemes laid out in charts II., III., IV., a V., and, furthermore, new combinations may sug-t themselves.

CHART I

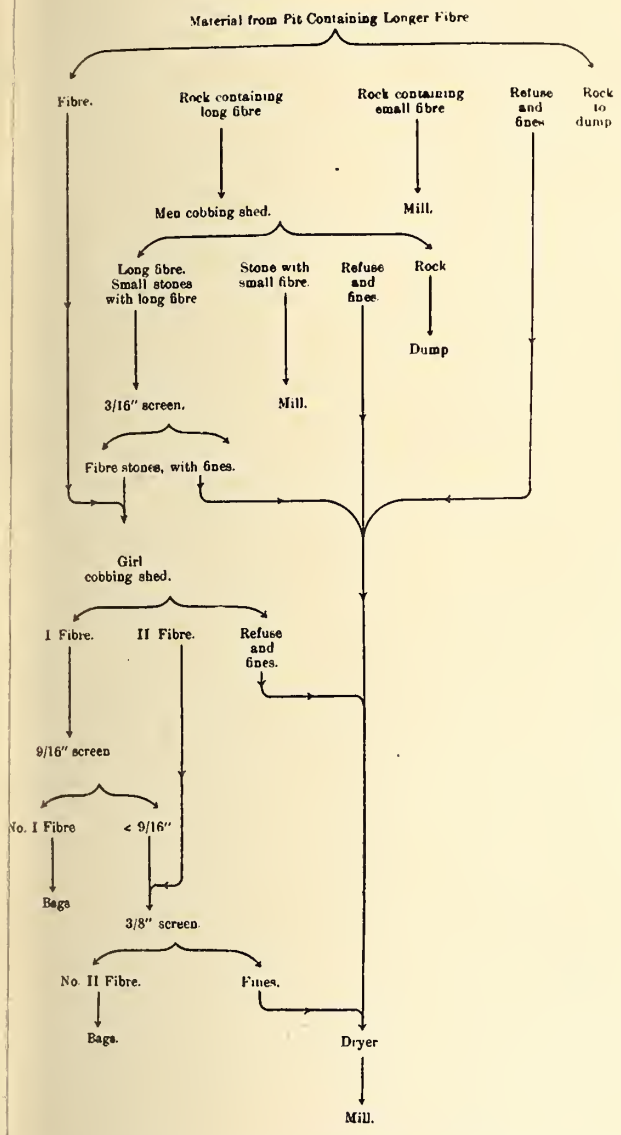
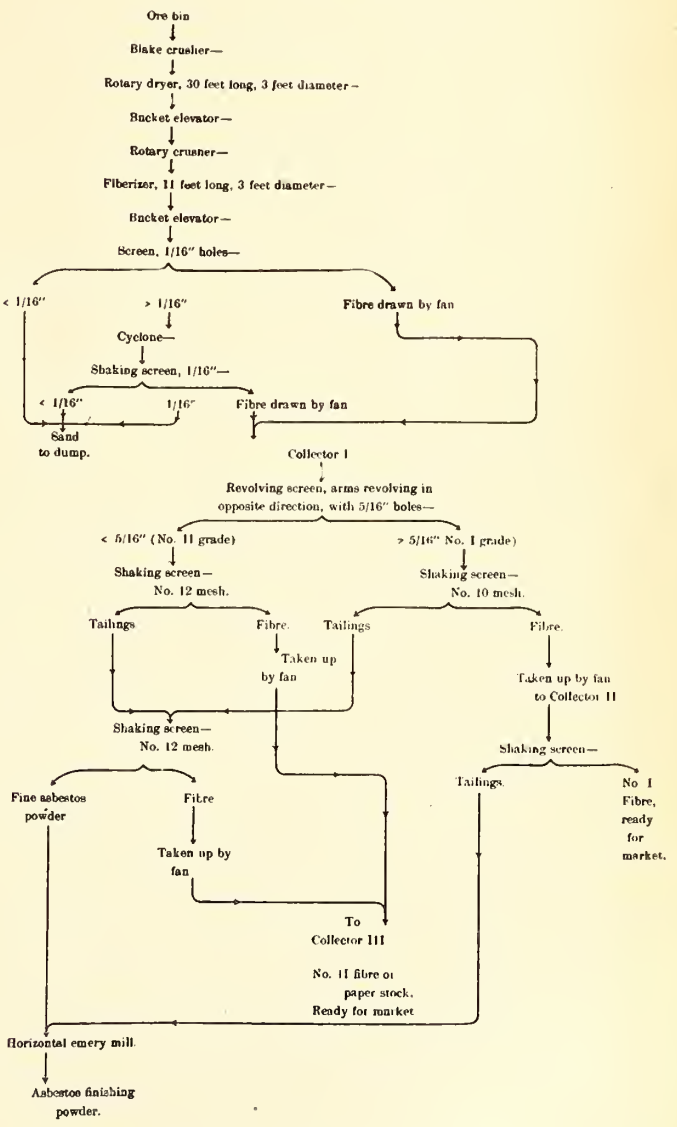


CHART II.



Theoretically, the principles introduced would allow perfect separation of all the asbestos from the rock, d of the different grades; but practically this is very fficult to accomplish, and is rarely attained.

In looking over the above-mentioned charts, we find at the principal object in the first stages of the pro-ss is to eliminate the sand through the shaking screens, d to have as much fibre taken up by the fans as is practically possible. We learn also that many combinations of the crushing machinery are used; but the jaw crusher always forms the initial step, followed by a rotary or Gates crusher; while the last stages of the process are practically the same in all the mills, with very few deviations.

In mill IV. a picking table is inserted between duplex crusher and elevator. These picking tables consist of an endless rubber belt of a width varying between 18 in. and 24 in.; and turning on a wide cone or pulley, with a length of from 12 to 18 feet. Boys are stationed along the belt, picking up the dead rock, long asbestos fibre, and pieces of iron, or rubbish which may have fallen accidentally into the ore. In mines which produce much crude, this arrangement is very important, as the long fibre which was hidden in the rock before breaking can be removed and saved as crude. It is also of equal importance that all the rock which contains no fibre be taken out, to relieve the subsequent operations from unnecessary work.

In the extraction of pieces of steel and iron from the ore powerful magnets are employed. An effective design for this purpose is in use in some of the Montana mines[1], and its adoption in the asbestos mills of Quebec will not meet with any difficulty. The magnet can either

be placed over the conveyer belt, or over the shaking screens. The metal to be removed consists of pieces of steel, bolts, track spikes, and castings from the machine drills; in fact, any iron that may get into the ore on its way from the stope to the mill.

The magnet used consists of a cast-iron part (a) 4 in. thick, 20 in. high, and 20 in. wide. It is wound with 19 layers of No. 10 double cotton-covered copper wire (c), with 2,300 turns on each pole. The current used is 5 amperes, at 125 volts. The pole faces (b) are 2 in. x 6 in. x 24 in., and are spaced 6 in. apart. The magnet is suspended from a carriage (e) and supported on a track (d) at right angles to the belt. When a number of pieces of iron are collected on the magnet, the entire apparatus is moved to one side, the current cut off, and all the iron is dropped to the floor. The magnet is suspended 6 in. to 8 in. above the belt, and is adjustable by the means of turnbuckles (f). This magnet will pick up pieces of steel weighing as much as 10 pounds; this prevents trouble and breakage at the rolls.

CHART III.

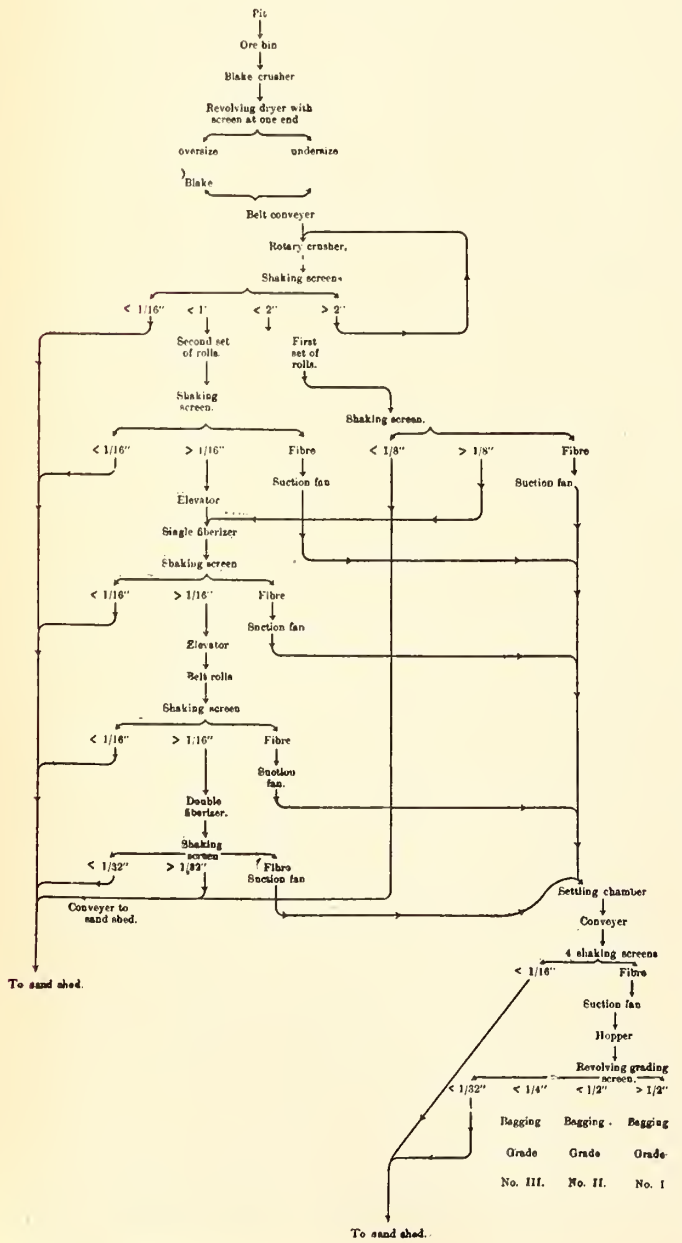
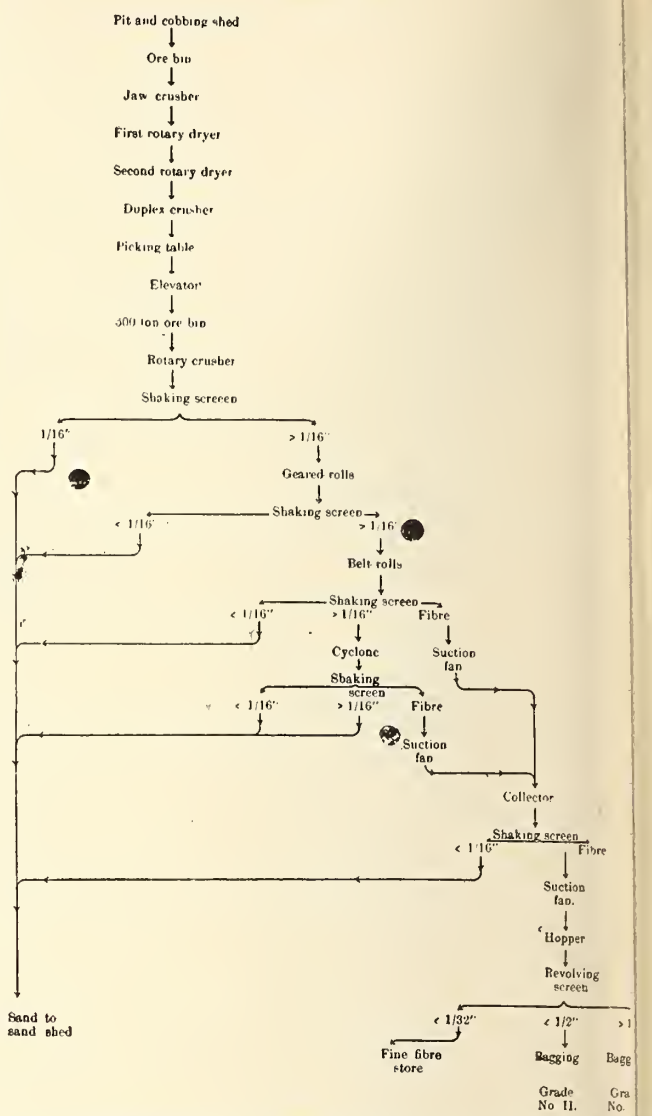


CHART IV.



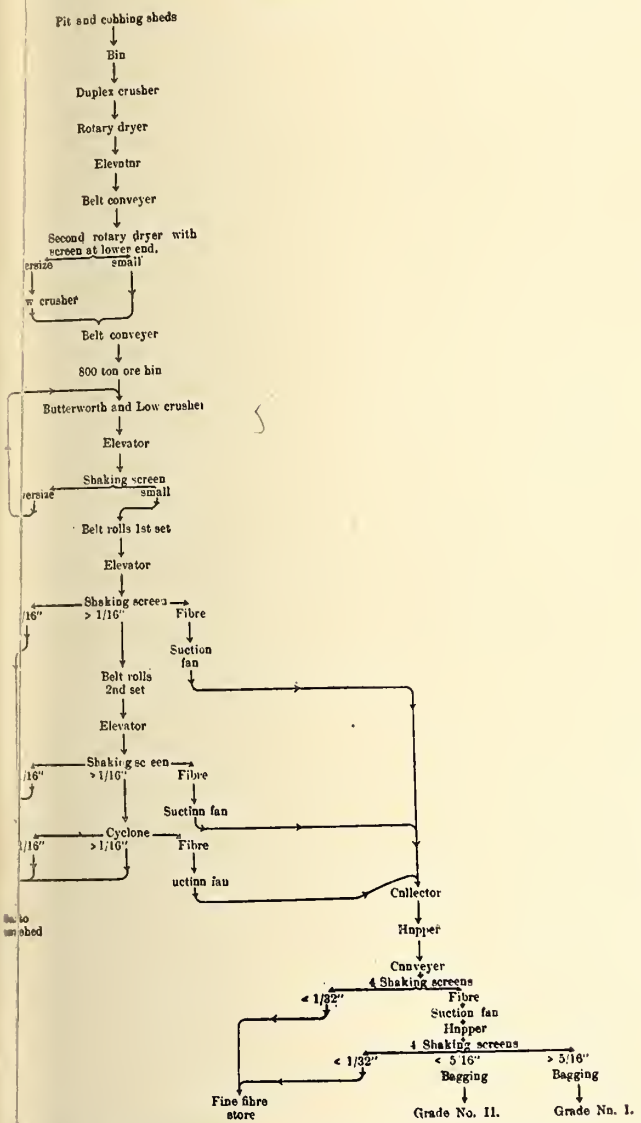
In designing a mill, due attention must be given p- cipally to the crushing department; since mistakes m- e here have very serious results, either in the quality f the fibre produced, or in the low percentage of ext- tion. Experience shows that crushing of the rock be- e drying is absolutely necessary in order to ensure c- plete drying of the rock in wet seasons. As a gen- l rule, one or even two Blake crushers are placed be- e the dryer, and one at the discharge end of the lat- r. The drying and most of the coarse crushing is now ll done in a separate building; because, when placed in e upper part of the mill building, the power toggle m- ment of the jaw breaker causes a heavy vibration in e structure of the building, hence, heavy construction is necessary. A new departure in mill construction may be seen in the plant of the Robertson Asbestos C- pany, between Robertson and Thetford stations. H- e the whole plant is divided into three parts: the dr r and crusher building; the re-crusher; and the cycl- e building. This is the first time that this division n three separate departments has been made.

There are other new noticeable features in this n- l. The rock coming from the dryer passes through o gyratory and one rotary crusher, having shaking scre- s between, for the purpose of abstracting, by means f suction, whatever fibre there has been liberated thro- h crushing. We notice that the rock passes through t

han five different crushing apparatus before it enhe cyclone; and three in nearly all other mills; it y exceptionally that four crushing machines are for the same purpose. It is urged in support of novation that the cyclone, which receives only ore iform size—smaller than a walnut—will treat a gher tonnage of ore, doing at the same time, better nore uniform work.

There can be no question that through the employmen of the designs indicated above, the efficiency of a mills increased; while much breakage in the different pieces of apparatus—especially in fast revolving machines like the cyclone—is prevented.[1]

CHART V.



f the fiberizing machines the cyclone appears to be th most extensively used in the mills. In some of the ne er mills other machinery has been introduced to take th place of the cyclone. This is shown on chart for mi l No. III., where the fine crushing is represented as be ng done by two pairs of belt rolls, in connection wi h single, and double cylindrical, fiberizing apparatus. In another mill the material passes twice in succession th ough a set of rotary crushers and a beater of recent design; the construction of which is kept a secret. It is claimed for this new departure that the fibre is not torn up so much, and that the repairs are less, and not so costly as those in the cyclone machines.

The different grades of fibre are, as a rule, made in most of the mills at the end of the process, by sizing in shaking screens, or in revolving screens, with arms moving in opposite directions. A new departure in the extraction of the fibre from the screen, and the elimination of the sand, was made several years ago in a mill of new construction. The experiment failed; but for the novelty of the idea, and for the purpose of calling attention to the mistakes involved in its application, the device is again described and illustrated. The material after being crushed successively in a jaw and rotary crusher,

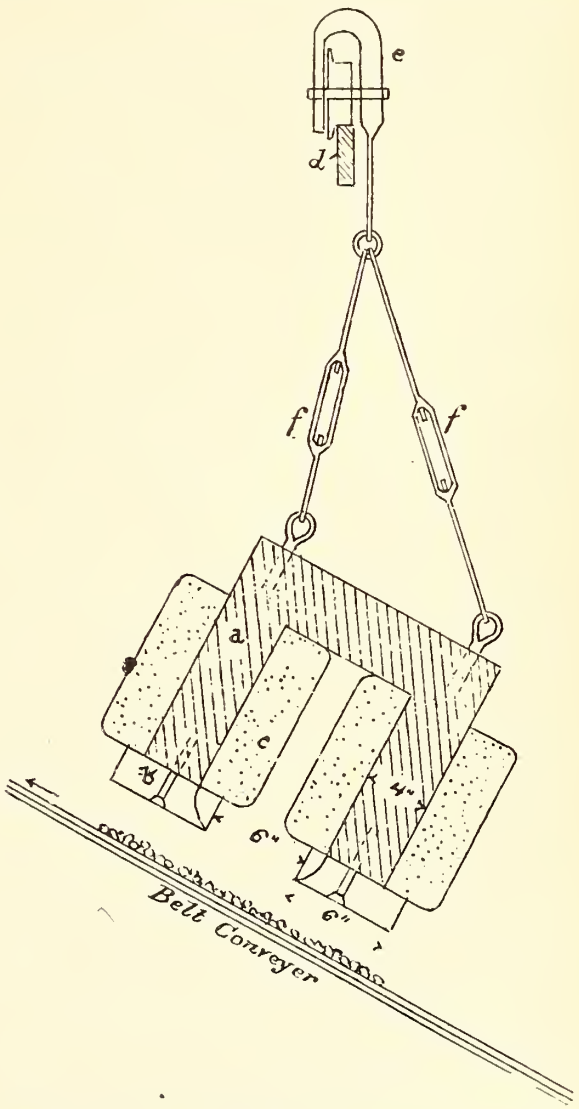


FIG. 42.—Magnet for picking steel from ore.

and a beater, falls on a double shaking screen, as illustrated in Fig. 43: the upper one having 7/16 in. and the lower one 1/16 in. mesh, allowing the sand to pass away. The fibre is graded in this way into No. I. and No. II. Each grade is taken up at the end of each screen by suction fans, and deposited in separate collectors. The overflow from both screens passes again through a rotary crusher and beater and a double screen as before; while the two grades of fibre, so produced, are taken up and deposited in collectors. The principal trouble in this device was the difficulty of

[1] Since writing the above several changes in this mill have been made, and at the same time the capacity increased from 2 to 6 cyclones.

gaining access to the lower screen: it was blocked so frequently that its usefulness soon vanished.

The sand from all the shaking screens falls generally into a long hopper, having a rubber belt conveyer at the bottom, which transports all material to the outside. Where the dumping ground is not on the same level with the mill, the sand is carried by conveyers into elevated sand-sheds or large reservoirs, from which cars are loaded and sent to the dump.

At the British Canadian quarries the sand is transported through a 658 ft. rubber conveyer to the dump; from thence it is carried away through sluicing; a turbine pump actuated by a 75 horse-power electric motor placed at the river bank furnishing the necessary water through a 6 in. main 1,000 feet long, to the top of the dump.

In the mills at Danville the bulk of the sand and tailings from the shaking screens is manufactured into *asbestic*: a fine asbestos powder which enters now largely into the construction and inside finish of fireproof buildings.

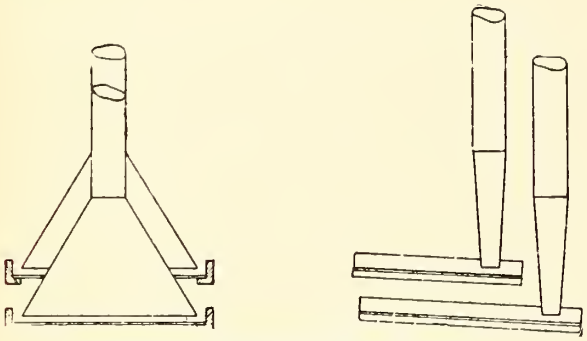


FIG. 43.—Double Shaking Screen.

In one of the largest mills recently erected, all the tailings are pulverized in giant, vertical, Emery mills.

GENERAL FEATURES OF THE MILLS IN THE DISTRICT.

With a few exceptions, the mills visited by the writer are located near the quarries: that is, within 500 feet; indicating that the transportation of the ore to the mill is a most important factor. In the general arrangement of all the newer mills due consideration has been given to the dumping ground, with a view to preventing the covering of valuable ground. For this reason the mills have been built away from the quarries.

With regard to the sites on which mills are built, we may distinguish between (1) a sloping or terraced site (Fig. 44); a flat site (Fig. 45). In the former case advantage is taken of the sloping condition of the ground, all material being conveyed by gravity, and heavy elevators are few. An example of this kind is the old mill of the Union quarry, now of the Black Lake Consolidated Asbestos Company at Black Lake.

Mills on the flat ground, however, are the common rule. The disadvantages are, that more elevators are required; which wear out rapidly; causing stoppages of the mill on account of breakage, and annoying the mill man.

An asbestos separation plant is usually designed in the form of a three or four-storey building. The ore is received in a large ore bin, placed in the upper part of the building, or in an annex: allowing the ore to pass through the crushing machinery by gravity; elevators being used between the apparatus for middlings and for recrushing. In the majority of cases, however, the passes on straight without recrushing in the same paratus. Sometimes all the fine crushing apparatus fiberizers are placed in one line and on one floor, as the mill of the Johnson Asbestos Company at Bl Lake. Small elevators convey the material from apparatus to another; and it is claimed for this arran ment that the machinery can be watched better, and

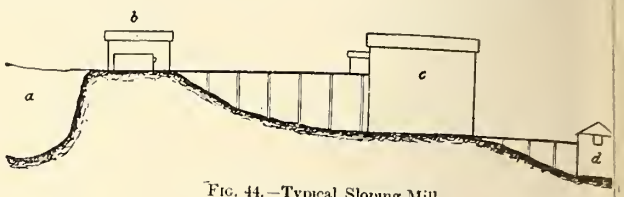


FIG. 44.—Typical Sloping Mill.
(a) Pit. (c) Mill
(b) Dryer (d) Storehouse.

more accessible than when placed on different lev The screens receiving the material from the crush are, as a rule, placed all on one floor, for the purp of greater accessibility; while an endeavour is made do the same in all the newer mills, with the shak screens for the fibre.

In mills of recent construction—in order to av complete stoppage caused by breakage of machinery otherwise—the whole milling plant is divided into portions, and constructed on precisely the same li but run independently of each other. This innovat was noted in the mills recently built at East Brough

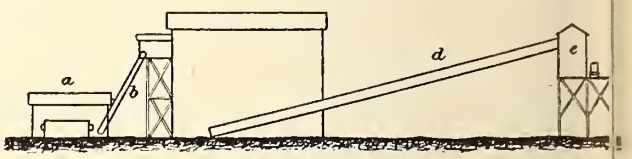


FIG. 45.—Typical Flat Mill
(a) Dryer (d) Sand conveyer
(b) Elevator. (e) Sand shed.
(c) Mill. (f) Elevated track

and at the "British Canadian" quarries. In the la this principle is even carried further: the two secti are again divided into different parts, each one emb ing a certain group of machinery run by special elec motors. In the mill proper the six cyclones are placed in one line on one side of the building; the e tric motors actuating the same being all in one separ compartment close by. This is an arrangement of paratus to be recommended on account of its great eessibility, uniform division, and the protection of motors against flying dust.

At the extraordinary general meeting of the C tral Mining & Investment Corporation, Limited, h at No. 1 London Wall buildings early in June, capital of the company was increased to £5,100,0 sterling. The agreement between the Central Min & Investment Corporation, Limited, and Messrs. We ner Beit & Company, and Messrs. W. Eckstein & Co pany, which provided for the purchase of several the assets of these two well known mining firms, a which had previously been unanimously confirm was brought to completion. The committee appoin to value the assets taken over were Messrs. R. T. B liss, Otto Beit and G. Rouliot, and the values m by them were accepted. Three representatives of French shareholders were elected to the board.

New Dominion Copper Company, Ltd.

The new Dominion Copper Company, Ltd., owns several groups of mineral elaims, situated in the Boundary Distriet of British Columbia. A controlling interest in the eompany's eapital stoek is held by the British Columbia Copper Company, so its mines are operated under the same local management as those of the atter eompany. Mr. J. E. MeAllister, of New York, formerly general manager, is now consulting engineer, and Mr. E. G. Warren, of Greenwood, is aeting general manager. The partieulars that follow have been taken from the eompany's second annual report:

Report of Directors.

Under date New York, June 5, Mr. Newman Erb, vice-president, reported to the shareholders as follows:

During the fiseal year ended March 31, 1911, the activities of your eompany were direeted principally to the development of the Rawhide and Athelstan mines. Incidental thereto, there was extraeted 90,000 tons of ore, of which more than 30,000 tons eonsisted mostly of waste left in the mines during former operations and about an equal tonnage in very low-grade ores, all neeessary to be removed as part of the development work. These mines have, with the end of the fiscal year, just reaehed the stage for normal operation, when reasonably profitable results may be henceforth expected.

The net expenditure during the fiseal year was $16,472.59, whieh is within the estimate originally submitted by the company's engineer before the development work was begun. Beside, this amount ineludes administration, office, legal, and other expense.

On January 2nd last a fire destroyed the offiee, machine and repair shops, supply building and eontents at the Rawhide mine, entailing a loss of $26,546.97, covered by insuranee to the amount of $25,000, whieh has since been eolleeted.

'The eompany acquired $16,150 par value of its bonds, whieh are now in its treasury. While no ineome was available for the payment of bond interest during the year, your direetors believe that the operations for the coming year, under normal conditions, will result in sufficient ineome to provide for its payment.

'It is intended now to diamond drill and thoroughly explore the Montezuma and Sunset mines in the expectation that they will develop as substantial producing properties.

'The past year has been extremely unfavourable to the eopper industry the world over. These eonditions appear to be approaching a marked ehange for the better, and, with the expeeted improvement in the market value of the metal, substantial gains in operating results will naturally follow. While eonditions have been discouraging, we are now justified in eonsidering them as more hopeful.

"The exeeutive is indebted to the general manager and the operating foree for their intelligent eo-operation, zeal, and fidelity."

Balance Sheet, March 31, 1911.

Assets.

Properties—mines, smelter, ete.—		
Cost-adjusted book value		$1,016,267.14
Permanent improvements and equipment—		
As at March 31, 1910	$306,546.56	
Additions	684.30	
	$307,230.86	
Less sales	10,772.02	
	$296,458.84	
Add transfer from supplies a/c	13,187.81	
Material overvalued or non-existent at March 31, 1910		309,646.65
Rawhide Mine eonstruetion		10,780.30
Rawhide spur—		
Book value at date of aequisition	$23,211.26	
Additions	5,678.50	
	$28,889.76	
Less refunds on shipments at $1 per ear	2,344.00	
		26,545.76
Bonds purchased—$16,150 par value		8,075.00
Store inventory		22,290.63
Ore in transit		1,814.02
Office furniture at Boundary Falls—		
Book value at date of aequisition		500.00
Expenditure a/e claims against Dominion Copper Co., Ltd.		24,599.58
Payments a/e reorganization ereditors		1,010.27
Treasury stoek, as contra—par value		71,880.00
Ineome and expenditure a/e—		
Net balanee Mareh 31, 1910.	$ 30,818.81	
Add excess expenditure for year	106,472.59	
		137,291.40
Deferred eharges		420.47
Sundry debtors		18,527.69
Cash in bank and in hand		188,448.86
Contingent asset—		
Deposit, pending result litigation	$10,030 62	
		$1,838,097.77

Liabilities.

Capital stoek—		
Authorized—350,000 shares at $5 eaeh		$1,750,000.00
Issued and outstanding—		
Issued as fully paid for property and assets of the eompany, 249,993 shares at $5 eaeh	$1,249,965.00	
Subseribed in cash, 7 shares at $5	35.00	
250,000 shares at $5.	$1,250,000.00	
Issued for conversion of bonds, 40 shares at $5.	200.00	
		$1,250,200.00
Ten-year 6 per eent. eonvertible ineome gold bonds issued	$500,000.00	
Converted into stoek at par	200.00	
		499,800.00

Surplus—par value of 14,377 shares at $5, received from Organization Committee..	$71,885.00	
Less one share issued since	5.00	
		71,880.00
Accounts payable		13,873.18
Reserve for outstanding liabilities—		
Employers' liability	$ 924.10	
Wage claims, Dominion Copper Co., Ltd.	1,413.28	
Unclaimed wages	7.21	
		2,344.59
Contingent liability, as contra, $10,030.82		
		$1,838,097.77

Income and Expenditure A/c March 31, 1911.

Cr.

Proceeds ore smelted, as Schedule A	$55,621.80	
Add transfer Rawhide expense account	3,045.49	
		$ 58,667.29
Interest on bank balances, etc.		7,602.23
Rent of cottages		658.65
Balance		106,472.59
		$173,400.76

Dr.

Expenses at mines—		
At Rawhide, as Schedule B..	$147,468.37	
" Athelstan	7,220.11	
" Brooklyn	367.98	
" Sunset	315.53	
" Idaho	256.59	
" Mountain Rose (¾ interest)	184.49	
" Stemwinder	170.93	
On various claims	804.18	
		$156,788.18
Smelter plant expense		2,990.95
Administration and office do.		4,626.34
New York office do.		4,883.93
Legal do.		4,111.36
		$173,400.76

Schedule A—Ore Treated, Etc.

Statement showing ore treated at smeltery and proceeds of same for year ended March 31, 1911:—

Ore shipped—		
Gross tons	90,858	
Dry tons	88,613.5	
Gross value of metals		$287,527.02
Gold, 3,828.1696 oz. at $20..	$ 76,563.39	
Silver, 22,430.17 oz. at av. 54c.	12,120.53	
Copper, 1,311,880 lbs, at av. 12.25c.	198,843.70	
Less deductions		209,632.33
Off gold, 5 per cent.	$ 3,828.17	
" silver, 5 per cent.	606.02	
" copper, 2¾c per lb.	44,326.72	
Sampling cost	3,995.25	
Treatment cost	156,157.34	
Handling loss, 0.25 per cent..	718.83	
Net value		$ 77,895.29
Less freight		22,722.71
		$ 55,172.58
Proceeds of ¾ interest in ore shipped from Mountain Rose mine		44.22
		$ 55,62[illegible]80

Schedule B—Rawhide Mine Expense.

Analysis of Rawhide mine expense for year e[illegible]ed March 31, 1911:—

Preliminary development		$ 10,63[illegible]3
Mining expense		58,45[illegible]0
Development—		
Drifts and cross-cuts	$14,045.92	
Raises and winzes	17,586.67	
		31,63[illegible]
General underground		26,83[illegible]0
Tramming and bins		2,15[illegible]5
General surface		11,13[illegible]
Construction		96[illegible]
Addition to stable	$253.07	
Addition to blacksmith shop..	174.23	
Dry house	84.90	
Carpenter shop	190.01	
Transformer building	208.86	
Miscellaneous	51.09	
Deficit on preliminary shipments ore		3,04[illegible]
		$144,87[illegible]
Less ore in transit March 31		1,814[illegible]2
		$143,061[illegible]0
Net loss on supplies destroyed by fire		1,54[illegible]7
Taxes accrued due		2,86[illegible]0
		$147,468[illegible]7

MINERAL PRODUCTION IN ONTARIO, FIRS[illegible] QUARTER OF 1911.

Returns to the Bureau of Mines show the follow[illegible]g production from the metalliferous mines and works [illegible]f Ontario for the three months ending 31st March, 19[illegible]

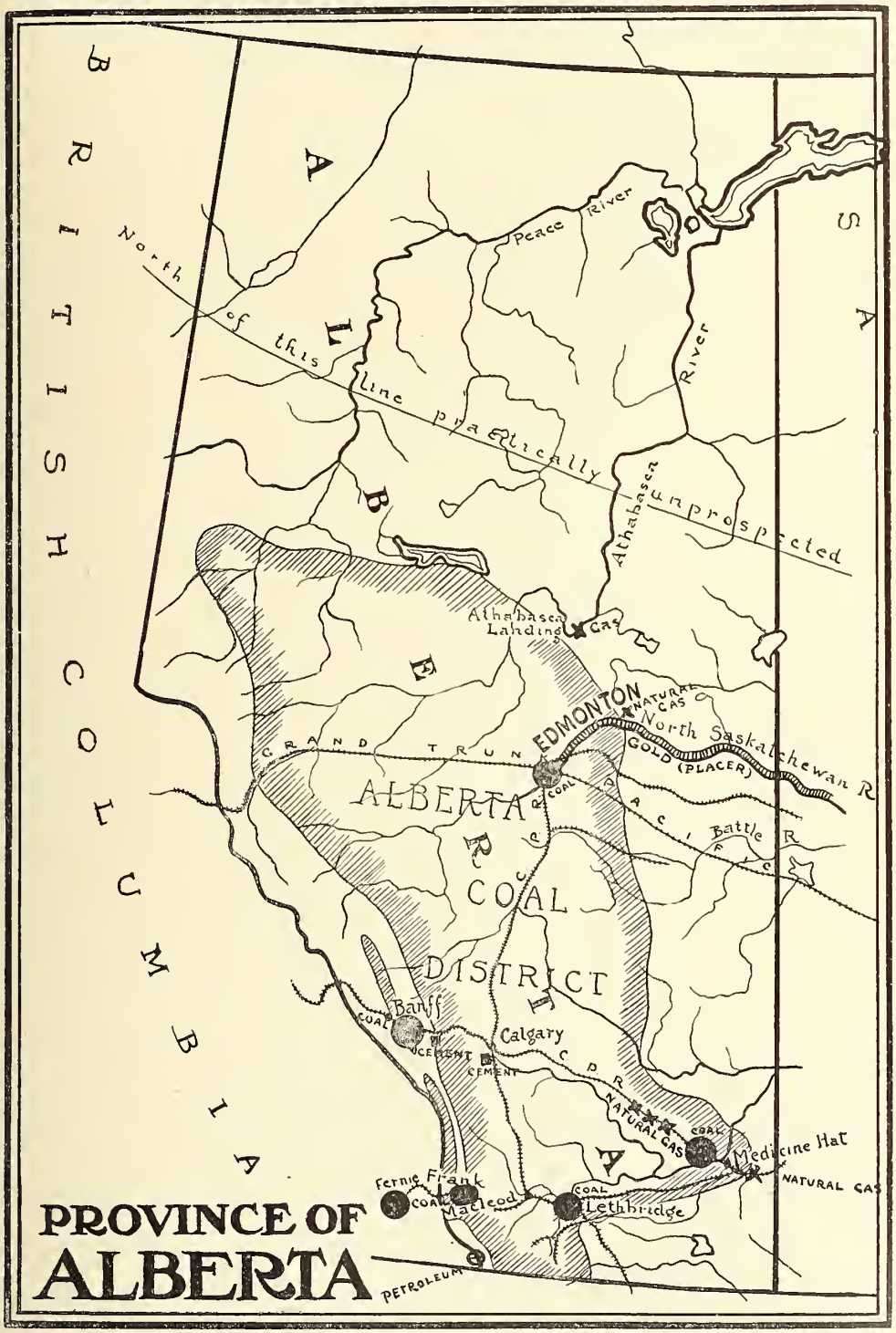
	Quantity.	Valu[illegible]
Gold .....ounces	1,813	$ 33,[illegible]0
Silver .....ounces	7,530,487	3,708,[illegible]4
Copper .....tons	2,121	303,[illegible]0
Nickel .....tons	4,124	884,[illegible]2
Iron ore .....tons	11,621	24,[illegible]4
Pig iron .....tons	115,454	1,823,[illegible]7
Cobalt and nickel oxides..lbs.	107,846	29,[illegible]2

As compared with the first three months of 19[illegible] there is a decrease in copper and nickel from $357,0[illegible] and $1,131,024 respectively, and an increase in iron [illegible] from $15,034, pig iron from $1,750,396, and in silv[illegible] from 6,399,927 ounces, valued at $3,041,158.

The somewhat serious shortage of electric power [illegible] Cobalt during the quarter might have been expected [illegible] lead to a reduction of the silver output, and althou[illegible] power is now again plentiful the effects may perha[illegible] be seen when the returns for the second quarter of t[illegible] year are received. Gowganda and Elk Lake produc[illegible] 132,900 ounces of silver during the quarter, and Sou[illegible] Lorrain 66,795 ounces. The total shipments from C[illegible] balt were: ore, 3,786 tons; concentrates, 1,974 ton[illegible] bullion, 2,004 pounds.

The Rocky Mountain Collieries, Brazeau Collieries, and Sixth Meridian Coal Lands.

Notes from the privately circulated Report of Chas. L. Hower, M.E.



EDITOR'S NOTE.—Through the courtesy of one of the directors of the above companies the CANADIAN MINING JOURNAL is permitted to give the following notes from Mr. Chas. L. Hower's excellent report. For some years Mr. Hower has been working in the coalfields of Alberta. His report is singularly careful and accurate.

The three groups of coal lands mentioned above are owned conjointly by Mackenzie & Mann and the German Development Co., Ltd.

Most of the property is held outright, the coal purchased, and the mining rights perpetual. Some of it is held on approved leases, with the title still pending.

All areas owned were purchased from the Government. The rights are perpetual. Ten cents per ton will be payable to the Government on all coal mined.

The leased properties are in the National Park, where special regulations are in force, or in territory acquired under the new mining regulations. These properties are held on twenty-year leases at a cost of one dollar per acre per year and a five-cent per ton royalty for coal mined.

The ultimate divisions are as follows:—

Rocky Mountain Collieries, Ltd., Kananaskis Field, coal leased, 5,440 acres.

Brazeau Collieries, Ltd., coal owned 10,320 acres, coal leased, 5,480 acres; surface, 640[1], 200[2].

Sixth Meridian Coal Lands, coal leased, 4,480 acres; surface, 6,400[3] acres.

History.—Most of the Province of Alberta is underlaid with coal; but east of the Rockies the accessible deposits are recent lignites. The Cretaceous measures carrying the true bituminous coals are under many thousand feet of cover, and only at points where the measures are thrown up in the mountain ranges are the deposits brought to the surface. And only in certain protected localities have the measures been preserved from erosion.

The existence of coal in the Kootanie series of rocks has been known for some years, and coal has been mined extensively in the Crow's Nest Pass and near Banff. Coal in the same measures in the mountains to the north was discovered by Mr. D. B. Dowling, of the Dominion Geological Survey in 1906. In 1907 Mr. Dowling's services were secured by the managing director of the German Development Company, and prospecting and staking commenced. Three fields, the Saskatchewan, the Bighorn, and the South Brazeau were staked. The Kananaskis field was staked in the National Park south of Banff.

In 1908 Mr. Dowling returned to the Survey, and Mr. James McEvoy, formerly chief engineer to the Crow's Nest Pass Coal Mining Co., was engaged. Under Mr. McEvoy's direction the territories mentioned above were thoroughly prospected, and, in 1909, the Race Creek field was staked. At the same time Thomas Russell staked the McLeod and Main Brazeau fields for Mackenzie and Mann. Later, Russell staked the Sixth Meridian Coal Lands. In 1909 the holdings of the German Development Co. and those of Mackenzie and Mann were amalgamated.

Rocky Mountain Collieries, Limited—As noted above, the property of this company consists of 5,440 acres of leased coal lands in the Canadian National Park, mainly on the west side of the Kananaskis River, about 12 miles above the junction of that river with the Bow River. Sections of the coal measures have been opened at three points, first near the southern end, second near the middle of the property on Ribbon Creek, and third near the northern boundary. The coal is known to run continuously through the property, but sufficient work has not been done to establish the identity of the seams at the various points. Neither are the seam intervals uniform. The various and excessive dips are difficult to measure and to project. Basing an estimate on the coal in sight, the property contains 415,800,000 tons, figuring the workable thickness of the various seams at 50 feet. The analyses indicate a semi-bituminous coal, rather high in ash owing no doubt to the surface dirt in the samples taken near the crop.

The following proximate analyses show the character of the coal sampled on seams Nos. 5, 7, 8, and

	5	7	8	
Moisture	0.72	1.50	2.82	0.
Volatile	16.34	11.79	19.33	12.
Fixed carbon	71.89	69.66	65.70	73.
Ash	11.05	17.05	12.15	12.
Sulphur	0.87	0.79	....	0.

Mr. Hower's estimates of production costs ran from $1.37 to $1.56, depending upon whether da outputs of 3,000 tons or of 1,000 tons be aimed at.

Brazeau Collieries, Limited.—The six areas of t company lie almost in a continuous straight line a extend from the southern banks of the North S katchewan River in a northwesterly direction to t headwaters of the McLeod River.

The company owns in the six fields of Saskatchew Bighorn, South Brazeau, Race Creek, McLeod, a Main Brazeau, a total of 10,320 acres of coal lan holds 5,480 acres under lease, and owns surface rig on 560 acres in South Brazeau. From 17 to 21 wo able seams of coal are known. The total workal thickness ranges from 13 feet in Main Brazeau up 60 feet in South Brazeau. The total quantity of c is estimated at 612,000,000 tons.

Nearly all the seams are coking coal. The a which is higher than normal to the unweathered co runs from 8.43 per cent. to 14 per cent. Volatile co bustibles are reported as low as 22.29 per cent., a as high as 32.30 per cent.

(To be continued).

The scope of the diamond drill does not include dr ing in such rock as limestone containing chirty nodul Highly inclined and flinty rocks are also dangerous t the diamond drill, as the loss of diamonds is apt to excessive. The calyx drill is cheaper in soft or mod ately hard material, but it is not adapted to bori holes at an angle greater than about 25 degrees fr the vertical. The shot method is more efficient than t calyx in hard ground, but is not adapted to soft m terial. It may, under proper conditions, be used f boring holes at any angle.

"The Yukon Territory is likely again to become c spicuous financially by reason of a new venture bas on gold-bearing gravel deposits in the Klondike d trict. A syndicate, with a capital of £200,000, has be formed by Messrs. H. C. Hoover and A. C. Beatty, ha of the amount being placed in New York and half London. The intention is to bring out a company lat with a view to exploiting a number of claims situat on Dominion, Quartz, Last Chance, Eldorado, and oth famous creeks near Dawson. The vendor is Mr. A. N. Treadgold, well known in connection with the Yuk Gold Co., an enterprise controlled by the Gugge heims. The money now raised is, we understand, to loaned to Mr. Treadgold, who, in return, gives the sy dicate the call on his rights, with a view to an issue, wh it is deemed expedient. The property has been examin by Mr. W. E. Thorne, who has submitted a favourab report."—From the Mining Magazine, London.

[1] Owned. [2] Leased. [3] Pending.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

mion Coal Output.

Th outputs for the first half of June were very satisfactory. alth igh the output capacity of the mines is not quite as large s it was in 1908, the production is gratifying by reason of its stea uniformity, and the fact that it is all obtained on single-shif working. For the first twelve days of the month the outp t averaged well over 14,000 tons per day, which it at the rate f 370,000 tons monthly. During the latter half of the mon there will be some reduction owing to the provincial elec ons on the 14th, and the effect of Coronation Day. Shipmen were also unusually rapid. During six days over 70,000 ton were shipped over the International Piers at Sydney for St. awrence ports.

Colliry Wash-Houses.

Th subject of the miner's bath has given rise to a large amo nt of discussion in the British Isles of late. It has always bee a matter of surprise to mining men from the Continent of urope to find that British miners are in the habit of returning to their homes from the pit without washing or changing their clothes. The person who suffers most from this custom is te miner's wife, more particularly as the arrangements for taki g a tub in the majority of miner's houses in Great Britain are not of the best. It is certain that very little opposition will be forthcoming from the female relatives of the miner to mo adequate provision at the pithead for washing and hanging of clothes. The writer was for many years employed at colliery in England at which one of the first ''wash-houses'' at n English colliery was erected. The wash-house was designed after the German pattern, with shower-baths and clo es lockers, and it was welcomed by the younger miners. Amo g the older generation of miners, however, there lingers an idea that too much washing is weakening, and in one district of England at least it is regarded as distinctly unwise to wa the backbone. One old collier that the writer remembers, who scrupulously clean in every other respect, would not allow any water to be applied over his spine, but had that portion scrubbed clean with a dry cloth.

In Nova Scotia it has been the custom for many years to provide wash-houses fitted with clothes-lockers and facilities for cleansing the upper part of the body, and they are used by practically all the underground workmen. To see the miners' bath in perfection, however, one has to travel to Germany, although ''Engineering & Mining'' had recently an account of a fine wash-house on the German plan which has been provided at the Marianna mine in Pennsylvania.

In many of the German collieries the miner coming from the pit heated and perspiring, can walk directly from the pit mouth into the wash-house through a covered gangway, and is not exposed to the outside air. After his shower-bath with hot or warm water he can finish off with a cold shower, thus lessening the risk of catching cold. No one seeing the German miner on the street can tell, except by the dinner-can he carries, whether he is on his way to or from work, or whether he is merely out for a stroll. This is just as it should be.

The Coal Mines Regulation Act in Nova Scotia calls for the provision of a suitable house for changing and drying clothes at every mine employing more than 12 persons, and this is generally interpreted to mean also the provision of washing-bowls and running water. The last wash-house erected by the Dominion Coal Company at the Lingan Mines is a great improvement on its predecessors, and it is certain that so far as Nova Scotia is concerned, the colliery wash-house is not only a permanent institution, but one which will be improved as time goes on.

The following paragraph from the ''Engineering & Mining Journal'' of New York of June 10th may interest Nova Scotian and New Brunswick readers:

''At auction in New York, June 1, a lot including 950 shares Northern Coal Company, Ltd., of New Brunswick; 39,936 shares Kent Coal Company, Ltd., of Maine; 44,875 shares Crown Coal Company, Ltd., of Maine; 24,950 shares Great Northern Coal Company, Ltd., of Nova Scotia; 41,201 shares Great Northern Coal Company, of Maine; 960 shares North Shore Railway Company, of New Brunswick, and claim to title in 49,950 shares Maritime Coal Company, Ltd., of Nova Scotia, brought $10,500 for the lot.''

This is the aftermath of the wonderful prospectuses of Dr. Hugo von Hagan, to which reference has been made at various times in this correspondence and the columns of the ''Journal.'' It is more than probable that the person who spent $10,500 on the shares just mentioned paid all they were worth.

ONTARIO.

Cobalt, Gowganda, and South Lorrain.

While there has been a considerable falling off in the tonnage from the Cobalt camp, the first quarter's figures as published by the Government show that the silver ounces are higher than for the first portion of 1910. It is a striking illustration of the fact that tonnage plays little part now as an index of the prosperity of the camp. While there is no likelihood that any more mills will be built this year when that of the City of Cobalt is completed, the Crown Reserve and the Kerr Lake have signed contracts with the Nova Scotia and in a few months all their low grade tonnage will leave the camp by express and will not add one single pound to the ore freight carried by the T. & N. O. Railway. In addition the Nipissing is now reducing to bullion most of its high grade ore, and in a few months will have so completed its plant as to be able to handle all its high grade ore in this way. Cyanidation has increased at four mills, and the local sampling plant is every week turning out many bars for other mines.

It may now be said that the process devised by Mr. Butters for the Nipissing high grade ore is a commercial success, though it is by no means out of the experimental stage yet. The high grade ore is now being treated at the mill and reduced to bullion at a substantial profit above what would have been received had the ore been sent direct to the smelters. Mr. Butters is now endeavouring to discover a process whereby the low grade ore can be treated chemically with a high extraction and at a low cost per ton.

There is to-day more chance that Gowganda will have a railroad than at any time in the history of the Montreal River. It is hinted that the Porcupine branch will be extended south to tap some good farming land that has been located, and it is understood that it may be extended through Gowganda to connect with the Canadian Northern lines.

The recent development at the Millerett renders it likely that that property will be running with profit for its owners for many years. In their diabase area they now have an ore body 75 feet long on the 150-foot level which gives promise of a large quantity of milling ore. A vein about two inches wide, carrying 2,000-ounce ore, has just yielded a shipment of 30 tons of high grade ore. Outside this, in the country rock there is on either side of the vein a foot of good milling rock. The ten-stamp mill is now running and treating about 30 tons of ore per day. At the Miller Lake-O'Brien recent development at the 200-foot level has revealed an ore body which for richness and tonnage has not been equalled in the mine so far. All ore shipped out this summer has to be handled six times before it reaches the cars at Latchford, and nothing but the highest of high grade can be shipped at a profit.

At the Wettlaufer mine, now under the management of the Mines Finance Company of New York, it has been decided to erect a mill of about ten stamps to treat the large amount of low grade ore which has been accumulating since operations

commenced. Good ore has been discovered at the 120-foot level of the Bellellen mines in the same camp. The vein, very spectacular on the surface, was lost when the shaft had been sunk a few feet on it. There is every prospect that when the gold excitement has subsided a little that considerable attention will again be paid to this now neglected silver camp.

The Buffalo annual report for the year ending April 30 shows that a little more than a million and a half ounces of silver were produced, that there is now a cash surplus of $41,000 after paying dividends of $370,000, and that the ore reserves now stand at approximately what they did a year ago, namely, 4,000,000 ounces. The president reports that but for the shortage of power there would have been a considerable increase in the production of the mine.

The Beaver Consolidated has declared a second dividend of 3 per cent., or $60,000. The company has now paid $110,000 in dividends. It is expressly stated that this dividend is not a regular quarterly, but hope is expressed that later in the year the directorate may declare a regular rate. An additional force of fifty men has been employed to push development work and a new bunk-house has been built for their accommodation. The quarterly report of the Beaver for the three months ending May 31 shows that there was then on hand $96,241, out of which the dividend of $60,000 has to be paid in August.

The St. Lawrence Mining Company has recommenced work on the Sasaginaga Lake property. A crosscut is now being run from the 100-foot level to intercept the calcite vein which dipped out of the shaft.

The Silver Leaf shaft is now being put steadily down till the Keewatin, which has been productive on the adjoining Lawson, is reached. It has now reached a depth of 465 feet.

The Temiskaming Mining Company has declared another 3 per cent. quarterly, payable July 12th. When this distribution has been made the company will have paid 38 per cent., or $924,156. Exploration at the 575-foot level has so far failed to discover any tonnage of high grade ore, though several rich streaks have been drifted through.

Porcupine, Swastika, and Cripple Creek.

It is now possible to buy a ticket into Porcupine from Kelso though until next month no passenger trains will be put on and no time schedule is published. Excellent progress is being made with the railway and steel is now laid to South Porcupine, while the right of way is being cut towards the Hollinger mines. The Timmins-McMartin and Dunlap syndicate is financing the building of the extra four or five miles, the Government refusing to make the extension without some cash assistance. The Commission will get $175,000 from the mining syndicate to build the line, will guarantee 5 per cent. of the bonds, and will pay back the amount in gross freight receipts over the extension, handing over 70 per cent. until the loan is wiped off. The power line from Sandy Falls has been completed and electricity can now be supplied to any of the properties desiring it. The Timmins McMartin and Dunlap syndicate is going to establish a townsite on the Campbell veteran claim adjoining the Hollinger. A certain portion will be retained for the homes of the employees and the remainder sold to the public. The syndicate will bring water from the Mattagami River for the mill and the town, and as the settlement will be on a sand plain, sanitation presents no great problem.

The damage done by the fire at the Hollinger will cause a delay in arriving at the producing stage of at least eight months. Everything was damaged almost beyond repair with the exception of the compressor, the two boilers, and a storehouse. So fierce was the blaze that the men, from the superintendent downward, lost nearly all their personal effects. Until the railroad is completed or the winter roads open, it will be almost impracticable to bring in the heavy mill machinery over the present road from South Porcupine, and the attempt will not be made. In the meantime the veins laid bare by the are being thoroughly sampled and a reconstruction of the p carefully mapped out. Instead of 40 stamps, at first pla before the fire, 60 will now be installed.

Excellent progress is being made with the 40-stamp mil the Dome. It is now announced that the stamps will be drop by the middle of October. The 12-drill compressor is now ning and furnishing all the power needed both for the struction of the mill and underground. Here two shafts being sunk in the big ore body 250 feet apart. They wil sunk at once to the 500-foot level and are both down to 125-foot already. The Dome also had to fight fire for the w of one day, but the force of 200 men was well organized nothing was lost.

In the vicinity of Pearl Lake excellent discoveries have made on the Pearl Lake Gold Mines, the Jupiter property der option to the Drummonds, and the Armstrong Booth. Pearl Lake has a large number of showings of visible gol small quartz stringers in the schist. On assay it has shown in some cases that the schist carries good values.

The Jupiter, which is on the same series of veins, has a spectacular surface showing in a quartz lead about five wide. Down the shaft, which is being sunk by contract, the free gold persists, and the assays are very encouraging. Drummonds, of Montreal, have an option on the control of stock, and the property is being vigorously worked. At one of the Jupiter veins has been traced and laid bare ac on to the Armstrong-Booth, and here both surface assays diamond drill cores are very encouraging. At the end

End of Steel early in June

Pearl Lake the Bewick Moreing and Company engineers h made their headquarters. Many of their 50 claims are be carefully trenched upon and sampled.

Sinking between a series of quartz stringers bearing gold on the surface, the Preston East Dome struck into a or five feet wide ore body at a depth of 40 feet. A si compressor is running and a small stamp mill is on the gro for use whenever it is required.

A good discovery has been made on the property of Scottish Ontario syndicate, in Whitney. A shaft was sunk a small vein and about twenty feet down the vein wide and became enriched.

Some spectacular samples from Bristol Township, west the Cripple Creek camp, have caused a stampede into that tion. It is stated that some months ago the original discov was made and is now under option to an American syndic at a long price. So far Cripple Creek, while yielding some markably good assays, has been able to show very little gold.

Several good discoveries have been made on the Swast camp in the last two or three weeks, and the competition claims is growing. West of the Swastika mine some six mi

eport of a big silver find precipitated a crazy stampede, othing but diabase has been discovered so far. The Swas- Company has definitely ordered its large plant, but will crease the size of its mill until further exploration work evealed adequate reserves of ore.

BRITISH COLUMBIA.

T Board of Conciliation and Investigation appointed to igate matters in connection with the failure of the West- oal Operators' Association and the officers of District No. 8, United Mine Workers of America, to agree as to terms and onditions under which the miners and other employees will eturn to work in the coal mines and at the coke ovens of berta and southeastern British Columbia, resumed its sit- ng on June 7th after having been in recess about a month. Litt progress toward a settlement of the several points in ispe between the operators and the representatives of the min s seemed to have been made by the middle of June. The Op tors' Association has lately been joined by the McGilli- ra Creek and Canada West Companies, both operating in A ta, the former near Coleman, and the latter at Taber.

A opos of this labour difficulty, Mines and Minerals, of Scr ton, Pennsylvania, published in its June number the fol- lowg, under the caption of "British Columbia Labour ro les." "At this writing the labour troubles in the North- wes are unsettled and operators are preparing for a period of leness. The railroads are contracting for coal in the Unid States. Large shipments will be made over the Great Lak into Canada. The Great Northern Railway Company is seeg to place contracts for coal in the States of the North- wes Under these circumstances it will not be long before the ope tors and miners settle their differences by arbitration." Unf tunately, though, this long-distance guess does not at pre nt seem likely to prove a correct one.

C iboo.—A press despatch from Barkerville, Cariboo, states tha a London syndicate, represented locally, has secured an opt n on the hydraulic placer gold claims held by the Gug- gen ims, and formerly the property of the Consolidated Car oo Hydraulic Gold Mining Company, of which Mr. John B. bson was manager. The property is situated at Bullion, in he vicinity of Quesnel Forks. When the Guggenheims bou t out the interests of the Consolidated Cariboo Company the planned to make ample provision for a much enlarged sup y of water for gravel-washing. Construction work was car d on until a comparatively large sum of money—stated t about $200,000—had been expended with the object of bring- ng n much more water, when operations were stopped, and afterwards the big hydraulicking plant and a large quantity of mat ial on the property were sold. Understanding that the hyd aulic leases had been forfeited, Mr. Hobson, who still has onfidence that with sufficient water available the enterprise can e made a profitable one, made application for some of the ground and commenced work on it with the small quantity of wat r then obtainable. The Guggenheims, however, paid up the rrears of rent, etc., due to the Provincial Government, and suc ssfully made application to the court for an injunction against Mr. Hobson's working the property. Since then it has bee idle, and Mr. Hobson has turned his attention to another hyd aulic property in the same neighbourhood.

Sheep Creek.—The Hon. Thomas Taylor, Minister of Public Wo ks for British Columbia, recently visited Sheep Creek camp, in he Nelson mining division. The journey was made from Nel on to Salmo by train, and thence to the camp by auto sta , the run from Salmo to the first mine visited having oc- cup d an hour and a quarter. Upon his return the Minister sai when interviewed by a representative of the Nelson Daily Nes: "This is the first occasion for some years upon which I ve visited a mining camp such as Sheep Creek camp is, and it reminded me of the old-time boom days. As we sped alo the road to the camp we passed many teams conveying supplies to the mines, and we saw a large number of men in the hills and at the mines. I was told that there are at present at least 400 men in the camp. Sheep Creek camp is certainly making remarkable progress and seems destined to have a great future. It is a real pleasure to me to see the waggon road the Provincial Government has constructed being made so much use of. Obviously it is proving of great benefit to mine owners and prospectors."

Mining in Sheep Creek camp is being proceeded with actively. The owners of the Queen are developing that mine at greater depth than in the past. The Mother Lode, owned by Mr. John McMartin and associates, is being provided with a mill and other gold-saving facilities. The Nugget is to have a 20-stamp mill in place of the 4-stamp mill it has heretofore used. The Kootenay Belle will also be in a position before long to mill its ore. A majority interest in the Summit has been sold to Eastern men, and several other claims are being developed with encouraging results.

Kaslo.—A local syndicate has purchased from the Great Northern Railway Company the Kaslo & Slocan Railway, which was much damaged by forest firo last summer along its length from Sproules to McGuigan, thus depriving the Whitewater group, Lucky Jim, Rambler-Cariboo, and other mines on the divide between Kootenay and Slocan lakes of convenient transportation facilities. During the interval between last summer and the recent negotiations for the purchase of the K. & S. Railway, the Canadian Pacific Railway Company had been urged to construct a spur from its Sandon-Nakusp branch at Three Forks up Seaton Creek towards the summit of the divide, so that ore might be shipped in considerable quantity from the Rambler-Cariboo and Lucky Jim mines, both of which had been practically deprived of income by the destruction of the railway that had long transported their ores to Kaslo for shipment thence to the smeltery. It is understood that arrangements had been entered into and the C.P.R. was arranging preliminaries, so that construction could be pushed during the summer and autumn. Now the new owners of the K. & S. are appealing to the C.P.R. Company to hold its hand aud not proceed with the construction of the promised spur, for if this be built it will take away the chief freight traffic the K. & S. would otherwise obtain, and so prevent the operation of the line under its new owners. It is stated to be probable that the C.P.R. will postpone construction of the extension from Three Forks, and thus leave this small field for the support of the K. & S. Railway, upon the continuous working of which Kaslo will have to depend for much of its general trade and commercial support.

Boundary.—As the first half of the year draws to its close it is regarded as probable the total output of ore for this period will reach an aggregate of about 750,000 tons, and this notwithstanding that the Granby Company's mines will have missed nearly a month's output, and that the Consolidated M. & S. Company has not latterly shipped any considerable quantity of ore from its district mines.

The British Columbia Copper Company continues to draw its chief supply of ore from the Mother Lode and Rawhide mines, with much smaller quantities from the Wellington and Athelstan mines, both in British Columbia, and the Lone Star and Napoleon mines, situated just south of the international boundary line. This company is about to commence development work at the McKinley mine, in Franklin camp, about 50 miles above Grand Forks. The Geological Survey has a field party at work in Franklin camp, obtaining data for the preparation of a map of this part of the Boundary district.

Provincial newspapers have lately stated that the British Columbia Copper Company's dividend, payable on June 1, was at the rate of 2½ per cent. and totalled $62,875. The Engineering and Mining Journal shows the dividend distribution to have been at the rate of 12½ cents per share on the company's

591,709 issued shares, making a total for this dividend of $73,963.63. Dividends previously paid by this company were: one at the rate of 40 cents per share in September, 1907, on 503,000 issued shares, total $201,200, and one of 12½ cents per share on March 1, 1911, on 591,709 shares, total $73,963.63. These three dividends give a total of $349,127.26. It may be explained that during its fiscal year, ended November 30, 1909, the company issued 88,709 shares of its treasury stock in part payment for the controlling interest it then acquired in the New Dominion Copper Company.

Coast.—Announcement has been made of the intention of the Vancouver company which last year acquired the Ikeda mine, on Moresby Island of the Queen Charlotte group, to do more development work on this property. Prospecting the coal measures occurring on Graham Island, of the same group, is in progress on several properties.

Coal mining on Vancouver Island is on a gradually increasing scale. Both the larger companies, namely, the Canadian Collieries (Dunsmuir), Limited, and the Western Fuel Company, are extending their development operations, with the object of opening new coal-producing areas in their respective large holdings of coal lands.

Copper mining in the southern part of the Coast district is being continued on Texada Island—at the Cornell mine, by the Tyee Copper Company, and at the Marble Bay mine, by the Tacoma Steel Company—and at the Britannia Mining & Smelting Company's Britannia mines, on Howe Sound. The last-mentioned company is showing persistent enterprise in continuing the extensive exploration of its large group of mineral claims. While no official information has been made public, it is freely reported that results lately have been encouraging.

COMPANY NOTES

DOMINION COAL COMPANY, LIMITED.

Report of the Board of Directors.

Presented to the shareholders at the annual meeting on 19th May, 1911.

Your directors submit herewith a statement of the affairs of the company as at 31st March, 1911, and of the earnings for the fifteen months then closed.

Change in Financial Year—In order that the annual meetings of the shareholders of the Dominion Steel Corporation, Limited, and of its subsidiary companies may be held at the same time, your directors have changed the financial year so that it ends on 31st March instead of 31st December. The report now presented covers the period from 1st January, 1910, to 31st March, 1911.

Business of the Year—The strike which was in existence at the date of our last annual meeting was abandoned by those concerned at the end of April, 1910, and as soon as possible thereafter full operations were resumed at the collieries.

The output was as follows:

For the 12 months ending 31st December, 1910, 3,526,754 tons.

For the 15 months ending 31st March, 1911, 4,412,639 tons.

The output in the preceding year, January to December, 1909, was 2,734,774 tons, and in 1908 3,555,068 tons.

Earnings—In considering the statement of earnings your directors would remind you that the period covered by the report includes four months in which the strike existed, that even when ended it was many months before the disorganization which it caused ceased to be felt, and that an extra winter period—December, 1910, to March, 1911, is included, during which earnings are necessarily small. The net result, under these conditions, is in your directors' opinion reasonably satisfactory.

Property and Plant—The capital expenditure on the company's property during the 15 months amounted to $784,366.92, chiefly for work on the new collieries in the Lingan district, and for additional railway equipment. It has been thought well to transfer $500,000 from profit and loss account as a general appropriation in reduction of the property account.

The company's plant is in very good condition, and your directors look for an increased production in the current financial year.

Cumberland Railway and Coal Company—During the year the Dominion Steel Corporation, Limited, came under agreement to purchase the entire capital stock of the Cumberland Railway and Coal Company, and an agreement for the lease of its property to this company was entered into, under which its collieries are now being operated as collieries of the Dominion Coal Company, Limited. Their output is not included in the tonnage reported above.

The Cumberland Company owns large and valuable areas in Cumberland County and in Cape Breton; it has collieries at Springhill, a well-equipped standard gauge railway from Springhill Junction to Parrsboro, 32 miles in length, a large area of timber lands, and other property.

A strike has been in existence amongst its employees for some time, but your directors hope that the reasonable attitude of the executive, coupled with the refusal of your directors to recognize in Cape Breton the United Mine Workers Association of America, of which it is sought to enforce recognition in Springhill, will shortly lead the men to take more reasonable views.

Changes in the Board—Mr. James Crathern, who was a director of the company for some years, died in June last, much regretted by his colleagues on the board and by his many friends elsewhere. The vacancy caused by his death was not filled. The vacancies caused by the death of the Honourable L. J. Forget and Mr. H. F. Dimock, elsewhere referred to, were filled by the election of the Honourable Senator Dandurand and Sir William Mackenzie.

Staff—Your directors again desire to record their high appreciation of the services rendered to the company by its officers and employees.

On behalf of the Board of Directors,

J. H. PLUMMER, President.

Montreal, 9th May, 1911.

Profit and Loss Account for the fifteen months ending March, 1911.

Net earnings from operations after payment of all expenses and current repairs		$2,118,685
Appropriation for depreciation and renewals		500,000
		$1,618,685
Interest on Bonds	$386,682.10	
Interest on Loans	51,151.71	
		437,833
		$1,180,851
Balance from previous year, viz.:		
Amount shown at credit of profit and loss account 1st January, 1910	$394,419.42	

ived from Steel Company for adsted price of coal, November and ecember, 1909	26,758.73	
		421,178.15
		$1,602,030.99
ess,		
Di dends on preferred stock, 2 half-arly payments of 3½ per cent. ch	$210,000.00	
Di dend on common stock, 1 per cent. paid 1st April, 1910	150,000.00	
Pa ments to capital fund of Miners' Relief Society	21,000.00	
Re rved for preferred stock dividend	52,500.00	
ritten off property account	500,000.00	
		933,500.00
Balance carried forward		$668,530.99

Balance Sheet, 31st March, 1911.

ASSETS.

Pro rties and investments		$24,359,132.29
Curnt Assets:		
In ntories	$1,035,183.83	
A ounts Receivable	699,542.44	
Ca h on hand and at credit	10,600.56	
		1,745,326.83
Def red Charges to Operations:		
In rance, taxes, and steamship ire paid in advance		113,043.72
		$26,217,502.84

LIABILITIES.

Firs mortgage 5 per cent. Bond: Total issued		$6,300,000.00
Cap Breton real estate debentures:		
T al issue	$480,000.00	
L s matured and paid	392,113.30	
		87,886.70
Dom ion rolling stock debentures:		
T al issue	$380,000.00	
L s matured and paid	331,470.75	
		48,529.25
Mo gages		50,000.00
Total bonds and mortgages		6,486,415.95
Cur nt Liabilities:		
A ounts payable, royalty on coal, tc.	$688,609.09	
B d interest accrued	131,250.00	
		819,859.09
Res ve Accounts:		
A rued dividend on preferred tock	$ 35,000.00	
S dry reserves	207,696.81	
		242,696.81
		$7,548,971.85

Capital Stock:		
150,000 shares of common stock $100 each	$15,000,000.00	
30,000 shares of 7 per cent. preferred stock, $100 each	3,000,000.00	
		18,000,000.00
Profit and loss account		668,530.99
		$26,217,502.84

Certified correct,

R. GORDON, Comptroller.

JUPITER MINES.

The reorganized board of directors of Jupiter Mines, Limited, is as follows: H. J. Hamilton, A. W. McDougald, C. A. Masten, K.C., John Wood, and James Pearson, the latter selected by minority interests to succeed Major Murray and Mr. O'Kelly. All details in connection with the completion of the Drummond Syndicate purchase of 900,000 shares of treasury stock have been sanctioned by the shareholders.

BUFFALO MINES ANNUAL REPORT.

The annual report of the Buffalo mines will show a production of 1,500,000 ounces, while the ore reserves are still maintained at practically what they were last year, 4,000,000 ounces. The mill treated 41,000 tons of rock during the year, and produced 1,250,000 ounces of silver, giving an average of about thirty ounces per ton milled. The company has paid a regular 8 per cent. per quarter through the year, and has now distributed among shareholders considerably over a hundred per cent. on capitalization.

BUFFALO MINES DIVIDEND.

Buffalo Mines Company has declared a regular quarterly dividend of 5 per cent. and 3 per cent. extra, the former payable July 1, and the latter August 15.

CROWN RESERVE DIVIDEND.

Crown Reserve declared a dividend of 2 per cent., with the usual bonus of 3 per cent., payable July 15 to shareholders of record June 30.

DIVIDEND NUMBER ONE.

Notice is given that a dividend of one per cent. upon the capital stock of the Dominion Steel Corporation, Limited, has been declared, payable on and after 3rd July, 1911, to shareholders of record at the close of business on Tuesday, 20th June instant.

STATISTICS AND RETURNS

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt Camp for the week ending June 16, and those from Jan. 1, 1911, to date:

	June 16, Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger	.....	55,200
Bailey	.....	40,000
Barber	.....	6,000
Beaver	.....	716,708
Buffalo	61,690	1,349,700
Chambers-Ferland	64,000	639,000
City of Cobalt	.....	493,780
Cobalt Lake	249,840	2,055,090
Cobalt Townsite	.....	480,700

Colonial	46,000	88,000
Coniagas	63,160	1,936,680
Crown Reserve	.....	1,208,220
Hargraves	60,000	161,100
Hudson Bay	64,210	502,660
Kerr Lake	60,010	1,322,040
King Edward	.....	40,000
La Rose	85,460	2,850,330
McKinley-Darr-Sav.	121,040	2,808,330
Nipissing	245,350	2,960,260
O'Brien	65,250	673,040
Peterson Lake (Little Nip.)	.....	58,430
Provincial	.....	40,510
Right of Way	60,100	579,560
Silver Cliff	.....	106,680
Standard	.....	102,813
Temiskaming	85,550	860,852
Trethewey	.....	672,380
Wettlaufer	.....	117,232

The shipments for the week were 1,328,660 pounds, or 664 tons.

The shipments from Jan. 1 to June 16 were 22,825,295 lbs.

NIPISSING IN MAY.

During the month of May the Nipissing Mines mined ore of an estimated net value of $221,584, and shipped ore of an estimated net value of $219,898, according to the report of Manager Watson to the directors.

In part he says: "With the return of satisfactory air pressure operations underground were resumed at all points and the production was again normal."

B. C. ORE SHIPMENTS.

The weekly mine and smelter returns record the second week of the Granby shut-down. Both mine and smelter are expected to resume the latter end of this week.

The following are the returns of the ore production and movement for the week ending June 10th, and for the year to date:—

Boundary Shipments.

Mother Lode	5,670	150,355
Rawhide	4,940	89,063
Jack Pot	556	14,776
Athelstan	227	2,169
Napoleon	555	3,192
Lone Star	413	2,456
Unnamed	127	127
Other mines		489,317
Total	12,488	751,455

Rossland Shipments.

Centre Star	4,289	89,130
Le Roi No. 2	507	12,214
Le Roi No. 2, milled	300	6,900
Le Roi	283	5,609
Other mines		421
Total	5,379	114,274

Slocan-Kootenay Shipments.

Sullivan	538	15,052
Richmond-Eureka	54	1,143
Silver Cup (at Ferguson)	19	240
Rambler-Cariboo	60	830
Enterprise	29	97
Society Girl	26	301
Knob Hill	113	1,499
Sweetgrass	21	32
Molly Gibson	137	386
Middleton	23	23
St. Eugene, milled	420	14,316
Queen, milled	420	9,456
Granite-Poorman, milled	250	5,756
Nugget, milled	110	2,536
Wilcox, milled	75	1,725
Van Roi, milled	800	9,049
Other mines		4,543
Total	3,095	66,966

The total shipments for the week, including the estim[illegible] milling, were 20,962 tons, and for the year to date, 932,695 [illegible]

B. C. Copper Co.'s Receipts.
Greenwood, B.C.

Mother Lode	5,670	150,355
Rawhide	4,940	89,063
Jack Pot	556	14,776
Athelstan	227	2,169
Napoleon	555	3,192
Lone Star	413	2,456
Unnamed	127	127
Other mines		568
Total	12,488	262,706

Granby Smelter Receipts.
Grand Forks, B. C.

Granby		458,982

Consolidated Co.'s Receipts.
Trail, B.C.

Centre Star	4,289	89,130
Sullivan	538	15,052
Le Roi No. 2	507	12,214
Le Roi	283	5,609
St. Eugene	129	3,067
Silver Cup (at Ferguson)	19	240
Rambler-Cariboo	60	830
Enterprise	29	97
Society Girl	26	301
Richmond-Eureka	54	1,143
Queen	37	690
Granite-Poorman	36	173
Knob Hill	113	1,499
Sweetgrass	21	32
Molly Gibson	137	386
Middleton	23	23
Other mines		35,844
Total	6,301	166,300

The total receipts at the smelters for the week, inclu[illegible] concentrates, were 18,789 tons, and for the year to date [illegible],018 tons.

GRANBY ORE RECEIPTS.

During the month of May the ore receipts at the Gra[illegible] smelter totalled 58,388 tons, 53,489 from the Granby mine at Phoenix, and 4,899 tons from American properties, as follo[illegible]:

Snowstorm, Idaho	1,580
Insurgent, Republic	839
Quilp, Republic	271
Knob Hill, Republic	196
North San Poil, Republic	106
United Copper, Republic	38
Surprise, Republic	24
Liberty	27
Lone Pine	360
Belcher	1,447
Silver Lead	3
Total	4,899

B. C. ORE SHIPMENTS.

shipments for the week ended June 17 were 16,184 tons, e smelter receipts were 14,071 tons, and for the year to 03,089 tons. The detailed figures are as follows:

Rossland Shipments.

ntre Star	3,625	92,755
Roi No. 2	555	12,769
Roi No. 2, milled	300	7,200
Roi	593	6,202
ther mines		421
Total	5,073	119,347

Boundary Shipments.

surgent	140	468
other Lode	5,880	157,235
ck Pot	724	15,500
awhide	422	89,485
thleston	404	2,573
one Star	321	2,777
apoleon	125	3,317
ther mines		489,116
Total	8,016	759,471

Slocan-Kootenay Shipments.

ullivan	664	15,716
ichmond-Eureka	55	1,198
ilver Cup (at Ferguson)	19	259
uth	31	266
nob Hill	197	1,698
umber 1	24	51
ancouver	30	56
t. Eugene, milled	420	14,736
ueen, milled	420	9,870
ranite-Poorman, milled	250	6,000
ugget, milled	110	2,640
ilcox, milled	75	1,800
an Roi, milled	800	9,849
ther mines		5,924
Total	3,095	70,061

Consolidated Co.'s Receipts.
Trail, B. C.

entre Star	3,625	92,755
ullivan	664	15,716
e Roi No. 2	555	12,769
e Roi	593	6,202
ichmond-Eureka	55	1,198
t. Eugene	196	3,263
ilver Cup (at Ferguson)	19	259
uth	31	266
ueen	35	725
nob Hill	197	1,698
umber 1	24	51
ancouver	30	56
an Roi	31	328
ther mines		37,101
Total	6,055	172,385

B. C. Copper Co.'s Receipts.
Greenwood, B.C.

Mother Lode	5,880	157,235
Rawhide	422	89,485
Jack Pot	724	15,500
Athleston	404	2,573
Lone Star	321	2,777
Napoleon	125	3,317
Insurgent	140	468
Other mines		367
Total	8,016	271,722

Granby Smelter Receipts.
Grand Forks, B C.

Granby	458,982

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending June 23, and those from Jan. 1, 1911, to date:

	June 23 Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger		55,200
Bailey		40,000
Barber		6,000
Beaver		716,708
Buffalo	56,160	1,405,860
Chambers-Ferland		639,000
City of Cobalt	64,200	557,980
Cobalt Lake	68,600	2,123,690
Cobalt Townsite		480,700
Colonial		88,000
Coniagas	117,500	2,054,180
Crown Reserve	67,200	1,275,420
Hargraves		161,100
Hudson Bay	63,300	565,960
Kerr Lake		1,322,040
King Edward		40,000
La Rose	203,900	3,054,230
McKinley-Dar.-Savage	180,700	2,989,080
Nipissing	63,600	3,023,860
O'Brien		673,040
Peterson Lake (Little Nip.)		58,430
Provincial		40,510
Right of Way		579,560
Silver Cliff		106,680
Standard		102,813
Temiskaming	85,550	860,852
Trethewey		672,380
Wettlaufer		117,232

The shipments for the week were 1,885,160, or 942 tons.

The shipments from Jan. 1 to June 23 were 23,710,455, or 11,855 tons.

TORONTO MARKETS.

June 24.—(Quotations from Canada Metal Co., Toronto).
Spelter, 5.65 cents per lb.
Lead, 3.65 cents per lb.
Antimony, 8 to 9 cents per lb.
Tin, 46 cents per lb.
Copper, casting, 12.80 cents per lb.
Electrolytic, 12¾ cents per lb.
Ingot brass, 8 to 12 cents per lb.

June 24.—Pig Iron (Quotations from Drummond, McCall Co., Toronto):

Summerlee No. 1, $22.50 (f.o.b. Toronto).
Summerlee No. 2, $22.00 (f.o.b. Toronto).
Midland No. 1, $19.00 (fo.b. Toronto).
Midland No. 2, $19.00 (f.o.b. Toronto).
Hamilton No. 1, $18.00 (f.o.b. Hamilton).
Hamilton No. 2, $17.50 (f.o.b. Hamilton).
Clarence, $19.00 (f.o.b. Toronto).
Cleveland, $19.00 (f.o.b. Toronto).

GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.
June 23.—Tin, Straits, 45.25 cents.
Copper, Prime Lake, 12.75 cents.
Electrolytic Copper, 12.75 cents.
Copper wire, 13.75 cents.
Lead, 4.50 cents.
Spelter, 5.85 cents.
Sheet zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.50 cents.
Aluminium, 19.75 to 20.25 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $42.50 per ounce.
Platinum, hard, $44.50 per ounce.
Bismuth, $1.80 to $2.00 per lb.
Quicksilver, $44.00 per 75-lb. flask.

Silver Prices.

	New York cents.	London pence.
June 10	53	24½
" 12	53⅛	24 3/16
" 13	53⅛	24½
" 14	53⅛	24½
" 15	53⅛	24½
" 16	53⅛	24½
" 17	53¼	24 3/16
" 19	53	24½
" 20	53	24½
" 21	52⅞	24 7/16
" 22	52⅞	Holiday
" 23	52⅞	Holiday

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous

	June 24, 1911 Bid.	Ask.
Dominion Steel Corporation	...	58½
Nova Scotia Steel	100	.....
Crow's Nest Pass	.	68
Granby	42	42½
Consolidated Mining & Smelting	40	45
Amalgamated Asbestos	...	12½
Black Lake Asbestos	09½	10¼

Cobalt Stocks.

Bailey	.04½	.05
Beaver Consolidated	.47½	.48
Buffalo	1.60	2.00
Chambers-Ferland	.13	.14½
City of Cobalt	.14	.16
Cobalt Central	.02	.06
Cobalt Lake	.21	.22
Coniagas	6.95	7.00
Crown Reserve	3.40	3.55
Foster	.04½	.06
Gifford	.02½	.04
Great Northern	.16¾	.17¾
Green Meehan	.02¾	
Hargraves	.14½	
Hudson Bay	85.00	105
Kerr Lake	4.75	5
La Rose	4.15	4
Little Nipissing	.03¾	
McKinley	1.68	1.
Nancy Helen	.02	
Nipissing	10.25	10.
Nova Scotia	.11½	
Ophir	.11½	
Otisse	¾	
Peterson Lake	.09	
Right of Way	.09	
Rochester	.04⅝	
Silver Leaf	.03	
Silver Bar	..	
Silver Queen	.03	
Temiskaming	.53¼	
Trethewey	.94	1.
Watts	..	
Wettlaufer	1.05	1.

Porcupine Stocks.

Foley	1.56	1.
Detroit	.50	
Porc. Northern	.70	
Rea	5.74	5.
Apex	.15½	
Porc. Can.	1.11	1.
Central	.86	
Dobie	2.85	3.
Dome Ext.	.84½	
Hollinger	15.30	15.
Monita	.21	
Preston	.45	
Gold Reef	.27	
Pearl Lake	.62½	
Imperial	.14	
Tisdale	.10¾	
Swastika	.67	
United	.05½	
Porc. Gold	.66	
Standard	.12	
West Dome	2.10	2.
Am. Gold Fields	1.30	1.
Northern Exploration	7.50	7.

New York Curb.

Brit. Col. Copper	5
Butte Coalition	19⅜
Chino Copper	23¾
Davis-Daly Copper	1
Ely Consolidated	7/16
Giroux Mining	6⅞
Goldfield Consolidated	5⅞
Greene Canadian	6¾
Inspiration Copper	8¾
Miami Copper	22⅜
New Baltic Copper	5
Nevada Con. Copper	20
Ohio Copper	1 5/16
Rawhide Coalition	.4
Ray Central	1 11/16
Ray Consolidated	17¾
Union Mines	⅜
Yukon Gold	3 15/16

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The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

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Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mi Institute, etc.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral ma Canada, by G. A. Young and R. W. Brock.

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1107. Joint Report on the Bituminous or Oil Shales of New Brunswick and Nova Scotia. Also on the Oil Shale Industry of Scotl Part I, Economics, Part II, Geology by R. W. Ells.

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1064. Geology of an area adjoining the east side of Lake Timiskaming, by Morley E. Wilson.

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1091. Memoir No. 1, Geology of the Nipigon Basin, Ontario, by A. W. G. Wilson.

NORTH WEST PROVINCES

1035. Coal Fields of Manitoba, Saskatchewan, Alberta and Eastern British Columbia accompanied by a map, by D. B. Dowling.
1115. Memoir No. 8. The Edmonton Coal Field, Alberta, with maps, by D. B. Dowling.

BRITISH COLUMBIA

1093. Memoir No. 2. Geology and Ore Deposits of Hedley Mining District with maps, by Charles Camsell.
1139. Memoir 11-T Triangulation and Spirit Levelling of Vancouver Island, 1909, by R. H. Chapman.

YUKON and NORTH WEST TERRITORIES

1101. Memoir No. 5, Lewes and Nordenskiold Rivers Coal District, Yukon Territory, by D. D. Cairnes.
1080. Report on a part of the North West Territories drained by the Winisk and Attawapiskat Rivers, by Wm. McInnes.
1006. Report on a traverse through the southern part of the North West Territories from Lac Seul to Cat Lake in 1902 A. W. G. Wilson.

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1042. Mineral Map of Canada. Scale 100 miles to 1 inch.
1084. Geological Map of Canada. Scale 100 miles to 1 inch.

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1019. City of Halifax Sheet. Scale 1 mile to 1 inch.
1134. Map 14 A. Hall Harbour Sheet. Scale 1 mile to 1 inch.

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1066. Map 18 A. Lake Timiskaming Mining Region. Scale 1 mile to 1 inch.
1112. Map 12 A. Vicinity of the Transcontinental Railway, Abitibi District, Quebec. Scale 4 miles to 1 inch.
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1091. Map 8 A, Lake Nipigon, Thunder Bay District, Ontario. Scale 4 miles to 1 inch.

ALBERTA

1132. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.
1117. Map 5A. Topographical map of Edmonton, scale 2,640 feet to 1 inch.
1118. Map 6A. Edmonton. Isobathic lines showing cover over "Clover Bar" coal seam, scale 2640 feet to 1 inch.

BRITISH COLUMBIA

1068. Geological Map (sketch) of the Sheep Creek Mining Camp, West Kootenay, B.C. Scale 1 mile to 1 inch.
1095. Map 1A. Topographical map of Hedley Mining District, Scale 1000 feet to 1 inch.
1096. Map 2A. Geological Map of Hedley Mining District. Scale 1000 feet to 1 inch.
1164. Map 28 A, Sketch map of Portland Canal Mining District.

YUKON and NORTH WEST TERRITORIES

1089. Map 9A. Explored Routes on Parts of the Albany, Severn and Winisk Rivers. Scale 8 miles to 1 inch.
1103. Map 10A. Tantalus Coal Area, Yukon Territory. Scale 2 miles to 1 inch.
1104. Map 11A. Braeburn-Kynocks Coal Area, Yukon Territory. Scale 2 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of cents is made for maps on linen.

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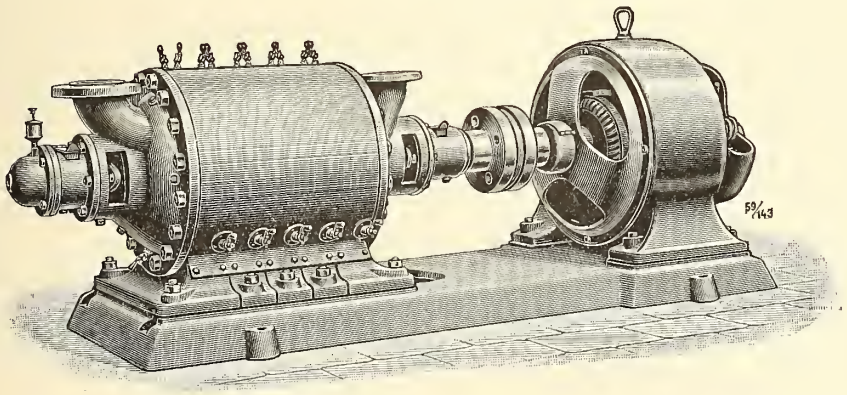

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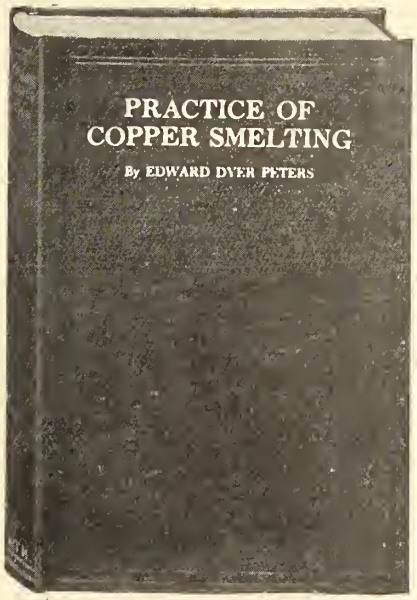

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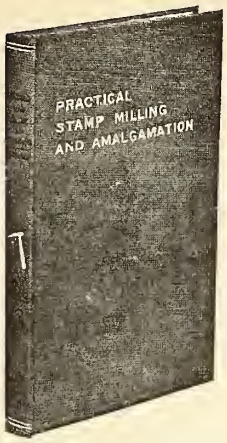

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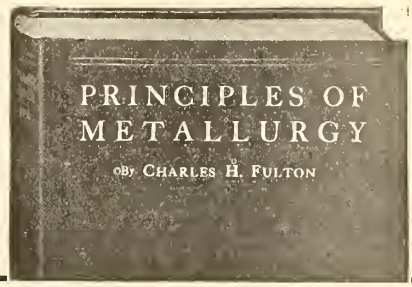
TORONTO



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The Mineral Province of Canada

h produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; o a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 s Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has n even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

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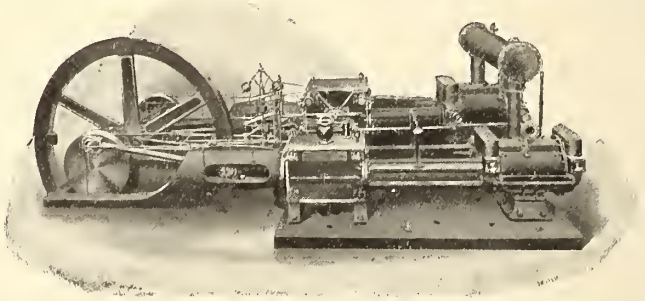

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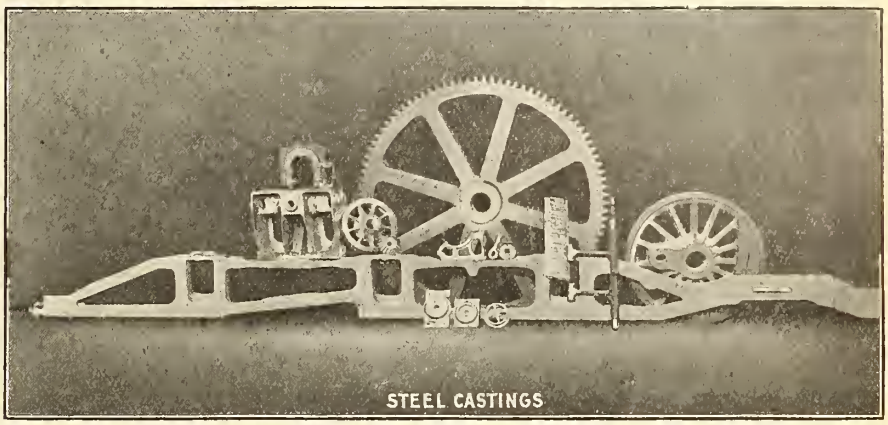
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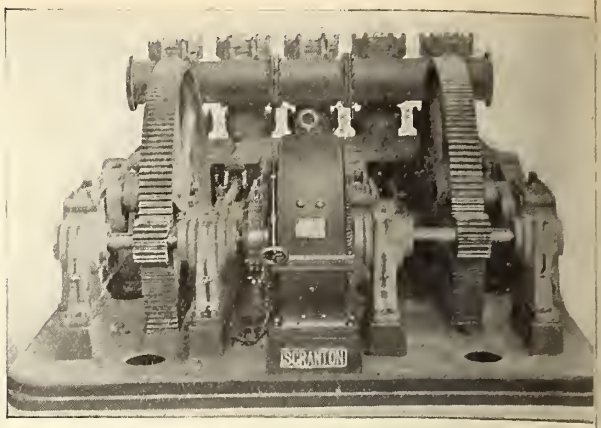

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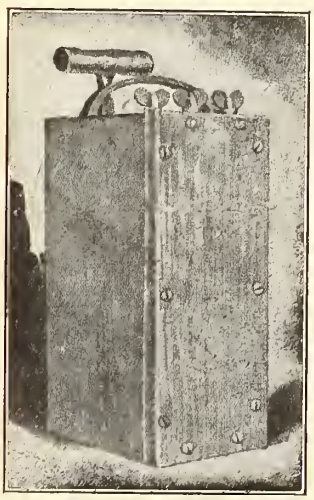

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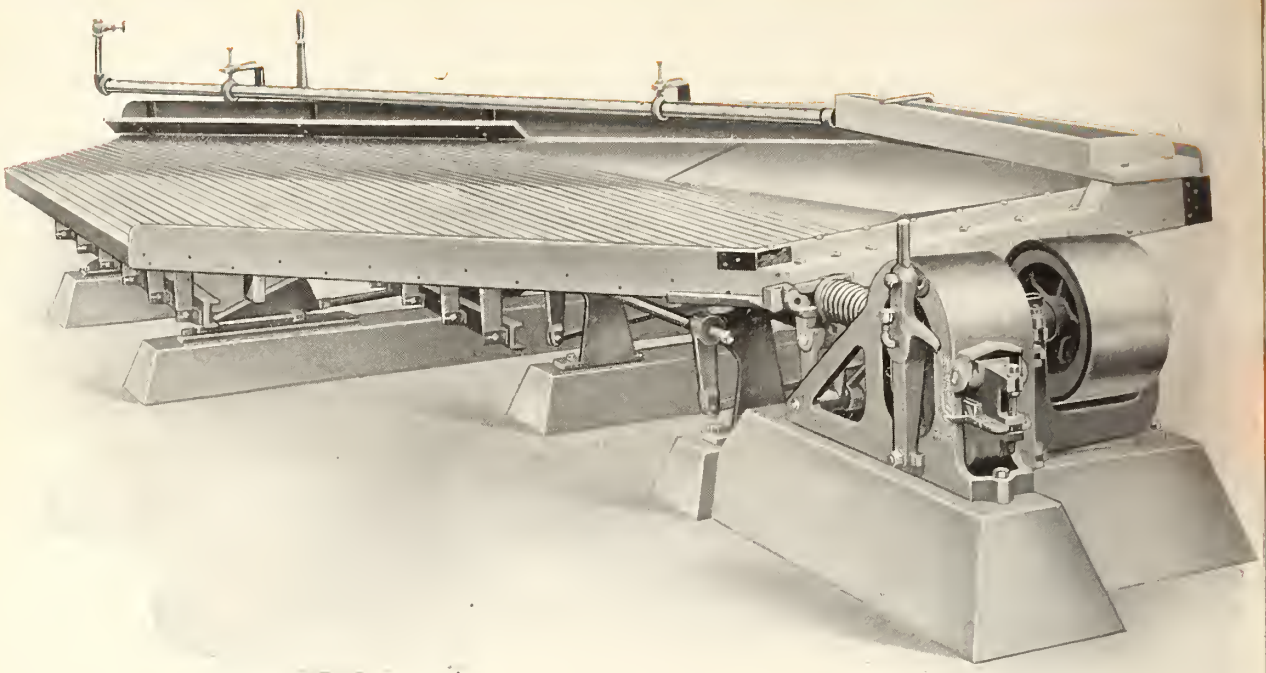

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JULY 15, 1911

THE CANADIAN MINING JOURNAL

TORONTO No.

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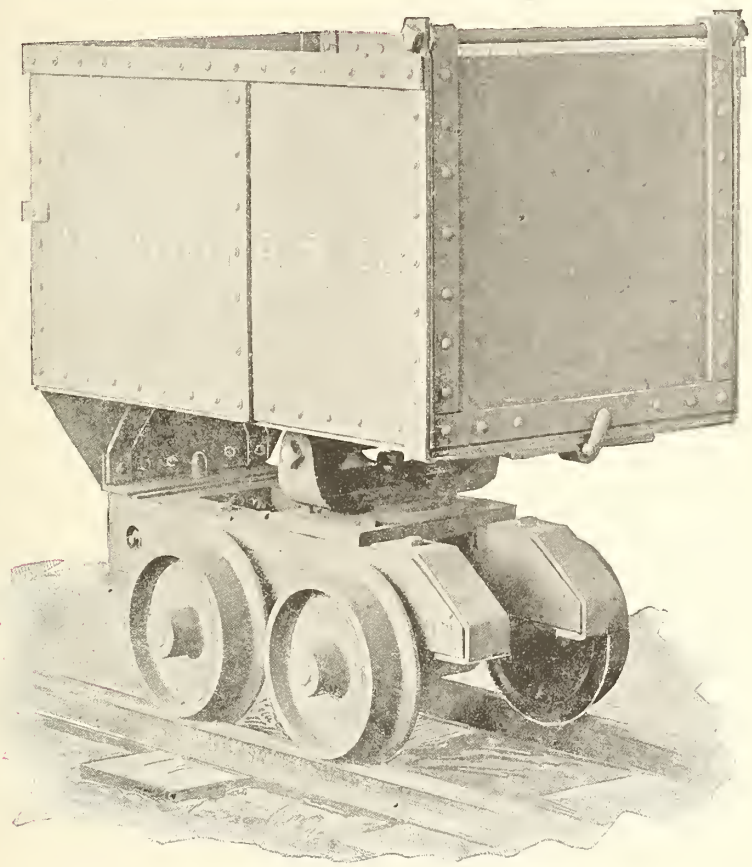

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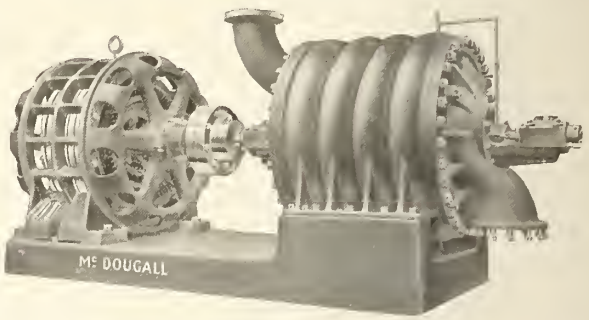
Turbine Pumps
FOR
Mining Work



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What Users Think

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Messrs. Jones & Glassco, Montreal.

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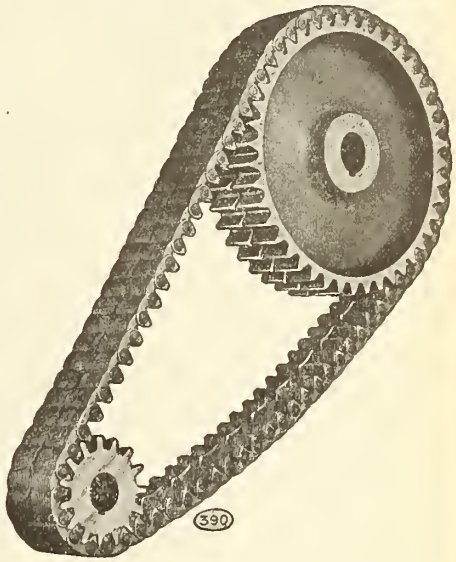

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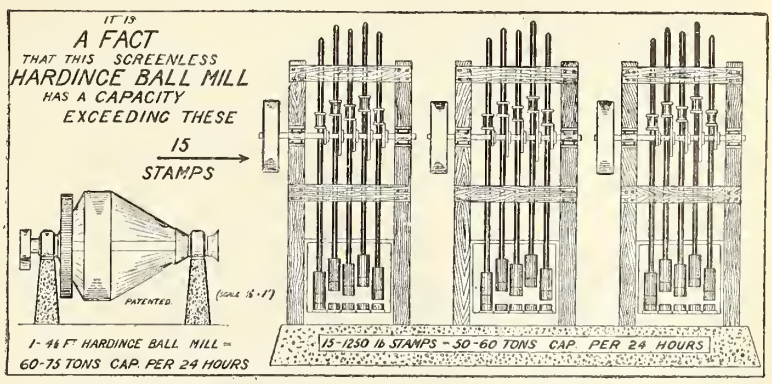

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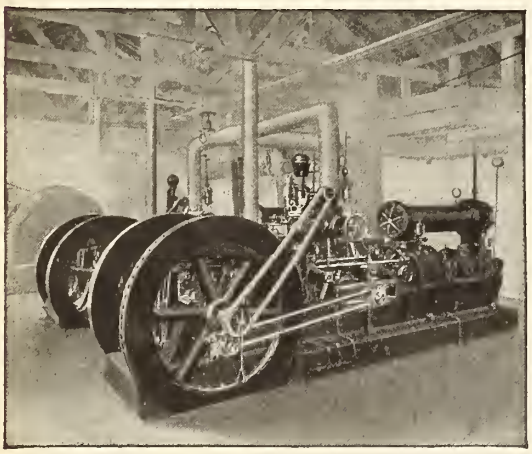

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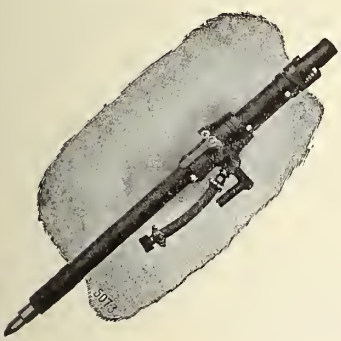

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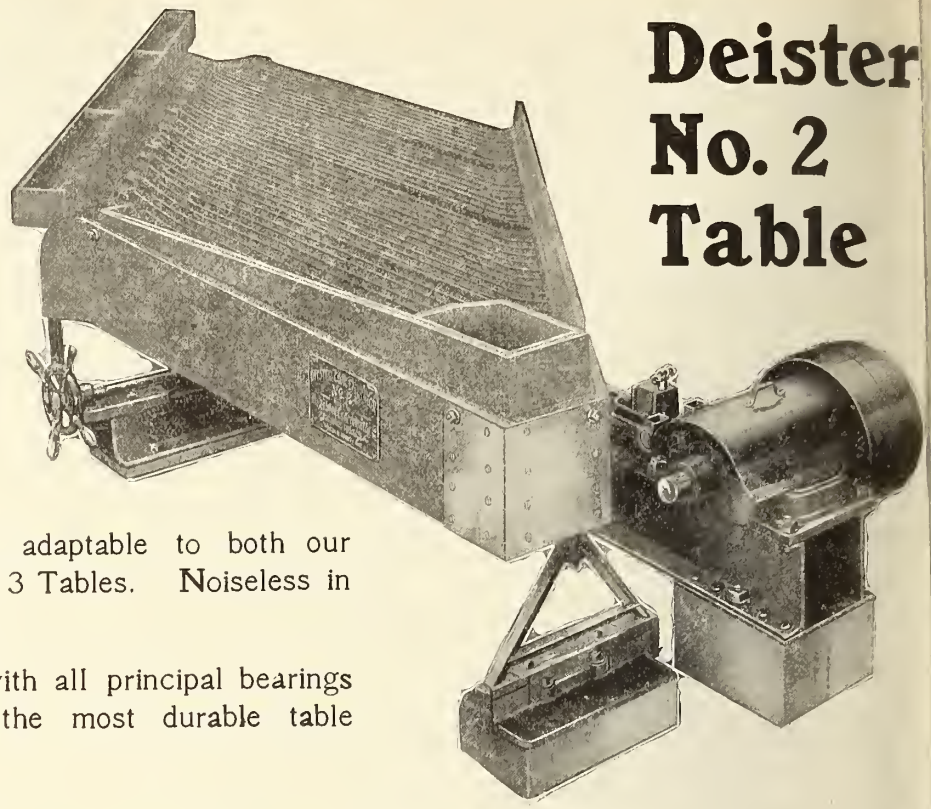

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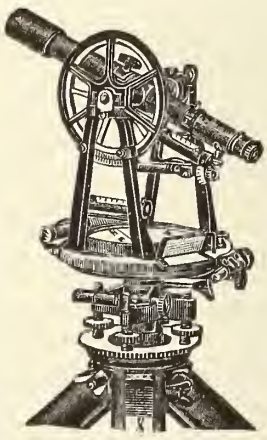

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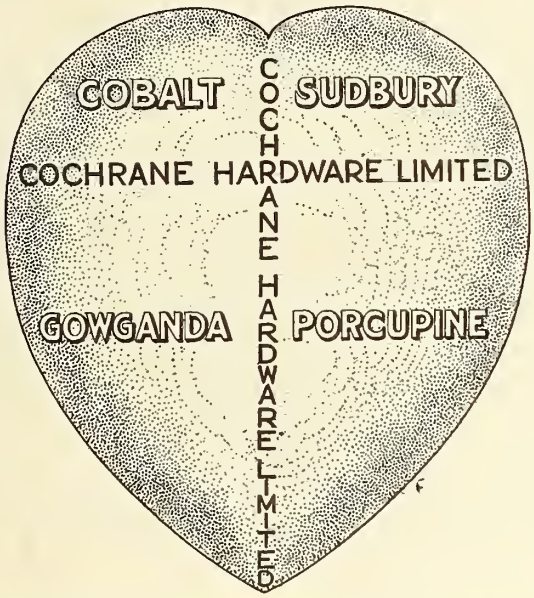

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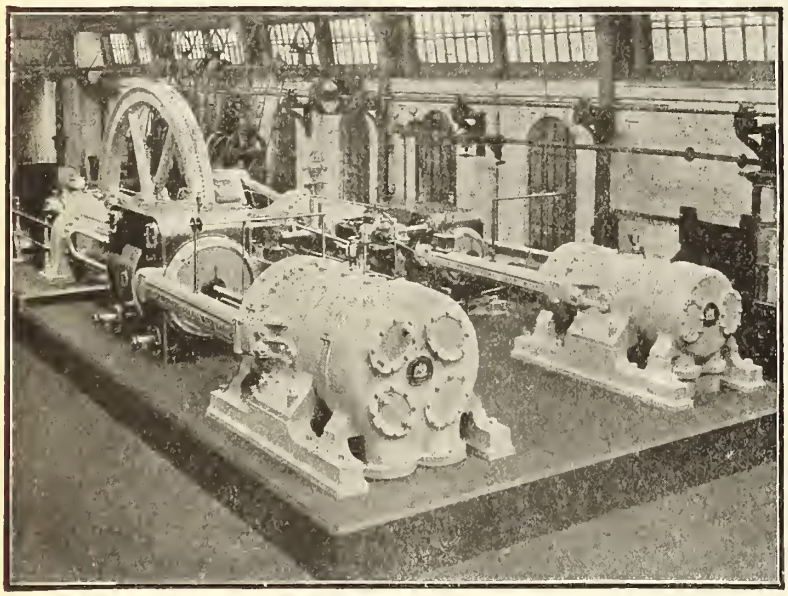

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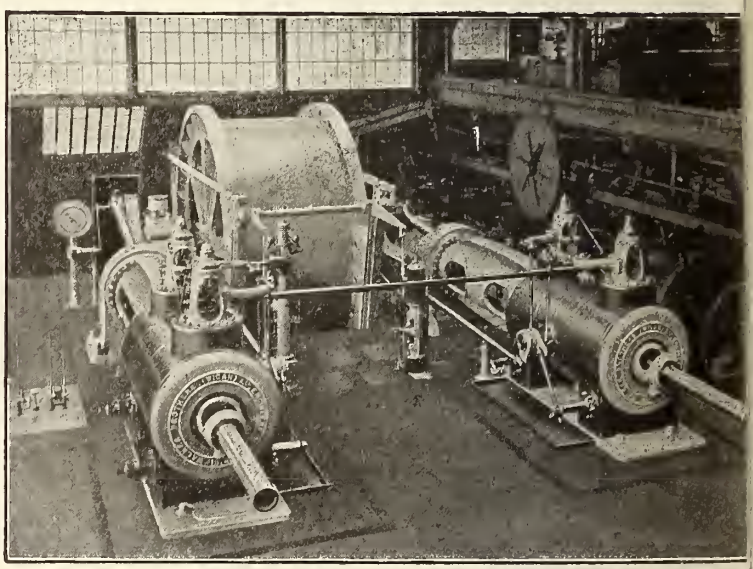

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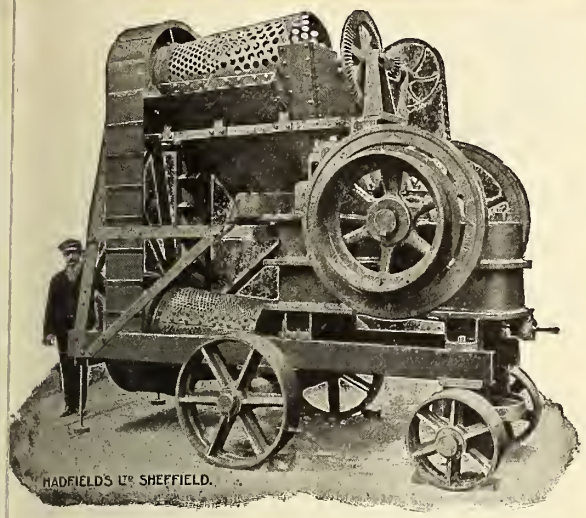

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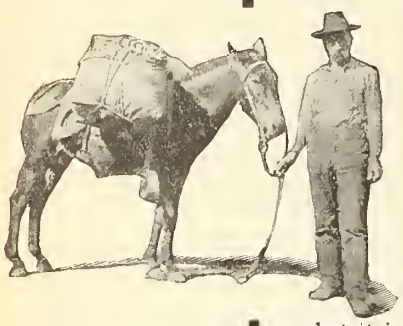

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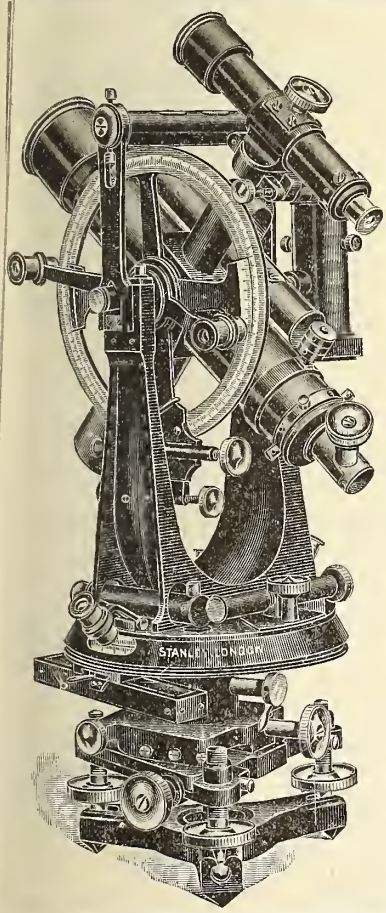

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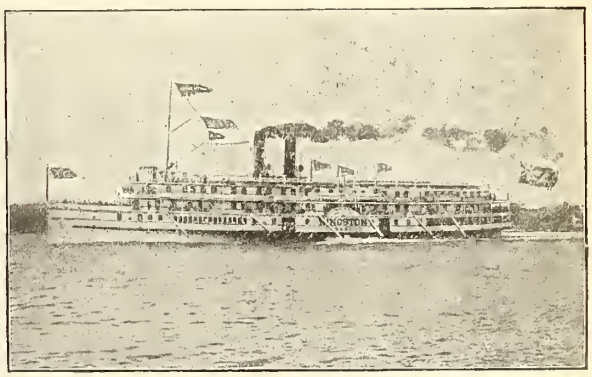

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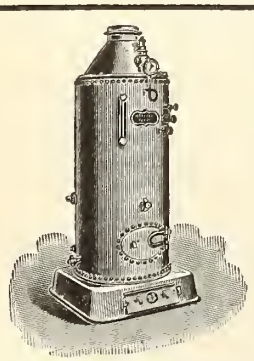

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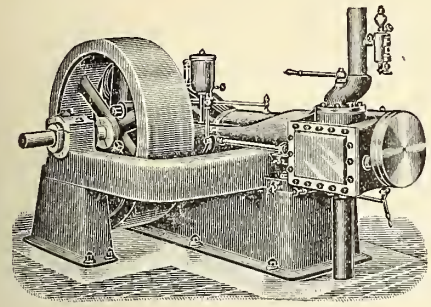

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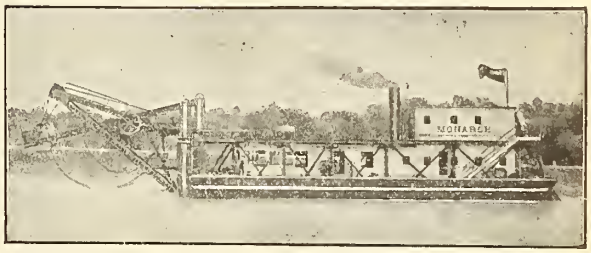

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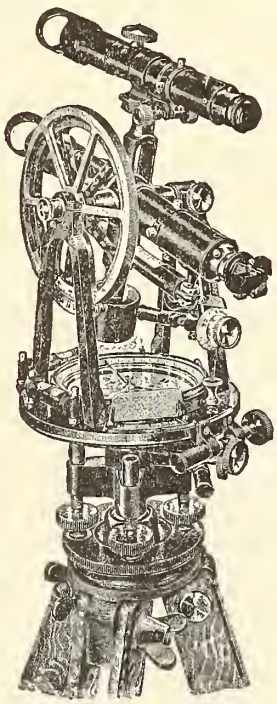

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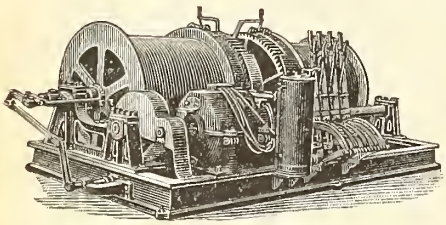

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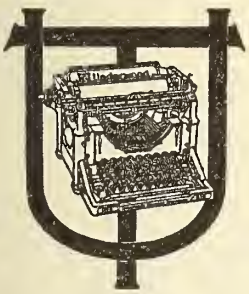

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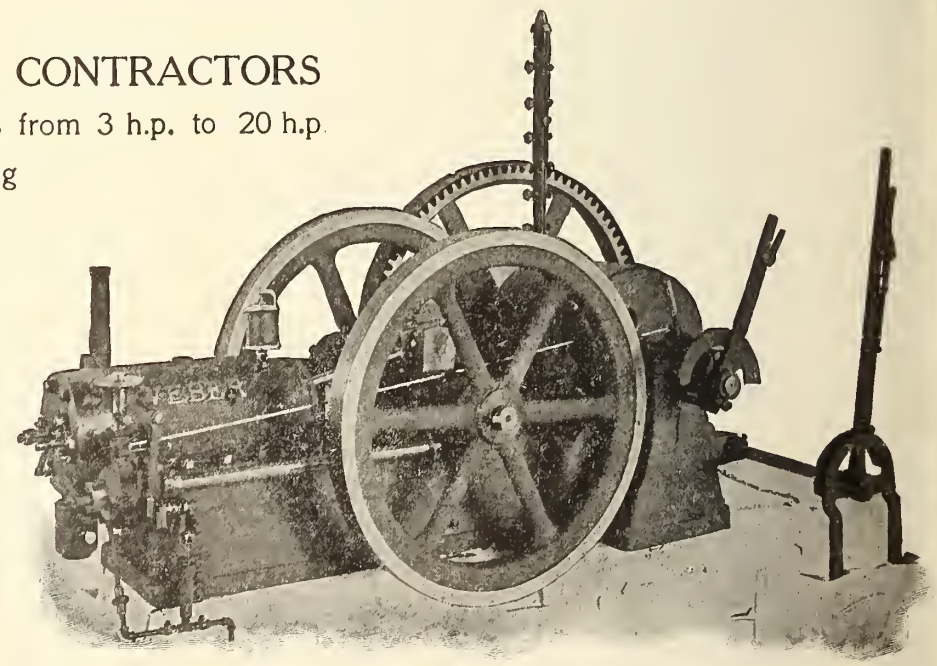

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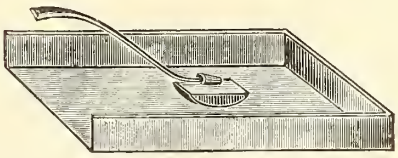

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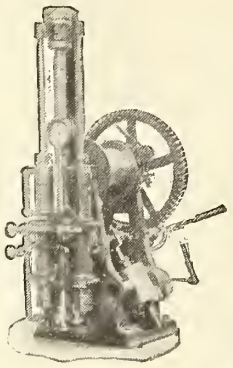

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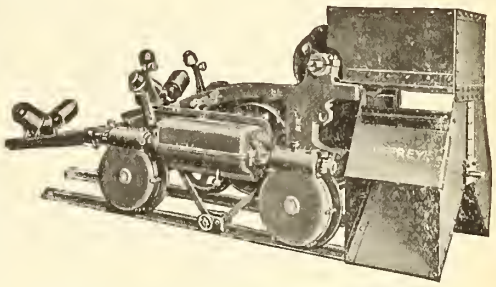

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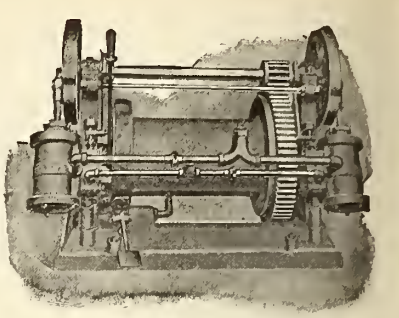

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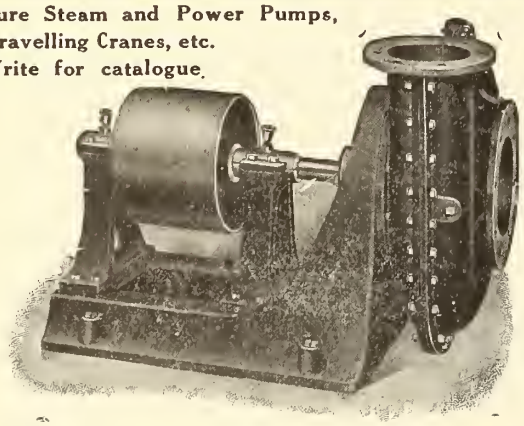

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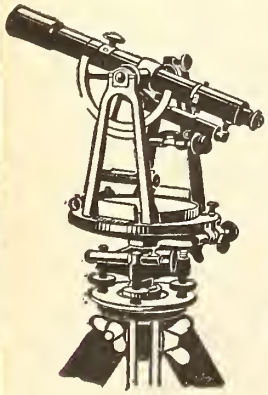

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THE CANADIAN MINING JOURNAL

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CIRCULATION.

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MINING AND THE COST OF LIVING.

Of late years the scales have been removed from the eyes of the consumer. Publicists, through our most effective magazines, have made it plentifully plain that all of us pay more than we should for the neeessaries of life and industry. The wide movement of reform that is spreading over America is manifested chiefly in the public exposure of the intricate iniquities of trusts, and in official investigations that sometimes bring results and sometimes do not. But reform, vaguely perhaps, and only rarely crystallized into definitive acts, is nevertheless pervading the atmosphere, not only in Americea but pretty well over the civilized world.

From South Africea, where the mining and farming communities feel most keenly the unbalanced ineidenee of taxation, there comes word of evidenee given before the Industries and Commerce Commission. The witnesses examined were representatives of the consumers' organization. Let us glance for a moment at their asseverations.

Whilst the peculiar and pressing need of South Africa is a larger population of whites, yet the same injurious fiscal and industrial conditions obtain there as in Canada. As illustration, here is an exeerpt from evidence taken: "No tariff can increase the total amount of work for white men in South Africa, but it may, and probably will, diminish it. . . The miner and the farmer have to earry the burden of protection. They subsidize protected industries, which in many cases means subsidizing the Kaffir and the coloured man who do not even purchase the articles they produce." The point is developed that only when the white man is enabled to live in decency and comfort at the lowest possible cost will he attain his fullest effectiveness.

Amongst the positive suggestions made, several bear upon bounties and subsidies. It is urged that customs duties be levied for revenue purposes only, and apply mainly to luxuries; that railways be run at eost and deficits of branch lines be paid out of general revenue; that coal, raw materials, and food supplies be carried at minimum rates; that harbour deficits be met out of general revenue; and that temporary bounties be granted to industries dependent upon raw material, provided there is reasonable ground for believing that they can shortly survive without the bounties. In short, a general downward revision of duties and railway rates is requested, along with a judicious trying-out of a temporary system of bounties. One strong point made refers to the fact that the local Johannes-

burg manufacturer is amply protected by the cost of laying down foreign goods in that city. He needs no tariff wall. It is shown also that the man with a family to support bears a burden of taxation out of all proportion to that borne by the bachelor. "It would be difficult," continues the evidence, "to conceive a more foolish and iniquitous system of taxation for a new country in need of white population."

The parallel between Canada and South Africa holds in a general sense. In detail, the circumstances of the two Dominions are widely divergent. The mining industry of the Rand is highly organized. Costs are so closely controlled that the immediate effect of extraordinary charges can be readily traced. The large gold mines are placed upon an industrial basis. Reserves are estimated more exactly than is possible in less favoured regions, and expenditure is carefully governed by engineering factors. Briefly, South Africa is pre-eminently a mining region. In agriculture and in manufacturing it has made but slight progress.

In contrast, Canada's chief industry is agriculture. But Canada also has large lumbering, mining, manufacturing, and fishing interests. Directly and indirectly Canadian manufacturers are enormously subsidized. Tariffs, bonuses, special subsidies, and a score of equally expensive devices aid the manufacturer. The consumer pays for all. Naturally the agriculturist, the lumberman, and the miner are bled.

The Johannesburg Daily Mail quotes from Mr. J. J. Harpell's book, "Canadian National Economy," a paragraph tracing the decline of Canada's gold output to the increased cost of living. Whilst we admit freely that in a country like South Africa, where gold mining has attained a degree of solidarity, any addition to living expenses will react at once upon the industry, we contend that Canadian gold mining has never reached the stage where the cost of living has become a serious factor. The impression that the Yukon, for instance, would still be producing on its old scale had it not been for inflated costs is entirely beside the point. Every new Canadian mining camp goes through a period of high prices; and each camp must ultimately be worked by large corporations on its own merits.

We do not deny that the cost of living is a problem in mining as in all other activities. But it does not become a problem in precious metal mining until certain other elements have had full play. The Yukon is thriving and probably will continue to thrive. Deserted gold mines are being re-opened in Nova Scotia and Ontario. If the cost of living was prohibitory ten years ago it is certainly much more so now. Yet never has there been more activity than at present. The volume of output is principally a function of the generosity of nature.

THE FLOODING OF THE PORT HOOD COLLIERY

From the accounts available at the time of writing there seems to be no doubt that the Port Hood Colliery has been inundated by water from the oce entering through a break in the submarine cov Sufficient particulars are, however, not as yet ava able to enable an opinion to be formed as to the cau of the inundation and the possibility of the cau having been preventable.

The Port Hood colliery has had many vicissitud and it has probably never made any money for owners. The first attempt to mine coal at Port Ho was made in 1865 by the Cape Breton Mining Co pany, who drove a slope from the crop of the six f seam; but operations were suspended in 1867.

The Port Hood mine at the present time has a ma slope extending 2,800 feet from the surface at angle of 27 degrees. The company operating is t Port Hood and Richmond Coal & Railway Compa and for some time past the bondholders have been possession, and have made a very determined effort make the mine pay. A new compressor was recent installed and coal-cutting machines were put to wo underground. One difficulty of coal mining on t Inverness shore is the lack of suitable shipping por and the long drift-ice season, requiring the banki of large quantities of coal in the winter, which in turn means the tying up of large sums of capital. D ing the summer the men worked irregularly, pref ring to find employment on a breakwater which t Government have been constructing for many ye to preserve the harbour of Port Hood. The unfor nate flooding of the mine will prove a ruinous blow the town of Port Hood, and is greatly to be regrett

The Inverness coalfield seems to have been parti larly unfortunate, both in its financial aspects and natural features. There can be little doubt that t detached basins of Chimney Corner, Broad Cove, M bou, and Port Hood are all remnants of one gr coalfield, which has been split up by folds of t strata and afterwards denuded, until nothing is l but the bare tips of the coal basins at the shore. So of the seams have without doubt disappeared un the waters of the Atlantic; others are visible at l tide only, and all the time the sea is encroaching what is left. In 1871 Mr. Richard Brown express the opinion that "immediate steps should be taken the Government to ascertain the exact situation a economic value of every seam of coal in Inverne because, owing to the rapid wearing away of the cli on a coast exposed to the heavy surf of the Gulf d ing the prevalent northwest winds, and to the co bined action of severe frosts and rapid thaws, vestiges of these valuable coal-seams will soon be tirely obliterated. In proof of this view it need on be stated that Seal Island, composed of carbonifer strata, which, beyond all doubt, was once connect with the mainland, is now separated from it by channel two miles in width, the intervening land h ing been entirely swept away by the waves. It evident, therefore, that a belt of coast, at least t

s wide, has disappeared, effacing the outcrops of y valuable seams of coal. If this process be re- ed to the extent of only one mile more, it is lly evident that all the outcrops now visible will e washed away, leaving 'not a wreck behind.' If ect plans are made, showing the position of every sea, at a future time, when all traces of them have dis peared, they may be reached by cross-cuts driven fro the bottom of shafts sunk upon the adjacent she e, and worked under the sea."

is comparatively recently that the Mabou mine, wh h lies some six miles to the northward of Port Hoo d, was flooded from the sea, and it is improbable tha this mine will be re-opened. The Government of Nova Scotia can hardly err in taking whatever steps the deem necessary to prevent the flooding of the ac- essible portions of these submarine areas, because it ma well be that such occurrences may render it im- po ible ever to mine the coal-seams that lie further ou to sea.

oubtless, the unfortunate accident at Port Hood w i add something to our knowledge of the mining of su marine coal, and some useful deductions may be ma e for future guidance when more definite infor- ma ion is available. It may not be generally known tha by far the greater portion of Nova Scotia's coal sea s are submarine, and it is difficult to exaggerate the importance of their conservation, since they con- stitute the main source of the Provincial revenue. They also constitute the best guarantee for the future industrial development of the Maritime Provinces and eastern Canada in general.

SALARIES.

ot once, but many times, have we urged upon the po ers that be the policy of paying higher salaries to th officers of the Federal Department of Mines.

n the last annual Summary Report, Mr. R. W. Br ck, Director of the Geological Survey, puts the ca e strongly. In part, he writes thus: "The salaries pa l to technical officers are too low. . . . More wi have to be done if the Survey is to attract and re in the type of man that is needed to secure good re lts. . . . The first requirement is the man; the fa lities for work are of only secondary importance."

Mr. Brock then proceeds to show that the system of gradual promotion is inimical to the Survey's best interests. The lowest salaries paid to technical offi- ers are attractive only to young graduates who have a reputation to make. Such men are engaged by cor- porations at the very time that their services are be- coming of value to the Survey. The loss to the Sur- vey, which is forced to begin all over again with raw material, is serious.

Another problem presents itself when experienced geologists are attached to the staff. These men can be held only by giving them the highest salaries paid by the Survey. Manifestly this is unfair to the older officers whose salaries increase slowly from year to year, and who have not yet reached the highest division.

Mr. Brock does not suggest any alternative for the present system, the imperfections of which need no demonstration. He confines himself to asserting that larger salaries are needed if the Survey is to retain its dignity and its usefulness.

We are inclined to believe that the solution of the difficulty lies in the hands of the Director, in part at least. Naturally he will be helpless without larger support from the Government. But there are matters of internal economy that call for immediate change. For instance it is a patent absurdity to apply to the Survey the same graduated classification of officers as is applied to clerical departments of the civil service. The Survey officers are essentially technical. If classification be necessary at all, it should be as simple as possible. Merit and special qualifications should count more, and long service less.

Incidentally, the anomalous and unseemly "time-book" should be consigned to the scrap-basket. In view of the fact that the Survey staff is composed of reputable professional men, and is not a miscellaneous assortment of irresponsible clerks, the idea of forcing each officer to record his goings and comings is futile in the extreme.

It seems but fair to say that the Survey's claims will be listened to with more favour as soon as it has been placed upon a professional and not a clerical basis.

FAME.

What is fame? The answer is easy. A capable press agent can bring you a surfeit of fame — if only you point a cheque-book at him. And no one has been luckier in his press agent than Mr. John Hays Hammond, "Special Representative of the President of the United States of America" at the Coronation.

In an anonymous appreciation of Mr. Hammond that was published in the London Daily Mail lately, it is stated, metaphorically and hyperbolically, of course, that Mr. Hammond "can smell a gold mine a thousand miles away." There follows mention of the passionate yearning of the Czar of all the Russias to meet the man who could exercise, with so much benefit to his nation, his olfactory upon undiscovered mineral riches.

But, as the effusive scribe points out, Mr. Hammond has forsworn mining and is to devote the remainder of his time and energy, not to mention his acute sense of smell, to the cause of international peace. So eloquent is the admiring agent that a brooding feeling of security immediately descends upon us.

* * * *

What it costs in mere money to reach the heights that Mr. Hammond has reached, we can only guess. But there remains no doubt that he is famous and will remain famous. He stands unique, alone, the man with

the largest salary in the world, the man who has capitalized his proboscis from the Rand to Mexico, and from Siberia to Cobalt, where lies a mine called Nipissing.

MILLING IN COBALT.

That there is excellent milling being carried on in Cobalt is indicated by Mr. A. P. Globe's paper on another page. Mr. Globe is mill superintendent of the McKinley-Darragh. His knowledge is first-hand, and what he writes is keenly interesting.

An extraction of more than 90 per cent. on ore such as is put through the McKinley-Darragh mill is creditable indeed. The extraction of silver from a 43-ounce ore at the McKinley-Darragh is 90.55 per cent. The tailings contain only 4.1 ounces per ton. Costs, also, are kept low. The mill is equipped to treat 60 tons of ore per 24 hours. The milling cost per ton of ore milled is $1.30. The cost per ounce of silver recovered is three cents.

We note with approval that steps have been taken to install a hand-picking section, with the object of reducing the value of the ore that goes to the stamps.

In the swirl of other mining excitements the steady development of Cobalt has been lost to view. In the staid, progressive Cobalt of to-day it is hard to recognize any trace of the blustering mining camp of four years ago. But nothing is more worth following than the ever growing efficiency of a mining camp that has cut its eye-teeth, and is in the hands of competent technical men. Whilst our metaphors may be mixed, we wish to draw attention to the fact that Cobalt has reason to be proud of her mining and milling practice.

THE INTERNATIONAL GEOLOGICAL CONGRESS

Coal is to be the chief topic of discussion at the twelfth session of the International Geological Congress to be held in Toronto next summer. The Eleventh Congress discussed the iron ore resources of the world, and published the results in monumental volumes. Logical sequence suggests that coal be the next subject of enquiry.

Already there has been distributed a circular outlining the campaign that is under way. Concise reports are being obtained from all mining countries touching both worked and unworked deposits. Actual, probable, and possible reserves are to be estimated, and complete forms are provided to assist in classifying scientifically each particular fuel and in determining its commercial value.

It is most urgently requested that each and every mining official do his best to aid in this world-wide stock-taking. The information thus gained will do much to forward the saner use of our most important mineral commodity.

EDITORIAL NOTES.

French capitalists are putting money into Newfoundland oil lands. Submarine claims between Pierson's Pond and St. Paul's Bay have been taken up.

In the volume on Porcupine published by the CANADIAN MINING JOURNAL, acknowledgment was omitted of the courtesy of Mr. A. C. Goudie in supplying tracings of the township maps.

The CANADIAN MINING JOURNAL is always anxious to receive notices of the movements of mining engineers. Brief items will be welcomed. It is good business for engineers to keep the mining public posted as to changes of address and absences from headquarters.

The representatives of the coal miners' unions of New Zealand have been requested by the British Admiralty to undertake to supply the navy at any time required, whether a strike exists or not. The reply of the unions was indefinite. They refused to bind themselves, but agreed to give due consideration to specific applications.

During the calendar year 1910, the Buffalo mine milled 41,484 tons of ore, averaging 36.07 ounces silver, a total of 1,496,255 ounces. The mill recovery was 80.07 per cent. The cyanide plant treated 11,[illegible] tons of slime from the mill, containing 13.06 ounces of silver per ton, or 152,783 ounces in all. The recovery here was 103,321 ounces, or 67.62 per cent. The total recovery by mill and cyanide was 1,301,396 ounces, or 86.98 per cent.

The extraordinary altruism of the larger breed of capitalist was never better demonstrated than by a recent utterance of Mr. Daniel Guggenheim. On leaving New York, Mr. Guggenheim delivered himself of a remarkable statement in which he expressed the fear that copper prices may soon become abnormally high. He dreads a "runaway price," and urges an organized community of copper interests so that prices may be kept at a decently low level. To Mr. Guggenheim we award the prize!

The Rev. Dr. Gordon ("Ralph Connor"), chairman of the Board of Conciliation that is attempting to patch up the dispute between operators and employees in southern Alberta and Crow's Nest Pass, showed singularly little discernment in his request that both sides send in a statement of their grievances and of concessions that they were willing to make. It is the chairman's business to collect, sift, and weigh the evidence. Then it is his duty to recommend such measures as he sees fit. Dr. Gordon's attitude is weak and puerile.

Personal and General

Mr. G. C. Bateman is at Elk Lake City.

Mr. Kirby Thomas, 20 Broad Street, New York, was in Toronto on June 28.

Mr. J. B. Tyrrell has returned from the Swastika mining region.

Mr. W. F. Ferrier, mining engineer, Lumsden Building, Toronto, has returned to town.

Mr. H. W. Hardinge, 50 Church Street, New York, has returned from a professional visit through western Ontario in the interest of New York clients.

Mr. Kirby Thomas, of New York, is in the Sudbury region.

Mr. A. E. Barlow has gone north to Cobalt and Porcupine.

Mr. William McGinnis is in Cobalt.

Mr. M. J. Butler, general manager of the Dominion Coal Company, recently visited the company's Springhill collieries.

Mr. Robert R. Hedley, who is now technical adviser to a Vancouver organization named the Canadian Mining Operators, has been spending several weeks in Nelson mining division, West Kootenay, B. C., making enquiries with a view to the purchase of mining properties.

Mr. Norman Carmichael, formerly manager of mines in the vicinity of Nelson, B.C., and now general manager of the Arizona Copper Company, with headquarters at Clifton, Arizona, was in Victoria, B.C., towards the end of June.

Mr W. Yolen Williams, of Spokane, Wash., will spend several months in the Coast district of British Columbia making enquiries relative to copper mining and smelting, and obtaining other information for the Granby Consolidated M., S. & P. Company, Limited. He will make Vancouver his headquarters while on the coast.

Mr. A. J. McMillan, liquidator of the Le Roi Mining Company, has gone to London. It is understood that a sale of the Le Roi mine, at Rossland, B.C., has been arranged, subject to confirmation by those who were directors of the company when liquidation was decided upon.

Mr. Andrew G. Larson, who lately paid a visit to Toronto, New York, and other cities, has returned to Vancouver, B.C.

Mr. Frederick G. Coggin, of the Deister Concentrator Company, has been spending some time in Idaho and eastern Washington, introducing his company's machines.

Mr. Byron N. White, of Spokane, Wash., president of the company owning the Slocan Star group of mines, near Sandon, Slocan, B.C., has lately been in Whitehorse copper camp, southern Yukon, in connection with the proposed resumption of operations at the Pueblo mine there.

Mr. James McEvoy has gone to the upper Skeena district, British Columbia, to open coal measures on property owned by a Toronto syndicate.

Mr. Jay P. Graves, vice-president and general manager of the Granby Consolidated M., S. & P. Co., Ltd., has returned to Spokane, Wash., from attending an important meeting of the directors held in New York.

Mr. E. Jacobs, of Victoria, B.C., has been re-elected secretary of the Western Branch of the Canadian Mining Institute, for the ensuing year.

Mr. Chas. Camsell, of the Geological Survey of Canada, is to do some reeonnaissance work in the Steamboat Mountain district, British Columbia, during the summer and autumn.

Mr W. M. Brewer, of Victoria, B.C., has resigned as president and director of the Pacific Metals Company to accept the position of general manager of the Matanuska Gold Mines, Limited, owning a free-milling gold quartz property in the Matanuska district, near the head of Cook's Inlet, Alaska. Mr. Brewer left for the north at the beginning of July.

Mr. George Safford, for a long time business manager of the Mining Journal, London, England, has joined the staff of The Mining Magazine.

Dr. A. M. Campbell, who returned from London and Scotland about a month ago, is at present in Porcupine. Dr. Campbell's permanent address is 70 Gloucester Street, Ottawa.

Mr. James Ashworth, late general manager of the Crow's Nest Pass Coal Co., has established an offiee at 1109 Hornby Street, Vancouver, B.C. Mr. Ashworth has had long experience in all phases of coal mining. He is thoroughly familiar with mining in the Canadian west.

Mr. Louis Reyersbach, managing director, and Mr. Hugh F. Marriott, consulting engineer of the Central Mining & Investment Corporation, of London, England, will visit this country in August. The corporation has recently taken over and consolidated with their own the interests of Messrs. Wernher, Beit & Company and Messrs. Eckstein & Company, the largest operators in Kimberley and the South African Rand. These gentlemen are making a tour of Canada and will visit the most interesting mining localities in this country in company with Mr. G. G. S. Lindsey, of Toronto, formerly president of the Crow's Nest Pass Coal Co. Arriving in New York on the 28th of July, they will proceed to New Brunswick and ultimately reach Vancouver, after which they will visit both the Skeena River and the Portland Canal. Mr. Marriott, it will be remembered, represented, with Mr. William Frecheville, the Institution of Mining & Metallurgy on the summer excursion of the Canadian Mining Institute in 1908.

Correspondence

DEEP DRILLING.

Chicago, July 3, 1911.

Gentlemen,—We note on page 403 of your July 1st issue, a summary of records of deep wells, including mention of one bored in 1905 near Johannesburg, South Africa, to a depth of 5,582 feet.

A few months after the hole referred to in your article was completed, John Skenke, an American drill contractor, using a Sullivan diamond prospecting core drill, class "P," completed a hole at a depth of 6,340 feet. A year or two ago, another American contractor, named William Gallagher, put down a hole on the Rand to a depth of about 6,600 feet.

The deepest diamond drill hole of which we have any record on this continent, was one bored in the summer of 1909, by Messrs. Cole & McDonald, of Virginia, Minnesota, near Republic, Michigan, with a Sullivan Class "D" diamond drill. This hole went to a depth of 3,265 feet.

Yours very truly,
"MINE AND QUARRY,"
S. B. KING, Editor.

Concentrating Methods at the McKinley-Darragh Mine, Cobalt, Ont

Written for the CANADIAN MINING JOURNAL by A. P. Globe, Mill Supt., McKinley-Darragh Mine.

Before going into the details of concentration at this mine, it should be pointed out that at nearly every mill in Cobalt the mill man has a different proposition in the concentration of Cobalt ores, which calls for some special treatment or permits of some step being omitted, or even permits some practice that would be prohibitive elsewhere

At one mine the values are carried in veins of very high grade ore, the wall-rock carrying very low or no values. Here a large percentage of values can be removed by hand picking or sorting plants. Under these conditions the ore going to the concentrator is reduced to from 10 to 20 ounces silver per ton. This enables the mill to make a high ratio of concentration and also a high grade of concentrates, but a lower extraction than where the veins are of a lower value and the values carried mainly in the wall-rock. The latter does not permit sorting to as great an extent before concentration as the former, therefore the grade of concentrates and ratio of concentration will be lower, but the percentage of extraction much higher, so it is hardly fair to compare such figures as ratio of concentration, average values of concentrates produced and per cent. of extraction.

It is not a matter of concentrating silver, but of the many grades of Cobalt ores.

In the following paper the writer has attempted to give correct information, to the best of his knowledge and belief, and it is to be understood that such figures as tonnage, value per ton, cost per ton and percentage of extraction, each depending one on the other, are estimated to a certain extent; that is, facilities are not provided to weigh every pound of ore and accurately sample mill feed as a customs plant must do. Figures may vary, although the law of averages will correct high and low points over a large tonnage and time.

The general formations milled at the McKinley-Darragh concentrator, are the Huronian slates and conglomerates with a certain amount of Keewatin. Generally the veins are small and split up, yet give a large amount of vein matter.

The metal of economic value in the veins and country rock is silver. It occurs in the form of leaf silver, argentite, ruby silver, dyscrasite, stomeyerite, freieslebenite, associated with smaltite, niccolite, glaucadot, calcite, and other sulphides and arsenides. The wall-rock slates carry a considerable quantity of sulphides and metallics, from a coating or paint of the former to nuggets of the latter. The many combinations formed by the various minerals and gangue give a specific gravity anywhere from 2.7 to 9.9, i.e., from calcite to dyscraseite.

Whereas the cyanide man's salvation often lies in the sliming of his ores, the reverse is the condition here. A certain amount of the values when once slimed will float away and no amount of mechanical concentration will save them, as has been found by returning the pulp over tables again and again under different conditions. As to the question of overcoming this difficulty, it will be seen from the flow sheet and tables that the sliming of values has been considerably reduced.

The accompanying flow sheet illustrates the flow through the mill:

The stamps are provided with slot screen .375-i x .187-inch aperture, .066-inch wire, 102 drops minute, 7-inch drop, level discharge, 90 per c water. This practice gives stamp duty of about 4 tons per 1,250-pound stamp, plus tonnage by-pas equals 146 tons per day of 24 hours for 30 stamps.

The following table gives distribution of values sizes in feed and discharge of stamps:

FEED.

	Mesh.	Per cent.	Assay
On	1¼-inch	11.	19 ounces.
On	1 -inch	14.	19 ounces.
On	¾-inch	21.	19 ounces.
On	½-inch	21.	19 ounces.
On	¼-inch	17.	19 ounces.
Through	¼-inch	16.	19 ounces.

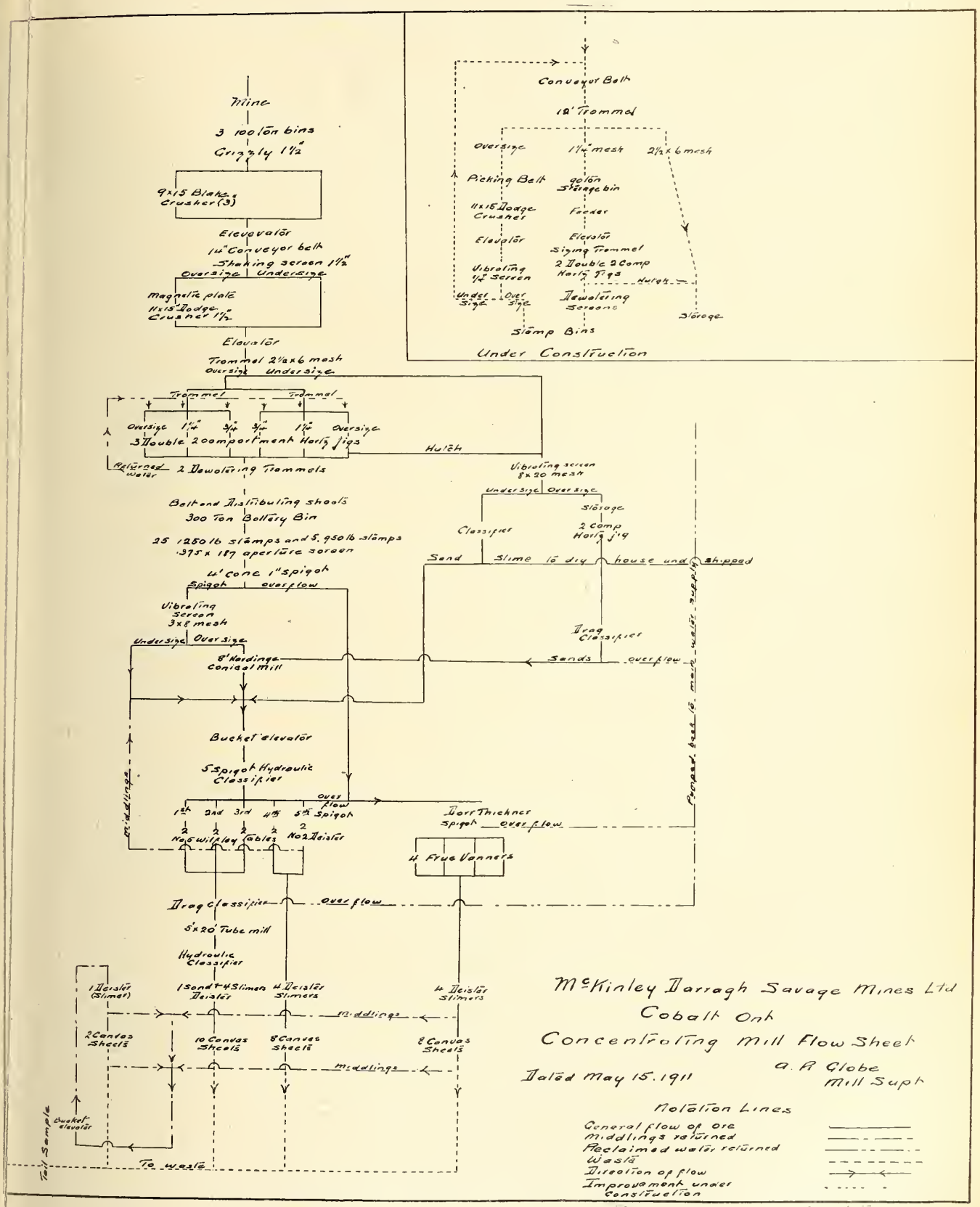
DISCHARGE.

	Mesh.	Per cent.	Assay per ton.	Total oz. silv contained in 1 tons.
On	8	17 60	8.00	168.96
	10	4.30	8.24	42.52
	20	16.60	10.20	203.18
	40	15.20	18.32	333.79
	60	7.99	22.16	212.73
	80	6.47	23.60	183.23
	100	6.70	27.56	221.58
	120	1.55	32.36	60.38
	150	1.15	33.92	46.90
	200	3.06	33.76	124.11
Through	200	19.38	29.28	691.40
		100.	19.	2288.78

The run of mine is received in three separate bi which permits mine sampling of this spotty ore large lots.

On the first grizzly high grade is picked out a sacked, and after crushing to 3-inch the ore is c veyed to a shaking screen where high grade is ag picked out. After crushing to 1¼-inch, the ore is vated to a trommel 2½ x 6 mesh, where the unders is washed out and by-passed around the stamps this way 18 per cent. is removed. This is joined the hutch product from 6 Hartz jigs (the largest screen being 3-16-inch, round punch). This by-pass material and Hutch product is passed over an 8 x mesh screen, the over-size going to a Hartz jig. T under-size is separated, the sands to table feed, and t slimes are settled and shipped direct, without furth treatment. These slimes form about 1 per cent. the total ore and will average 200 ounces of silver p ton.

The over-size of 8-mesh from the stamp pulp, a tails from fine jig are re-ground in one 8-foot H dinge conical mill. This product, together with t stamp pulp under-size of 8-mesh, and about 4 tons sands from original wash (running about 70 ounc per ton) is classified for 10 sand tables and 4 Fr vanners. By coarse crushing only 19.38 per cent. slimes is made in the batteries, and the value of 1 per cent. of the battery pulp is reduced to 8 ounc before fine grinding. With the average stamp pu


Mine
3 100 ton bins
Grizzly 1½"
9x15 Blake Crusher (3)
Elevevalor
14" Conveyor belt
Shaking screen 1½"
Oversize Undersize
Magnetic plate
11x15 Dodge Crusher 1½"
Elevalor
Trommel 2½x6 mesh
Oversize Undersize
Trommel Trommel
Oversize 1¼" ¾" ¾" 1½" Oversize
3 Double 2 compartment Harz jigs
Hutch
Returned water
2 Dewatering Trommels
Belt and distributing shoots
300 Ton Bollery Bin
25 1250 lb stamps and 5 950 lb stamps
.375 x 187 aperture screen
4' cone 1" spigot
Spigot overflow
Vibrating Screen 3x8 mesh
Undersize Oversize
8' Hardinge Conical Mill
Bucket elevator
5 Spigot Hydraulic Classifier
Overflow
1st 2nd 3rd 4th 5th Spigot
2 2 2 2 2
No 6 Wilfley Tables
No 2 Deister
Middlings
Dorr Thickner
Spigot Overflow
4 Frue Vanners
Drag Classifier Overflow
5'x20' Tube mill
Hydraulic Classifier
1 Deister (Slimes)
1 Sand + 4 Slimes Deister
4 Deister Slimers
4 Deister Slimers
Middlings
2 Canvas Sheets
10 Canvas Sheets
8 Canvas Sheets
8 Canvas Sheets
Middlings
Bucket elevator
Tail Sample
To waste
Conveyor Belt
12' Trommel
Oversize 1¼" mesh 2½x6 mesh
Picking Belt 90 ton Storage bin
11x15 Dodge Crusher Feeder
Elevator Elevator
Vibrating ¼" Screen Sizing Trommel
2 Double 2 Comp Harz Jigs
Hutch
Under Size Over Size Dewatering Screens
Storage
Slimp Bins
Under Construction
Vibrating screen 8x20 mesh
Undersize Oversize
Storage
Classifier 2 Comp Harz jig
Sand Slime to dry house and shipped
Drag Classifier
Sands overflow
Pump and belt to mine water supply
McKinley Darragh Savage Mines Ltd
Cobalt Ont
Concentrating Mill Flow Sheet
Dated May 15. 1911
A. A Globe
Mill Supt
Notation Lines
General flow of ore
Middlings returned
Reclaimed water returned
Waste
Direction of flow
Improvement under construction

running 19 ounces per ton the sands will run 22 ounces and the slimes 18 ounces per ton.

The tails from 6 Wilfley sand tables, which will run 5 ounces, are re-ground in one 5 x 20 tube mill and re-treated on 5 Deister tables. The tails from four sand tables treating the finer sands are retreated on old style Deister slimers. The tails from the 4 vanners are retreated on No. 3 Improved Deister slimers. The total tailings from the Deister floor pass over 28 canvas sheets before going to waste. Over the canvas tables the pulp is allowed to flow for about one hour, when the top is washed off and elevated to a Deister table, where it is cleaned. The underlying mineral is then washed off and settled.

The final tailings from a mill feed of 43 ounces will average 4.1 ounces, ratio of concentration 20-1, thus

FEED...			PRODUCT.	
	Mesh	%		Mesh.
On	8	.70	On	40
	10	2.10		60
	20	34.		80
	40	34.70		100
	60	14.		120
	80	11.10		150
Through	80	3.40		200
			Through	200

Mill, 8-foot Hardinge Conical. H.P used, 50. Spe 27 R.P.M. Tons of ore treated per 24 hours, 48. Wa used, 70 per cent. It should be mentioned that t 50 h.p. includes motor ineffieiency.

EXTRACTION AND GRADE OF PRODUCT.

Unit	Feed Assay. ounces.	Tail Assay.	% of Extraction	Grade of product. Assay per ton.	
Hand picking	43	41.4	.35	1500	
Coarse jigs	39	19.	51.30	1200	Bed skimmed (smaltite).
Fine jig	40	18.	55.	1450	Jigging through screen bed of.
Wilfley sand tables	23	5.	78.30	975	Treating sizes 8-40 mesh.
Deister sand tables	21	6.	71.50	1150	Treating sizes 40-120 mesh.
Vanners	19	9.	52.20	500	Treating sizes 120-slime.
Deister Slimers	9	5.5	40.	250	Retreating vanner tails.
Canvas Sheets	4.5	4.	13.	200	Tailings from Deister tables.

showing an extraction of 90.55 per cent. The sand in tailings will run 2 to 2½ ounces and the slimes 5 to 7 ounces.

COSTS.

Average costs will run:

	Per ton of ore milled.	Per ounce Recovered.
Concentrating	.670	.007
Power	.300	.008
Power plant repairs	.007	....
Mill repairs	.326	.016
	1.303	.031

Fine grinding in tube mills. Mill—5-foot x 20-foot tube mill. Horse-power used, 55. Speed, 19 r.p.m. Tons of ore treated per 24 hours, 60. Water used, 60 per cent.

FEED.			PRODUCT.	
	Mesh	%		Mesh.
On	8	58.	On	40
	10	10.		60
	20	20.8		80
	40	1.6		100
	60	.8		120
Through	60	.8		150
				200
			Through	200

Improvements.

At present a hand picking section is being instal to increase the quantity of high grade, and reduce values going to the stamps, also to get a better scre ing efficieney and reduce the quantity of fine mate going to the stamps. This is illustrated on flow she

OUR EUROPEAN LETTER

Electricity in British Mines — Government report on the Hulton Explosion and earlier reports — Interesting new electrical winding plant in Durham — South African mines still out in favour with the investor despite continuous growth of gold output — Substantial interest evidenced in the Giesecke ball mill — What it may do on the Rand — Oil market dull — Slow petroleum developments in Russia — Falling production in Galicia — Reasons and results of extraordinary London tin fluctuations —

(Exclusive correspondence of CANADIAN MINING JOURNAL.)

London, June 21, 1911.

Electricity in mines is one of the questions that is always being debated now and the definite statement just published in the Government report on the Hul colliery explosion is particularly interesting and i portant because of its bearing on the use of electric in coal mines. The Government inspector says that is perfectly satisfied that the use of electricity in mine has no bearing on the disaster. Although t definite opinion is not read as absolving electric from being a source of risk under any circumstan it will go a long way to reassure working miners a their leaders who have not been at all backward declaring that the electric switch at the conveyor f was the initial cause of the explosion.

A Government committee was appointed to look i the whole of this class of operation as far back as 19 and a second committee in 1909 revised the rules s

by the earlier committee. It was pointed out although the accidents and ignitions arising from electrical causes were on the increase, yet, having regard to the great increase in electrical plant, the risks attending the use of electrical plant in mines were decreasing, and in no year had the fatal accidents due to electricity been greater than 1.54 per cent. of the total accidents. The risks associated with the use of electricity may be classified as due to either shock or ignition. There are two ways of attacking the shock problem. One is that of employing such a low pressure that the shock would seldom be dangerous and the other is that of employing only properly protected apparatus. The view in this country is that for all fixed plant the latter is the better and indeed the only really safe method. For portable plant complete protection should be aimed at, but having regard to the inherent difficulties in the way of totally preventing contact with live parts, it is advisable to adopt a low pressure as a further safeguard. In the case of fixed plant adequately protected, the question arises as to whether any limits should be set to the pressure under which it should work. Many think that there should be a limit, and a fairly low limit, and ten or even five years ago there was considerable justification for such a view, for at that time high tension cables and apparatus had not been as thoroughly developed as they have been since, and moreover not much attention was then paid to the special requirements of colliery electric apparatus.

The above mentioned second committee in its report stated very definitely that it saw no reason why a high pressure system should not be as safe as regards risk of shock and explosion as a medium or low pressure system. The adoption of higher pressures is moreover accompanied by some substantial benefits. A high pressure cable is thinner and lighter and more easily handled and supported than a low pressure cable of the same power, and it is generally of the highest class of construction, and provided with extra thick insulation.

The safe use of high-pressure apparatus turns upon the provision of complete protection. The only satisfactory protective system is the elementary but effective one of encasing all live parts in a substantial metallic sheath or box maintained at earth potential. A good deal of discussion has lately taken place as to the advisability or otherwise of earthing all apparatus. There are difficulties. In dry mines, particularly, good earths are often difficult to obtain, and two earth plates some distance apart may even be at appreciably different potentials until connected. If a difference of potential is maintained it will, of course, lead to the flow of current in the protective armouring, which may have objectionable results. On the other hand the risks of a difference of potential being maintained are small, except possibly in very deep or extensive mines. Armouring may be local or continuous, but the latter is much safer. Indeed, if the armouring is discontinuous a section of the armouring may, in the case of a fault to earth, become dangerously charged. To maintain armouring in continuous conditions involves systematic inspection. It is held that all electrical plant should be systematically inspected, and the absence of competent inspectors should not be admitted as an excuse.

The report insisted strongly upon the need for having all the electrical plant properly looked after, as well as thoroughly well made in the first instance. There is no doubt that competition, which has been more than usually keen in the electrical industry, had in some instances reduced strengths and proportions below a proper limit, but a considerable improvement is taking place, and the report strongly disapproved of the suggestion that the Home Office should officially approve of certain types of mining electrical apparatus. In this most engineers, if not all colliery managers, will agree with them, for official approval would certainly tend to hamper progress, which is particularly needed in the early stages of the mining electrical industry. The quality of workmanship and materials are as important as design or type; official approval could only be a partial guarantee, and would tend to relieve the colliery manager of his proper responsibility for the safety of his mining equipment.

A very interesting winding engine plant operated electrically has just been put in an important Durham colliery. The depth of the shaft is 162 feet, the time of each wind 15 seconds, the average winding speed 648 feet per minute, and the time allowed for changing 10 seconds. The winding gear is fitted with a coned drum, varying from 5 feet 6 inches to 7 feet 6 inches in diameter. The 100 b.h.p. motor is of the three-phase type, 440 volts, 40 cycles, and drives on the drum shaft through a flexible coupling and a train of machine cut helical gearing. The winder is fitted with automatic winding gear, which, in the event of an overwind, trips the main switch and cuts off the supply to the motor, and also applies the main post brakes. This gear also comes into operation in the event of failure of the supply, and is further fitted with an emergency lever, by which it may be brought into operation by hand.

The switch gear consists of an iron-clad column fitted with a three-pole oil switch with overload and no-voltage release, and an isolating switch is provided, interlocked with the main switch and the various doors of the switch column. The controller is of the rising liquid type. the control being carried out by means of one lever, which is "off" in the central position. A small centrifugal pump and motor are provided on the controller, the pump constantly delivering water from a storage tank contained in the controller bed-plate to the tank containing the electrodes. This tank is fitted with a rising and falling shutter, which is operated from the control lever, and regulates the level of the liquid in the tank. The reversing switches are mounted upon the shaft that operates the controller, and one switch is provided for each running direction. The switches are worked by means of a link motion from the control lever.

South African mines in London, although at times showing a desire to spurt, are now again completely out of favour. Yet the industry is not doing badly, although there is the usual falling off in the supply of native labour which is to be expected at this time of the year. The gold output keeps growing. Last March the record, which, owing to exceptional circumstances, had stood since December, 1908, was at last broken. In April the daily average yield was again a record,

but owing to the month being a thirty-day one the aggregate production was below high-water mark. For May, however, one has to chronicle a new record, the total of 685,950 ounces being nearly 10,000 ounces better than in March. The daily average has, on the other hand, fallen by 130 ounces. But this is much more than explained by the drop of 6,500 ounces in the East Rand Proprietary's May return, as a result of the fire on the Driefontein section. Thus the loss of nearly 4,000 "boys" from the Rand's working force last month has not yet affected working results, although it will, no doubt, influence the figures for the current month.

The midsummer Rand dividend list is satisfactory enough, a decrease in the case of the Ferreira being offset by a further increase in the Modderfontein dividend. The latter was rather unexpected considering the heavy capital requirements of the company. The Ferreira is this time only paying about what it is actually earning, the accumulated profits not being further drawn upon for the bonus which has been usual for some time past.

Great interest is being aroused in this country in connection with the Giesecke ball mill, and rumours are current as to the possibility of its displacing the present ordinary stamp batteries. It may be remembered that Lionel Phillips, in Johannesburg, on May 28th, made a reference to this appliance which, although in an experimental stage, he said, was destined to have a great influence on the future of the Transvaal gold mining industry. The inventor of the machine is now on the Rand, but particulars from his home in Germany indicate that the machine will greatly simplify the methods of recovering gold, besides making a big reduction in costs. The mill is meant to displace the ordinary stamp batteries, and the tube mills introduced on the Rand some five years ago, the crushing being completed and the ore reduced to a consisteney of slimes by a single operation. There are no screens, and the amalgamation process is also eliminated, the cyanide being applied directly as the product leaves the grinder. The ore is crushed so fine (to 60-mesh sereen) that the recovery of the gold by cyanide will be effective. The mill consists of a huge wrought-iron cylinder, about 23 feet long, over 8 feet in diameter for the first third of its length, and about 6 feet for the rest. The reduction of the ore is effected by means of steel balls, which both crush and grind it. The cylinder is divided into three compartments, and the balls in each are graded in size according to the stage of grinding, beginning with balls of about 4 inches in diameter in the first section and ending with about 1½-inch in the last. Within the cylinder are placed some ten rows of so-called "fall-plates" of heavy steel; these lift the balls and the ore about half-way up the cylinder as it revolves, when the whole mass drops upon the next plate. Water is fed in with the ore at the rate of about one-third of a ton to each ton of ore, which means a very heavy reduction in water consumption as compared with stamps.

There has been no special increase in the volume of business in the oil share market here lately. A fair sized full account exists in most descriptions. There is not much news that is fresh from the European oil fields. At Baku the relatively low returns continue, whilst at Grozny the yield in the first months of the year wears a satisfactory aspect. This area has rapidly risen from the position of an interesting petroleum region to that of an important contributor to Russia's total supply, more than making up for the decline at Baku, the importance of which looks like becoming within a measurable time simply one of inland supply and demand. Such must become the case till at last the petroleum reserves in sight at Maikop are exhausted, and it cannot positively be stated yet whether the period will be a long or a short one, or, again, whether Maikop may not yet reveal reserves of petroleum at various levels to dwarf the supplies that Baku may be able to send to the Black Sea shipping port of Batoum. Hitherto Maikop has developed very satisfactorily.

Of what is doing on the other petroleum lands of Russia not much is to be said. There are frequent reports of gusher strikes at Tcheleken, in the Caspian Sea. But little news comes through from Ferghana respecting the Tchimion Oil Company's operations. And the Government boring operations in search of payable petroleum at Uchta in the north do not appear to have yielded satisfactory results. But it is clear that these operations are on far too small a scale for forming a useful opinion. They, however, have been carried out at great expense, as the tools and plant had to be carried over many miles of hitherto untrodden land, and special houses had to be constructed for the workmen.

The falling off in the production of certain wells in Galicia has aroused particular interest, especially in view of the fact that during the last few months British capital in the Galician field has been largely increased. A well in this field costs between $50,000 and $70,000 to drill and from eighteen months to two years before the principal oil horizon is reached. Drilling, therefore, has been fairly slow. Another cause which has contributed slightly to diminish the production has been a local water trouble.

The tin position here is a very uncomfortable one, sensational rises and slumps in the price of the metal being of almost daily occurrence. The Anglo-Continental syndicate, which has been so successfully manipulating the market, has now evidently come to the conclusion that discretion is the better part of valour, and that to push its advantage to extremes would be only to incur dangers the effects of which might be disastrous. Apparently it has come to terms with the bears after unmercifully squeezing them for as long as it could do so without causing a panic. As it is, these operations are likely to have a lasting influence on the London metal exchange, and no one will be greatly surprised if one of their results is a sweeping change in the regulations affecting that organization. Already the establishment of a similar institution in Germany is threatened, and unless the London Exchange arranges to permit dealings in tin other than that of Straits or Australian origin, it is only too probable that the threat will be carried out. It is contended, with some show of reason, that the London Exchange is abusing its monopoly, and that by boycotting tin produced in the Straits Settlements or Australia it is creating an artificial shortage, which is detrimental not only to consumers, but to all the various trade interests affected.

GOLDBEARING SERIES OF LAHAVE BASIN, LUNENBURG COUNTY, NOVA SCOTIA

Abstract of report by E. Rodolphe Faribault, from Summary Report of Geological Survey for 1910.

The greater part of the district is underlain by the quartzites and slates of the Goldbearing series; but towards the north and northwest these rocks are cut by granites of Devonian age, which extend northward across South Mountain to the Annapolis Valley, and form part of the very large granite area which constitutes the backbone of the western counties of the Province. A small isolated mass of greenish grey granite was located far away from the main area, at a place situated 2 miles east of Italy Cross station, and one-fourth of a mile north of the outlet of Wallace Lake. At this locality, a recent conglomerate has been prospected for gold.

In the absence of fossils and other conclusive evidence, it has been customary to refer provisionally the Goldbearing series to the lower Cambrian, though on account of their similarity to the quartzites and slates of the Avalon peninsula of Newfoundland, which have been assigned to the Pre-Cambrian, as well as for other reasons, it is possible that they may be Pre-Cambrian.

The series as exposed in different parts of the Province has been estimated to have a total thickness of over 5 miles. This great series of rocks falls naturally into two lithologically distinct conformable divisions; a lower one, called the Goldenville quartzite; and an upper one, called the Halifax slate.

The Goldenville division is mostly made up of thick beds of grey, altered quartzose-sandstone or quartzite, locally called "whin"; interstratified with beds of dark clay slates, which are quite numerous at certain horizons, but almost wanting at others, especially at the top of the division. At many places, and more especially near granite intrusions, these rocks are much altered, and have become schistose, with a development of very minute scales of mica along the planes of schistosity, which gives them a characteristic glistening appearance when split. The Goldenville division has a thickness of over 3 miles of strata in the eastern part of the Province.

The Halifax division is composed entirely of argillaceous slates, in some cases arenaceous, and with occasional flinty layers holding iron pyrites. Dark grey layers occur sparingly, and are sometimes found to be slightly calcareous, especially when occurring at the base of the division. The lower beds are olive green in colour, and are followed by others of dark grey colour which gradually give way to a great thickness of glistening bluish-black, foliated, graphitic, soft clay slates, often pyritous, overlain by banded, black and grey arenaceous slates. The thickness of the Halifax division has been estimated at over 2 miles of strata.

After their deposition these sedimentaries were uplifted and folded into a succession of anticlines and synclines following northeast and southwest courses. They were then subjected to extensive erosion, which removed the upper part of the folds and gradually planed the surface down to its present attitude, exposing the edges of the uptilted, once deeply buried strata. The rocks, generally, dip at high angles, ranging from 45 deg. to 90 deg. from the horizontal.

In view of the intimate relation existing between the structure of the anticlinal folds and the occurrence of the gold-bearing quartz veins, special attention was paid to the location and structure of the anticlines and synclines. A section across the folds along Lahave River from Bridgewater to the old Dalhousie Road gave a succession of five major anticlines and synclines in a distance of 25 miles. Minor folds were also observed along the crest of some anticlines, especially for the first 4 miles above Bridgewater, where the strata have been plicated into a succession of small folds or undulations. Going up Lahave River the five anticlines are met with in the following order from south to north:

(1) Leipsigate Anticline crosses the river at Bridgewater, where it is composed of several minor folds in slate well exposed along the west side of the river. These folds converge westward as they approach the Leipsigate gold district, where they join and form a broad dome along which the Goldenville quartzites are brought to the surface and extend to the west. The most southerly of the minor anticlines extends eastward through the Blockhouse gold mines where the Goldenville quartzites are again brought to the surface on a smaller elliptical dome one mile long by a quarter of a mile wide. From these two domes situated, respectively, west and east of the river, the anticline pitches towards the river, forming a cross syncline which is strongly marked and extends north and south along the river, affecting the other folds similarly but to a less degree.

(2) Spondo Anticline crosses the river 4½ miles north of the first anticline and half a mile south of Mossman station. It extends eastward to the granite, passing the south end of Big Mushamush Lake and through the Spondo gold prospect, where a large saddle-shaped vein has been uncovered. Westward, it crosses Wile and Fire Lakes south of Baker Settlement. It shows nothing but slate along its whole course. A minor anticline between the above two anticlines was located in grey slate at Waterloo, where it crosses Frederick and Matt Lakes, but it could not be traced eastward to Lahave River on account of the drift.

(3) Northfield Anticline crosses the river at Northfield station 3 miles north of the second anticline. Traced eastward it crosses the north end of big Mushamush Lake and continues through Caribou Lake where the slates are superseded by the quartzites which are brought up to the surface along a broad dome extending to the granite. West of the river the anticline passes near Clifford post-office, where it converges with the adjoining north syncline in dark grey slate.

(4) Pleasant River Barrens Anticline is situated 4½ miles north of the third anticline, and crosses the river at an island 2¼ miles north of Riversdale station, where the lower quartzites appear at the surface on a westerly plunge of the fold and spread out towards the east beyond Newburn and New Cornwall to the granite. It crosses the outlet of Indian Lake and the north end of

Church Lake, where numerous cross veins and a few interbedded veins have developed. West of the river the quartzites are overlain by the upper grey slates on the transverse syncline which is here strongly marked; but, a short distance farther west, the quartzites again appear at the surface on a broad elliptical dome, on the eastern end of which the gold mining district of Pleasant River Barrens has been located.

(5) Cherryfield Anticline occurs at a distance of 9½ miles north of the fourth anticline, where it begins at the granite contact on the main river, directly east of Cherryfield station, and extending eastward, crosses the Sarty Road at the school house and the Sam Moore Road half a mile south of the bridge over North River, and ends at the granite, 3 miles farther east. This anticline brings to the surface lower beds than any other fold in the district, exposing at the surface a thickness of 2½ miles of the Goldenville quartzite, which extends southerly for 3½ miles to the Halifax slate, and northerly beyond the next syncline to the granite along the old Dalhousie Road. The strata dip at angles increasing from 25 deg. to 80 deg. on the south side of the anticline, and from 25 deg. to 65 deg. on the north, and appear to form a very narrow dome near the Sarty school house, where quartz veins have been uncovered.

Some interesting granite contacts are well exposed at a few points along the boundary line, one of which may be observed at Dog Falls on the west side of Lahave River, below the bridge, half a mile north of Cherryfield station. As a general rule the quartzites are altered quartz-mica schists, but the strata show no local disturbances as a result of the granite intrusion.

Evidence of dislocation and faulting has been observed, however, at many places, especially in the vicinity of large projections of the granite into the sedimentaries, but the disturbances are apparently the result of movements that took place subsequent to the irruption of the granite. At Upper New Cornwall—between Otter Lake, the northeast end of Big Mushamush Lake, and the south end of Church Lake—the strata are much disturbed, and there is probably an important fault running northerly in the direction of Union Square, Morton Corner, and Sarty, along which the western block has moved south with reference to the east one. Towards the south, this fault probably runs along the eastern shore of Big Mushamush Lake and passes through Slaughenwhite Island and Farmville towards Blockhouse. Along this course much brecciated country rock and quartz is shown. The cross veins operated at Blockhouse are probably a zone of fractures on the southern extension of this fault.

Economic Geology.

Gold.

Leipsigate Gold District.—Two gold mining districts, Leipsigate, and Pleasant River Barrens, are situated in the area surveyed. A detailed survey of Leipsigate was made in 1904 and a report on that district was included in the Summary Report for that year, pages 321-329, together with a plan on the scale of 500 feet to 1 inch, published separately. After 1904, operations were continued until 1908 on the Micmac fissure vein by the Micmac Gold Mining Company, and a depth of 596 feet has been attained. When in operation the Micmac mine proved a good producer, and there is every reason to believe that under good management it should still continue to yield well. In 1905 and 1906 some work was also done at the Owen mine on the vein. A little prospecting was done in the nort part of the district by Simeon Erust and others, no important discovery has been made since the su of 1904.

Pleasant River Barrens Gold District.—The dis is situated in Lunenburg County, on the Pleasant R Road, 15 miles north of Bridgewater, between R and Shingle Lakes, on the eastern end of a broa liptical dome of quartzites, which is 4 miles long miles wide, and is surrounded and overlaid by slates of the Halifax division. The auriferous qu veins occur at the outer edge of the dome in slate ers interstratified between thick beds of quar (which often stand out prominently and form a cession of parallel ridges with intervening swa curving gradually around the eastern part of the d and dipping towards the southeast, east, and north at angles of 20 deg. to 40 deg. The district has l idle for the last twelve years, hence only a cursory amination could be made of the old workings. Sev veins have been uncovered, a few of which have developed, but none of them have been exploited, cept to a limited extent. The more important veins the Dunbrack, Mill, Pine Tree, Brignell, Ernst, Bent leads. A specially rich but narrow pay-streak worked for a short time on the Dunbrack lead at intersection of an angular vein dipping north 60 One fissure or cross vein, was also discovered by Ja Deal, crossing the strata in a southwesterly direct Most of the work was done in the eighties and nine and three stamp-mills are reported to have erected.

On the east side of the river, gold-bearing veins h been uncovered and prospected at several places, the results obtained appear to have been unsatis tory. The most important veins developed are following:

On the southeast side of North River, 2 miles eas Meisner post-office and three-fourths of a mile east O. Acker's house, a vein was discovered in 1892 Thomas Acker, and worked by a Windsor company a depth of 40 feet; a five-stamp mill was built and tons of ore crushed, but the prospect was finally ab doned. The vein is 1 to 10 inches thick, dips north deg., and is interbedded in altered quartzite, in c tact with the granite. In 1909 a few other para veins were prospected by David Lawrence.

At Upper New Cornwall, at Rocky Point on t northeast shore of Big Mushamush Lake, two ve were opened in or about 1888 by Freeman Millet, slate between walls of quartzite. On the north v there is a pit 21 feet deep, and on the south one, t pits 24 feet deep, but the whole prospect is now flo ed by the lake.

Farther north, half a mile south of Indian Lake, the east side of the road, a vein 12 inches thick cutti across the quartzite was prospected by W. H. Pr with two shafts 25 feet deep, and some ore was crush at the Blockhouse mill. Numerous other cross vei have been located between this prospect and the fo of Indian Lake along the fault passing in this vicinit Ore-shoots may possibly occur at the intersection some of these cross-veins with the interbedded vei which are found along the Pleasant River Barre anticline at the foot of Indian Lake and the north e of Church Lake.

Copper.

ver twenty years ago, at Dalhousie East, Kings nty, situated 10 miles northeast of Springfield sta- o on the west side of Crossburn Road and three- ths of a mile north of Old Dalhousie Road, a shaft wa sunk to a depth of 165 feet on a copper-bearing ve in granite. At the surface the vein appears to st ke S 25 deg. E magnetic, and dip vertically. Sam- pl picked up at the mouth of the shaft show the ore to e chalcopyrite and chalcocite in a gangue mostly co posed of granite and quartz. An analysis of the sa ples made at the Mines Branch gave 1.05 per cent. of netallic copper, but did not show the presence of go l, silver, nickel, tin, or tungsten, for which elements th were tested. Irving Smith, who occupied the fa n on which the shaft was sunk, and also worked at th mine, furnished the following information: The ve a was discovered about the year 1876 by Ainslie W son, and the shaft was started in 1890 by a Bridge- w er company. The shaft measures 14 by 8 feet, is 16 feet deep, and is timbered to a depth of 100 feet. A the cropping the vein was 12 inches wide, and pr ved rich to a depth of 20 feet, where large crystals of quartz were found, after which it decreased in size ar value, and at the depth of 100 feet it began to dip to ards the east, and its size became less than 2 inches. A a depth of about 20 feet, a drift was driven 12 feet on way and a few feet the other. The vein has not be n traced at the surface, because its outcrop is prob- ably of very limited extent; as in the case of the King ve n at Lake Ramsey, near New Ross. Drift of similar or is reported, however, to have been found half a mile fa ther north in the direction of the vein, half way be- tw en Irving Smith's present house and Sixtymile L ke, where also traces of copper were found on an ou crop of granite.

Iron Ochre.

A deposit of yellow and red ochre was found at A burndale, along Heckman Brook, on the west side of L have River, and 4 miles north of Bridgewater. The d posit is said to be 1 to 2 feet thick, and 50 tons taken fr m John Penney's farm were shipped to Halifax in 19 8.

Whetstone.

A quarry of slaty rock suitable for the manufacture o whetstones was opened in 1901 by George McFaden, o Bridgewater, at Parkdale, Lunenburg County, at the ou let of Whetstone Lake, 9 miles northeast of New Germany. The rock is composed of beds of hard, greenish, grey, siliceous and argillaceous slate, occurring at the base of the Halifax slate division; the strata dips south at an angle of 75 deg. After about two years' operation, McFaden sold the quarry to a Maine company, which continued operation for a short time, and erected a building for machinery, which, it is said, never reached the quarry on account of financial difficulty. The quarry is now 3 to 6 feet deep, 12 feet wide, and 25 feet long.

Tin and Manganese at New Ross.

At New Ross, Lunenburg County, some distance east of the district surveyed last summer, two important veins, one bearing manganese and the other tin and copper, were opened last summer.

A vein of manganese recently discovered by Ernst Turner in granite, 2 miles to the north of Wallaback Lake, and 8 miles north of New Ross, has been opened by a Windsor company, under Dr. H. W. Cain's management, with a shaft to a depth of 145 feet; and it is reported, with very satisfactory results. The vein varies in width from 4 to 18 inches and dips nearly vertically. The ore, which carries streaks of red hematite near the surface, is found to be exceptionally free from iron at a lower depth. An assay of some samples gave only 0.1 per cent. of iron, with 5 to 6 per cent. of carbonate of baryta. A similar vein of manganese, occurring at a distance of 1¼ miles to the south, was exploited a few years ago by Dr. Cain, but has not yet been reopened.

A tin-bearing vein, also recently discovered by Ernst Turner, at Mill Road, 4 miles north of New Ross, has been prospected under the management of A. L. McCallum. It has been proved to a depth of 20 feet, and for a length of 250 feet, while the float has been traced half a mile towards the north. The vein is 24 inches wide, mostly made up of quartz, merging with granite at the sides, and carries at the middle a streak of rich ore from 3 to 5 inches wide. Several assays of the ore made by Mr. McCallum have given from 10 to 30 per cent. tin, and 8 per cent. copper, present in the form of cassiterite and chalcopyrite, with association of tungsten-bearing and zinc minerals. Several other veins occurring in this vicinity, and showing copper, molybdenite, etc., have not yet been prospected.

Tungsten.

A new discovery of tungsten ore, in the form of scheelite, has been made by W. H. Prest, at Middlefield, Queens County, near the Fifteenmile Brook gold mine, and prospecting was started last fall in order to trace the float to the parent vein.

International Geological Congress

12TH SESSION, CANADA, 1913.

Coal Resources of the World.

OTTAWA, May, 1911.

For some years the attention not only of geologists d mine owners, but also of the general public, has en directed to the question of the coal reserves of the rld. The very large increase in the consumption of al in recent years makes this question of the world's pply of great importance to almost every country. he Eleventh Congress dealt with the iron ore reserves the world, calling attention to the fact that, along with coal, the iron ore supply is one of the most important factors in industrial development, and to the radical importance of the relation between supply and demand in these materials to the industry of the future.

The Executive Committee of the 12th Session of the International Geological Congress, to be held in Toronto, in 1913, has, therefore, decided to make coal the chief subject for discussion at that session. In order to obtain a sure basis for the discussion and to secure a profitable result, the committee would like to have

the co-operation of colleagues in every country, so that they may publish statistics of the amount and distribution of the world's supply of coal. With this end in view, we have decided to address to the proper authority in each country, a respectful request that there be sent to us for publication a concise report on the geological occurrence, extent of the coal areas, and amount of the reserves in that country.

The statement should include:—

(I.) Coal of economic value contained in seams of workable thickness, situated within a mineable distance of the surface.

(II.) Coal of economic value contained in seams of workable thickness, situated beyond present mineable distance of the surface, but possibly of future availability.

In Group I. should be given coal in seams containing not less than 1 foot of merchantable coal occurring not more than 4,000 feet below surface, including workable submarine areas.

In Group II. should be given coal in seams containing not less than 2 feet of merchantable coal occurring not less than 4,000 feet and not more than 6,000 feet below the surface or submarine areas not included in Group I.

Since estimates of quantity may differ in exactitude, both groups should be subdivided into: (1) Actual Reserves, including cases in which the calculation of the amount is based on a knowledge of the actual thickness and extent of the seams; (2) Probable Reserves, including cases in which an approximate estimate only can be arrived at; and (3) Possible Reserves, including cases in which an estimate in figures cannot be given. Thus:—

In columns 1 and 2 returns should be expressed in figures. In 3 a general statement should be made, "Large," "Moderate," "Small." All quantities in columns 1 and 2 should be given in metric tons.

In order to have the various reports uniform and easily comparable, a standard classification has been adopted, to which, it is respectfully requested, the matter of each report should be made to conform. A chapter summarizing the chief results will be prepared by the committee, but each report received will appear separately.

This classification is adopted as a simple basis on which the desired information can be received and correlated. The committee recommend a discussion by the Congress, looking to the adoption of a universal standard classification.

The reserves of coal of each of the following classes or subdivisions of classes should be given in conformity with the above schedule. It is hoped that the characteristics mentioned under each class and subdivision of class will enable authors to place in its proper class not only a well known coal, but even a coal that may not have been closely studied.

Class A.

(1) Burns with short, blue flame; gives off 3 to 5 per cent. of volatile combustible matter.

$$\text{Fuel ratio} \frac{\text{Fixed carbon}}{\text{Volatile matter}} = 12 \text{ and over}$$

Calorific value 8,000 to 8,330 calories, or, 14,500 to 15,000 British Thermal Units.

GROUP I.

Including seams of 1 foot or over, to a depth of 4,000 feet.

District	Coal Seams		Actual Reserve. (Calculation based on actual thickness and extent.)			Probable Reserve. (Approximate estimate.)			Possible Reserve.
	No of	Thickness.	Area	Class.	Metric tons.	Area	Class.	Metric tons.	
Napanee...	1	3 ft 2 in to 3 ft 6 in	2 sq m	A_2	7,841,118	.....	.....	.....	
	3	1 ft., 3 ft, and 4 ft	.....	.....	.....	Same area	A_1	18,214,560	
Essex.....	5	Aggregate 25 ft.	50 sq. m	B_2	1,312,337,500	.....	.....	.....	
	4	Aggregate 15 ft.	.....	.....	.....	Same area.	B_1	786,750,000	
Mackinnon	2	4 ft and 5 ft	.....	.....	.....	200 sq. m	B_2	1,888,000,000	Large.
Olliver.....	15	Aggregate 60 ft	1½ sq. m	B_1	21,189,580	.....	.....	.....	
				B_2	81,267,320	.....	.....	.....	

GROUP II

Including seams 2 feet and over at depths between 4,000 and 6,000 feet.

District	Coal Seams		Actual Reserve. Calculation based on actual thickness and extent.)			Probable Reserve. (Approximate estimate.)			Possible Reserve.
	No	Thickness	Area.	Class.	Metric tons.	Area.	Class of coal.	Metric tons.	
Mackinnon	1	3 ft	.....	.....	.....	200 sq. m.	B_1	600,000,000	Moderate.
Olliver. ...	2	2 ft and 3 ft	1½ sq m.	A_2	8,538,075	.....	.....	.....	
Ballantyne	.....	.....	.....	.....	.....	150 sq. m.	.....	.....	B_1 large. A_2 moderate.

ean composition,

Carbon	93 to 95 per cent.
Hydrogen	2 to 4 per cent.
Oxygen and nitrogen	3 to 5 per cent.

) Burns with slightly luminous, short flame and litt smoke; does not coke and yields from 7 to 12 per cent. of volatile matter.

uel ratio, 7 to 12.

alorific value generally 8,330 to 8,600 calories, or, 15,00 to 15,500 B.T.U.

ean composition,

Carbon	90—93
Hydrogen	4—4.5
O and N	3—5.5

Class B.

))Burns with short, luminous flame and yields 12 o 15 per cent. volatile matter; does not readily co. Fuel ratio 4 to 7.

alorific valne generally 8,300 to 8,900 calories, 15,- 20 to 16,000 B.T.U.

ean composition,

Carbon	80 to 90 per cent.
Hydrogen	4.5 to 5 per cent.
O and N	5.5 to 12 per cent.

2) Burns with luminous flame and yields from 12 to 6 per cent. volatile matter; generally cokes.

uel ratio 1.2 to 7.

alorific value 7,700 to 8,800 calories, 14,000 to 16,- 00 B.T.U.

ean composition,

Carbon	75 to 90 per cent.
Hydrogen	4.5 to 6 per cent.
O and N	6 to 15 per cent.

3) Burns freely with long flame; withstands wea- th ing but fractures readily and occasionally has mois- tu content up to 6 per cent.; volatile matter up to 35 per cent.; makes porous, tender coke.

Fixed carbon + ½ volatile
——————————————=2.5 to 3.3.
Hygroscopic moisture + ½ volatile

alorific value 6,600 to 7,800 calories, 12,000 to 14,- 00 B.T.U.

lean composition,

Carbon	70 to 80 per cent.
Hydrogen	4.5 to 6 per cent.
O and N	20 to 30

Class C.

Burns with long, smoky flame; yields from 30 to 40 per cent. volatile matter on distillation, leaving very p ous coke. Fracture generally resinous.

Calorific value 6,600 to 8,800 calories, 12,000 to 10 000 B.T.U.

Class D.

ontains generally over 6 per cent. of moisture; dis- in grates on drying; streak brown or yellow; cleav- a indistinct.

1) Moisture in fresh-mined, commercial output up to 20 per cent. Fracture generally conchoidal.

Drying-cracks irregular, curved lines.

Colour generally lustrous black, occasionally brown.

Fixed carbon + ½ Volatile
——————————————=1.8 to 2.5.
Hygroscopic moisture + ½ Volatile

Calorific value 5,500 to 7,200 calories, or 10,000 to 1,000 B.T.U.

Average composition,

Carbon	60 to 75
Hydrogen	6 to 6.5
O and N	20 to 30

(2) Moisture in commercial output over 20 per cent. Fracture generally earthy and dull.

Drying cracks generally separate along bedding planes and often show fibrous (woody) structure.

Colour generally brown, sometimes black.

Calorific value 4,000 to 6,000 calories, or 7,000 to 11,000 B.T.U.

Average composition,

Carbon	45 to 65
Hydrogen	6 to 6.8
O and N	30 to 45

The reports should include not only a statement of the location and distribution of the various deposits (if possible, illustrated by means of maps and sections), but should deal with such chemical and physical qualities as are determinative of their technical utilization.

For the rest, every writer is free to act as he thinks fit, though it is very desirable that his statement should not exceed the dimension of — quarto pages of print.

The choice of language is limited to French, German and English.

It is the intention that these reports, together with the chapter prepared by the committee, shall be published before the end of 1912, so that every one interested may make use of them for all purposes, and particularly for the discussion at the meeting of Congress. Under these circumstances it is specially desirable that the separate reports reach us before January 1, 1912.

We, therefore, address ourselves to you, in the hope that you will contribute to the investigations referred to, by drawing up a comprehensive survey of the occurrences of coal in

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We feel sure that the plan we have presented will gain your interest, and that you will not refuse us the benefit of your valued co-operation, and we beg you to rest assured of our gratitude for the assistance that we feel confident you will give us.

All communications on this subject should be addressed to the General Secretary of the Twelfth Congress, R. W. Brock, Director of the Geological Survey, Ottawa, Canada.

G. G. S. Lindsey, Convener.
F. D. Adams,
R. W. Brock,
D. B. Dowling,
Chas. Fergie,
Jas. McEvoy,
J. B. Porter,

Committee on Coal Resources of the World, appointed by the Executive Committee of the International Geological Congress, Twelfth Session.

The Quest for an Ideal Stope Drill

Mr. E. M. Weston, A.S.M.E., after giving the reasons for the failure of various stope drills in the Rand competition, commented as follows on the deductions made by the Stope Drill Committee in their report: (1) "Hammer drills are not at present suitable for the general stoping conditions which obtain on these fields; that is to say, for down holes the reciprocating drill has proved its superiority." One must remember that as far as the hammer drill itself is concerned there are a very large number of one type of hamm-

drill successfully at work on the Rand and several others being successfully introduced, so that the weakness does not lie with the drill, but with the means employed for ejecting the broken cuttings, which included hollow steel. The inference is that if these difficulties could be overcome we have ready to hand a man drill weighing from 50 to 70 pounds.

(2) The second deduction is: "That hollow steel is not at present recommended, the class of material used in its manufacture not being suitable. It is a high-priced article, but it appears to crystallize more rapidly than the cheaper solid steel, and gave more difficulty in tempering, which process, however, was carried out by smiths used to the cheaper material ordinarily employed." Progress is continually being made in the manufacture of hollow steel, and at the present moment I believe the first statement of No. 2 does not apply. Steel used in the bulk of the piston drills in use on the Rand carries about .6 per cent. carbon, and, though not as hard as it might be, can be carelessly heated and tempered by plunging. Already, however, as a result of the experiments carried on at the Robinson Deep, steel of .7 per cent. to .75 per cent. carbon is recommended for some work. Steel of this temper requires more careful heating and tempering, and it has long been known that the slap-dash save a penny a hundred in sharpening costs and send the steel below with the minimum amount of labour and trouble expended on it methods do not pay. Mr. Tom Johnson, in his report, indulges in some plain, but not too plain, speaking with regard to the methods in vogue. Until recently all hollow steel was high carbon steel with .7 per cent. and over, I believe, and such steel should be carefully heated and should have the temper drawn, as is done in the case of picks; and the adoption of these methods, though they might add a few white blacksmiths to shop staffs, would scarcely ruin the mines, as the saving in costs of cutting rocks would run them into thousands against an expenditure of hundreds. Every other progressive mining field I know of has proved this and acts on it. However, today steel makers are prepared to supply hollow steel of any temper required, and steel can be procured of .69 carbon exactly similar to that in use in piston drills. It is also stated that one manufacturer has a secret process somewhat similar to that employed in the manufacture of Mannesman piping.

At any rate, hollow steel in long lengths, with a hole as large as ¾-inch in 1¼-inch round steel, is now on the Rand, and holes have been bored with it by both piston and hammer drills on the surface, and experimental holes are now being drilled underground in a Rand mine. This steel per foot of length as used to make drill bits (jumpers) is cheaper than solid steel. The committee express themselves unfortunately in stating that hollow steel appears to crystallize more rapidly than the cheaper steel. What they might have written was that hollow steel was used in hammer drills and in them it tends to crystallize more than solid steel does in piston drills. As a matter of fact, steel used in either piston or hammer drills gives little trouble from this cause if it be annealed once a month. Boring with high air pressure in piston drills in shaft sinking in some of the hardest diabase on the Rand, I have seen solid steel of two carbon contents, owing to the intense vibration, crystallize so that I broke as many as 50 shanks with 12 rock drills in six hours, and the high carbon steel stood better. It is, however, true that the vibrations set up by hammer drills striking 1,000 to 1,500 blows per minute tend in hard gro to cause breakages from crystallization. This trou has been increased from two causes.

The hammer drill manufacturers do not know t the real requirement of the Rand in the matter o one-man drill is for a really simple light drill that native can understand, and will like. which uses o 30.50 cube feet of air at 70 pounds pressure, and wh will put down a 4-foot hole, starting with about in diameter and finishing about 1-inch. Now, whet such a drill puts down four, six or eight holes in shift does not matter so much as the fact that suc machine would do the work of at least four nati and do it better than they would, and relieve labour shortage on the Rand and in Rhodesia, while the same time stopes could be kept ready now blasting with large charges, and using 6 or 7-f holes, which are the conditions under which the p ent small piston stope drill works would be avoid Hammer drill manufacturers strive to produce chines with a maximum boring speed. Though it well known that one can get any boring speed likes as long as the steel will stand (in other wo that the resisting power of the steel in any gro must be the determining factor in hammer drill sign), it is amusing sometimes to note the rival cla for boring speed among the various manufactur and as soon as one maker produces a machine that bore, say, upper holes at a reasonable speed, anot introduces a machine that delivers a heavier or m rapid stroke on the plea that it will bore faster. der such conditions one must expect that the resist powers of the long-suffering drill steel must soon severely tested, and a return be made to machines signed to drill at the highest economical rate cons ent with the size of steel used in them and the air p sure and hardness of the ground.

Tin Corners on the London Metal Exchan

(Translated from the "Cologne Gazette" of June 1

During the past year we have frequently had oc sion to call attention to the movements in the pr of tin, and especially during the last few days to present unsatisfactory state of affairs. A small gro of financially strong speculators, who already at beginning of last year successfully forced up pric have now succeeded by withholding supplies in fecting a corner in tin, which began in February a now reaches its highest point this month. In Feb ary, 1911, the price of three months' tin was on average about £187 10s., whereas the cash price w £190 3s. The difference between the cash and th months' quotations remained about the same duri March and April, but in May it reached £10, th £19, and on the 9th June even £42. Cash tin was p for at up to £233, whereas the quotation for th months was only £191. At the present moment tin prompt delivery is quoted at £231, and for delivery three months £190. The possibility of bringing abo a condition of affairs so extremely harmful to regul business, and the temptation to such manœuvres in the tin contract adopted by the London Metal E change.

The determining factor as to whether tin may delivered against contracts is not its quality, but origin; that is to say, tin must be produced in t

its Settlements or Australia (both British colon-
Prudent members of the London Metal Exchange
of course, perfectly aware that a state of affairs
as at present prevails is quite incompatible with
standing and influence of the London Metal Ex-
ge, and consequently are thinking of means to
e a recurrence more difficult. A movement is,
efore, on foot to alter the tin contract in such a
as to admit to the market tin other than Straits
Australian. Due, however, to the conservative
s of the English, the delivery of other kinds of tin
ing made as difficult as possible, and heavy deduc-
s are made for tin of other origin, as compared to
delivered in the past. Consequently in practice
delivery of tin from other sources than hitherto
vered will only come into question when there is
in an artificially created shortage of tin for prompt
very. The new contract will make it more difficult
in the past to effect illimitable corners. The only
cal method would be to introduce a contract which
ely does away with the question of origin, and
prescribes a definite quality. The quality can be
exactly both mechanically and chemically. (It
be mentioned that there are already in London a
ber of assayers recognized by the Metal Ex-
ge). Nevertheless, the present proposition of a
London merchants would be an advance upon the
state of affairs, provided some absolutely neces-
alterations are made.

cording to the present proposals, there will be de-
rable in future tin from Banka and Billiton as well as from China and England, with varying deductions according to the purity of the tin. This purity is to be ascertained by an assayer recognized by the Metal Exchange, and his certificate for this and for the other details of quality is to be affixed to each warrant. German tin is the only kind to be excluded. This is all the less explainable, as the production of tin in Germany forms a considerable part of the world's production, and is steadily on the increase. In 1910 the production of tin in Germany amounted to 11,000 tons —that is, about two-thirds of the English production and about 10 per cent. of the world's production. The attempt to exclude German tin from the market can only be put down to some small-minded business reasons and to an unhealthy Chauvinism. It may be expected from the Committee of the London Metal Exchange, whose quotations are taken as the basis for the trade all over the world, that they will not allow themselves to be influenced by such attempts, but, being fully aware of the responsibility of their position in relation to the trade of the whole world, irrespective of nationality, will act up to it. All the incidents of late and the movement depicted above, show, however, how necessary it is to establish on the Continent an institution holding the balance to the London Metal Exchange—let it be in Berlin, Hamburg, or Amsterdam. The manner in which the London Metal Exchange abuses its monopoly can only hasten the creation of a new exchange elsewhere independent of London.

The By-Product Coking Process and its Future Development*

By Mr. Ernest Bury, Skinningrove.

he writer has chosen this title for discussion by
son of his belief that the by-product coking indus-
has thoroughly justified its inception, and that the
e has now come to enquire into the future possi-
ties of the process.

y-product coke ovens cannot be said to have had
ery rosy time in our country, and criticism of the
ustry has been unnecessarily harsh. Since Messrs.
se & Partners led the way at Crook in 1881, there
until quite recent years been a never ending war
inst the more economic manufacture of coke. It
been variously alleged that the coke from by-pro-
t coke ovens was inferior to the produce of the old
-hive ovens, and that the recovery of by-products
ng with the production of a first-class metallurgi-
coke, was impossible. These statements have, by
son of the big development in the by-product cok-
industry, proved absolutely untrue. In 1898 the
ount of coal carbonized in by-product coke ovens in
at Britain was 1.8 million tons per annum, it is
over 8 million tons. With regard to the unsuit-
lity of by-product coke for furnace use, the writer
of opinion that now nothing more may be said, and
old prejudice may be laughed at.

During the last year the plaint against by-product
ustry has taken on a different hue. It is not now a question of unsuitability of the coke produce, but this large amount of by-product development is going to be the ruin of us, and by-products are going to suffer. This is an unconscious compliment to the industry, whose coke product was supposed to be unsuitable, but let us enquire into the grounds for dread. The most important and valuable by-product from coke ovens is sulphate of ammonia, representing as it does from 1/7 to 3/- net per ton of coal carbonized. The following figures of yield taken from the Blue Book of the Chief Inspector of Alkali Works, together with the average prices, show how little the big development in coke ovens during the last seven years has affected the prices of the principal by-product.

Year.	Total production of Sulphate from By-Product Coke Ovens. Tons.	Total production of Sulphate from all sources. Tons.	Average price per ton of Sulphate of Ammonia. £ s. d.
1903	17,435	233,664	12 9 2
1904	20,848	245,990	12 3 8
1905	30,732	239,114	12 10 9
1906	43,677	289,391	12 0 9
1907	53,572	313,281	11 15 8
1908	64,227	325,228	11 12 0
1909	82,886	349,143	11 5 0
1910 Returns not yet to hand			12 3 2
Present Price			13 6 0

*Paper read before the Cleveland (England) Institution of Engineers.

Since in 1891, the price of sulphate of ammonia was only £10 17s. 6d., i.e., at a time when the sulphate produce from by-product coke ovens did not exceed 5,000 tons per annum, the extensive growth of the by-product coke oven, coupled with other sulphate recovery works (the gas industry, blast furnace and producer gas processes), can hardly be said to have threatened the value of the main by-product. The answer to the apparent paradox is the growing appreciation and demand for sulphate of ammonia as a fertilizer for cereals, sugar, and vine growing, all three important articles of food. With the food supply at stake there is little chance of this product from coal being put in the background. The only danger would be a cheaper fertilizer, and this is not forthcoming. Certainly there is the possibility for atmospheric nitrate (i.e., nitric acid electrically produced from the atmosphere and combined with lime), but given this possibility, and its production is not great except with very cheap power, there is room for the two products, in the consideration of the world's food supply.

As regards tar and benzol, the other products obtained from by-product coke ovens, there has again been an upward recent tendency. Tar has risen from 16s. to 21s. per ton, and benzol (90 per cent.) from 6d. to 9d. and 10d. This again, the writer would suggest, is due to fresh fields and pastures new. Tar has found an outlet for road dressings, and benzol has developed as a motor spirit, the result being a shortage for the old outlets, which have had to bid against the new usages. In fact, the by-products process depends for its future developments, as do all other processes on fresh applications for its products, and to this end the writer offers to the meeting the following considerations:—

The future of the by-product coking process lies (1) in the development of the process itself, (2) in the application of the process.

Developments in the Process Itself.

Recent years have brought forth many improvements which have helped to establish the process. Flue arrangements have been perfected, whereby regular heating of large coking chambers is produced, the result being even carbonization with minimum repairs to oven lining. It is safe to say that with a modern design of heating flues coupled with the choice of a first-class siliceous firebrick, the minimum life of a by-product coke oven lining may be taken at four years, and the chance of serious breakdown in this direction such as have occurred in the past, may no longer be considered.

The growing possibilities of coke oven gas as a source of towns' illumination, power generation, furnace heating and the like, have furthermore led coke oven inventors and designers to perfect regenerative systems of oven heating whereby the process has been resolved into a highly developed heat economizer, so that where 60 per cent. of the gas evolved was required by waste heat processes for oven heating, an equivalent quantity is now available for any desired extraneous purpose.

Before proceeding, it may be of interest to you to see the design of a by-product coke oven, which is now being erected by the Otto Hilgenstock Coke Oven Company, at Skinningrove, which in the writer's opinion embodies the modern drift of coke oven design. From the illustration you will see that in the first place the gas is admitted to alternate sections of flues, not from a common gas flue or duct, but by independent burners which are accessible and interchangeable from the c- side. By this means there can be no mis-direction f the heating gas, and the temperature of the oven w- remains even throughout. In the second place, si- the products of combustion, having passed up one s- tion of flues, are drawn down the adjacent flues, s much heat is transferred to carbonization duty as p- sible. There is, furthermore, the advantage that products of combustion, instead of collecting in a c- mon flue at the top of the oven wall, thereby tending overheat the oven crown, are immediately withdra and superheating of the crown is minimized. The generators, which are 15 feet deep, are tall and narr and no opportunity is afforded the gases to cut acr corners, which is the case with squat regenerat Finally, you will observe that the depth of the carb- izing chamber is considerably higher than the de of the flue chambers. Most of you who are in co- oven practice, will admit that the crown of all c ovens gets too hot by radiation from the mass of coke during the latter stages of carbonization, an fect which is harmful, since it produces breakdown gases, tars, benzol, and ammonia. By increasing depth of coal beyond the flue depth, the aforesaid diant heat will be absorbed in the upper thickness coal, which, of course, will be carbonized, resulting a greater all round output of coke, gas, and by-produ per oven with no further expenditure of heating g and at the same time giving a cool crown with grea yields per ton.

The writer believes that, as regards the design the carbonizing chamber itself, very little remains to accomplished, except that where the consideration coke oven gas for any use is of moment, the chamb might be heated by producer gas (regenerated if n be) instead of by coke oven gas as at the present ti Such method of heating was suggested by the wri at the Dublin meeting of the Institution of Gas En- neers in 1907, and would open up, by employment modern mechanical producers, the large quantities refuse small coal which are still thrown to waste, left in the pits, in many parts of this country. T writer is informed that at one plant in Westphalia coke oven battery is already heated by producer g from refuse coal, and suggests that there are ma cases in Great Britain, the need for coke oven gas ing urgent, where this method of heating would tend national economy. When all is said and done, it only the method employed for heating towns' gas torts throughout past generations.

The writer has suggested that the design of constr tion of coke oven carbonizing chambers has nea reached its zenith in the type of oven just describ but the chemical aspect of the process offers a far m extensive territory for development and economy. T last two years may be truly said to have marked epoch in carbonization practice, since inventors ha been driven from the worked-out field of oven desi to investigate economies and developments in deali with the gaseous products resulting from their ov as carbonization chambers pure and simple. The writ refers, of course, in the first instance to the attem which have been made to recover sulphate of ammo direct on the gas main, without having recourse to t usual method of condensation of ammonia liquor, a the subsequent distillation of the latter in the ma facture of ammonium sulphate. To students of co oven economy, it has always appeared wasteful to c down from the gases the aqueous vapours contain

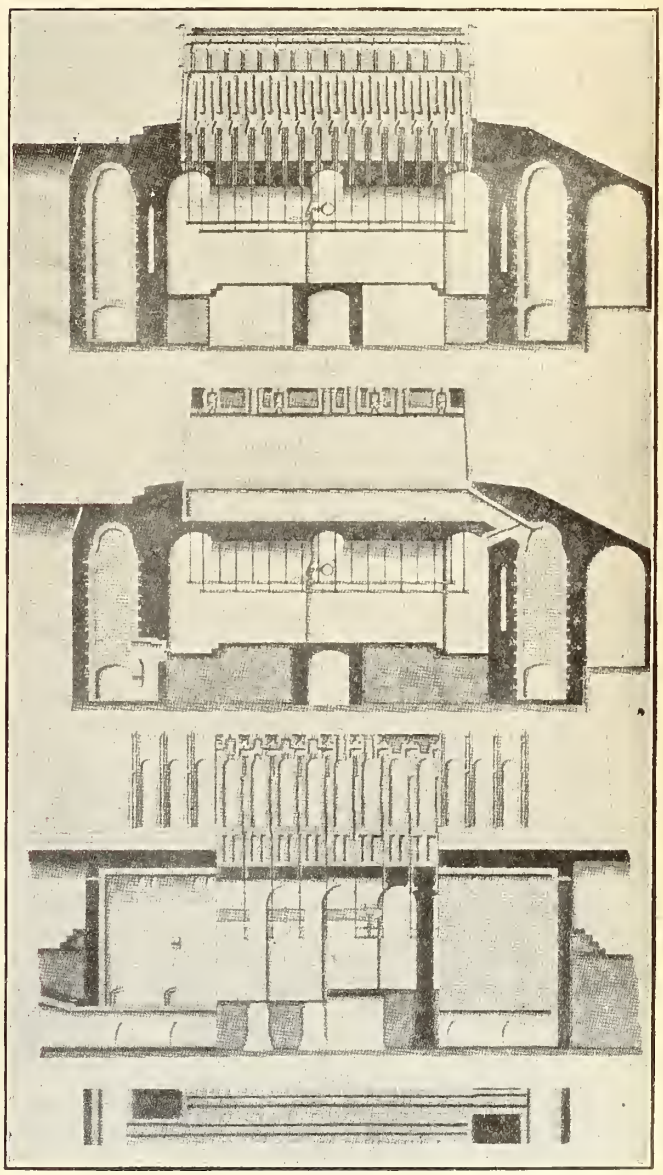
monia, forming part of the distillation products of ovens, and afterwards to reheat these aqueous ducts to recover ammonia or ammonium sulphate. a procedure was the reverse of fuel economy, and cordingly Brunck, in 1903, sought to pass the hot uncondensed tarry gases from his coke ovens direct through sulphuric acid. Brunck's aim was ethically right in seeking to conserve the heat contained in the hot gases from the ovens for the manufacture of ammonium sulphate, but unfortunately his object was baffled, in so much as the acid became tarry and dirty sulphate was the result. Furthermore, the tarry products exerted a reducing action on the sulphuric acid, and the sulphurous acid gas produced corroded his gas mains. The entire process therefore became unworkable.

The next attempt at direct sulphate recovery was made by Koppers. This inventor avoided Brunck's method of attempting to treat the hot gases, and decided to cool out his tars in the usual manner before the sulphuric acid washing. The vessel containing sulphuric acid or saturator, as it is called, is inserted as a scrubber, through which the tar-free gases are passed, thus eliminating the chances of loss of ammonia which might occur with liquor or water washing in the usual type of scrubber. The liquors which have condensed in the process of tar removal (containing with wet coal about 80 per cent. of the ammonia) are heated with steam in an ordinary ammonia still, the ammonia and steam from which are passed into the saturator on the gas main. In order to avoid condensation within his saturator, Koppers preheats his gases after tar removal, by passing them before entering the saturator through a "reheater" or "heat exchanger," through which is passed the hot gases travelling from the ovens to the condensing plant. By his invention, Koppers avoids using the scrubbing water ordinarily employed, thus reducing the amount of liquor requiring to be treated by the ammonia still, and therefore, the amount of river polluting effluent which is of serious moment in some parts of the country. Koppers' salt is of good colour and contains a minimum amount of tarry matter.

The most important development in the treatment of coke oven gases and in the recovery of tar and sulphate, is that devised by Dr. Hilgenstock of the Otto Company. The inventor reverts to Brunck's original aim, but instead of passing tarry gases into sulphuric acid, he primarily removes the tar from the hot gases by passage through a tar spray, the temperature of which is so regulated as to completely remove the tars without effecting condensation of the greater bulk of ammonia liquor. From the spray, the gases containing the liquors in steam form, together with the ammonia, are passed directly into sulphuric acid, where the ammonia is caught and precipitated as ammonium sulphate. The gases leaving the saturator are free from ammonia, but still contain the liquors as steam, which is carried on to the ovens and boilers and thus disposed with.

In the event of the gases being required for benzol recovery, gas engine use, or towns' lighting, the Otto Company employs a fractional method of condensation, whereby the greater portion of the liquor containing very little H_2S, etc., is precipitated immediately below the dew-point. The remainder of the liquor obtained by completion of the cooling is similar to ordinary spent liquor without, however, containing any lime; its amount is so small that it can be mixed off with the coke slacking water.

The next three diagrams and photographs of models will show the extent of these recent simplifications in the recovery treatment of coke oven gases. It will be seen from the illustrations that Otto's new process dispenses with condensers and water for the same, liquor circulating pumps, liquor cellars and stores, ammonia stills and superheaters, lime mixer, lime pump, settling tanks for spent liquor and drains therefrom, steam connections and boiler power, thereby effecting a big economy in ground space. The working costs are reduced by abolition of steam and lime in sulphate making, and trouble in dealing with spent liquor. Finally, all chances of loss of ammonia are reduced to a minimum, since the free or volatile ammonia never leaves the gas main, and losses by circulation and in the distillation process are avoided.

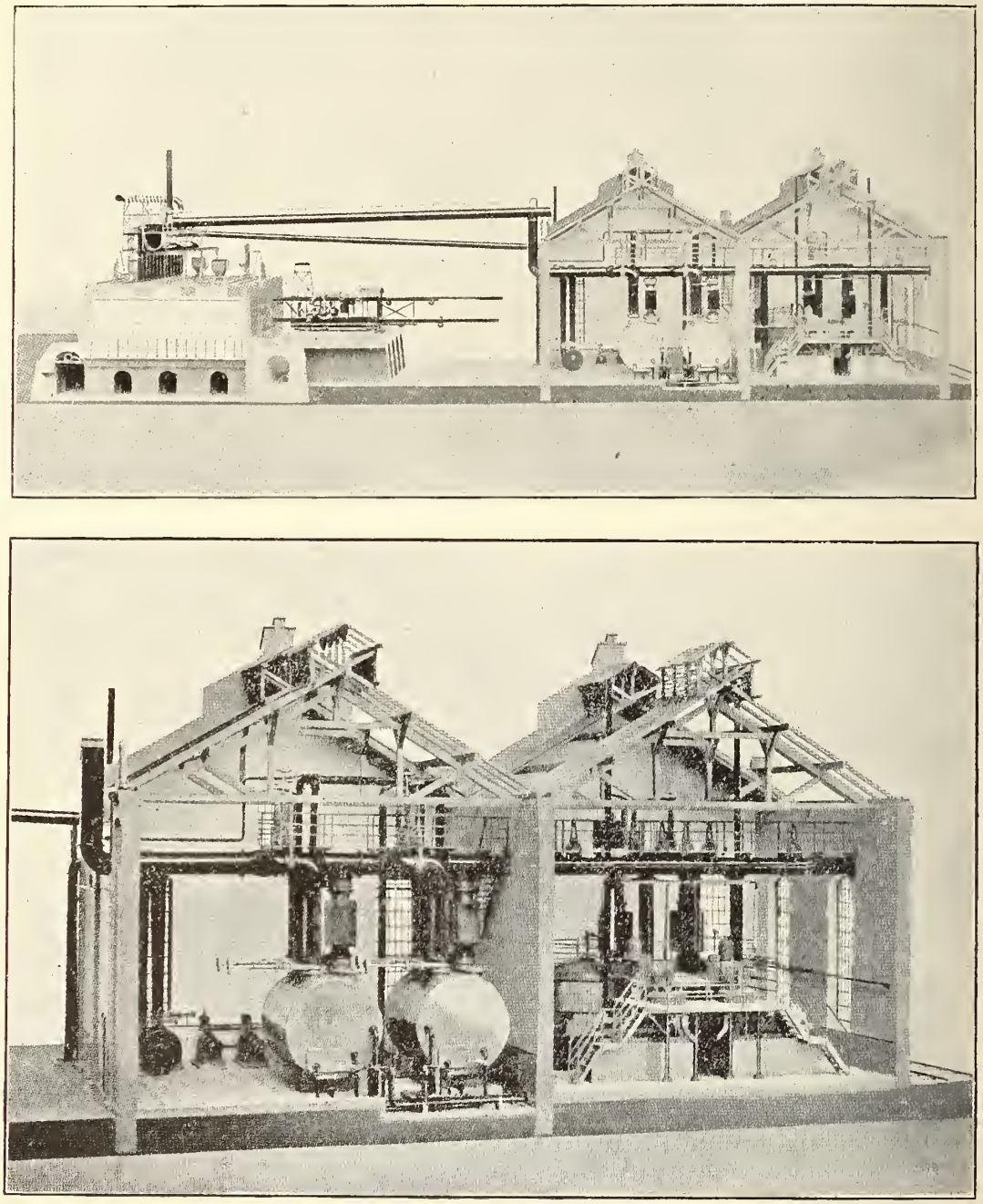


Regenerative Coke Oven

Several points have been suggested against the Otto method of recovery from the hot gases. In the first place it has been stated, that the temperature of the gases, and the reaction heat produced by the ammonia and sulphuric acid in the saturator was insufficient to prevent condensation in the latter, and that external steam had to be supplied to avoid such condensation.

The writer has found that this point turns on the percentage of ammonia present in the coal; very small quantities of condensings containing fixed ammonia salts are produced in the foul gas mains and sprays, and these have to be worked off in the saturator. If the amount of ammonia in the coal is below the equivalent of 1 per cent. of sulphate, the reaction heat in the saturator is insufficient to evaporate these condensings when put into the saturator, and a small amount of steam has to be supplied to the vessel to keep up the temperature. If the sulphate of ammonia exceeds 1 per cent. the reaction heat is sufficient to evaporate the condensings without need for supplementary steam. Under the worst conditions the writer found in Westphalia that one ton of steam per ton of sulphate made was required for the Otto saturator, and since eight tons are required for heating up the liquor from the old recovery method, Otto's worst conditions may be said to have effected very great economy. At Auchgeich, the first Otto direct recovery plant in Great Britain, where the yield of sulphate of ammonia is approximately 1.5 per cent. on the coal, the writer found the following temperatures:

Gas entering sprays	93 deg.
Gas entering exhauster (after sprays)	65½ deg.
Gas leaving exhauster	66 deg.
Gas leaving saturator	70½ deg.
Gas delivered to ovens	62 deg.



Otto-Hilgenstock Direct Recovery Process

It will thus be seen that so far from the saturat losing heat, the temperature rises, and there is no nee for the application of auxiliary steam in evaporatin the condensings, and this is the case for all coals co taining 1 per cent. of sulphate and over.

It has been further alleged that the Otto sprays c

*Gain in temperature by reaction heat 4½ deg. C.

completely remove the tars, and that dirty sulphates would result as in the case of Brunck. The best answer the writer can give to this statement is, to submit a sample of sulphate which he collected at Auchengeich, which speaks for itself. At the six plants which the writer visited in Westphalia, the highest percentage of tar found in the sulphate was 0.22 per cent., the lowest 0.07 per cent., as compared with 0.06 per cent. in sulphate made by the old process.

Some gas engineers have thought, that by the passage of the gas through sulphuric acid, the calorific value would suffer, presumably through absorption of heavy hydrocarbons, ethylene, and benzine. At Auchengeich the writer found the following calorific values on successive days:

596
602
599 } b. t. u. Gross per cubic foot.
608
581

Since modern London coal gas averages about 580 b.t.u. gross, the writer is of opinion that the weak solution of acid in the Otto saturator has no solvent action on the gas.

It has likewise been suggested that at the temperature of the gases leaving the spray, both naphthalene and benzol will be carried forward with the gas. This, the writer found, took place to some extent, but does not consider it of moment, since, with coke oven plant recovering benzol, both products are brought out by the solvent oil. If the gas is required for town's lighting, the benzol contributes to the value of the gas, the naphthalene being removed by one of the usual solvents. With regard to the question of naphthalene, it may be added that one of Krupp's plants working on Otto direct recovery system, is to be used as town's gas works for Bochum, so that no naphthalene trouble is anticipated in this instance.

In the writer's opinion not one of the least important applications of Otto's new process lies in the facility which it affords for the recovery of ammonium chloride from those coals containing a high percentage of common salt. In such event, the condensings found in the foul gas mains would be collected and concentrated for the recovery of ammonium chloride without passing them into the saturator for conversion to sulphate. The price for ammonia as ammonium chloride is much higher than when combined as sulphate, so that the natural disadvantage of a coal in containing much common salt may be turned to profitable account in this instance.

The Burkheiser Process.

The next important attempt at coke oven economy has been put forward by Burkheiser, who proposes to utilize the volatile sulphur contained in the coal for the manufacture of the sulphuric acid required for the sulphate of ammonia recovery, incidentally effecting purification of the gases en route. As a general rule the amount of volatile sulphur given off in the form of H_2S from most coals will produce more sulphuric acid than required for sulphate of ammonia recovery, the average amount of sulphuric acid obtainable being 40 pounds per ton of coals.

The next illustration shows a diagram of Burkheiser's arrangement. The gases coming from the ovens are cooled in the usual manner, the tar and liquors being completely separated from the gas. The liquors are then distilled in the usual type of ammonia still, and the evolved ammonia returned to the gas main. The dry tar-free gases containing the whole of the ammonia and H_2S, are then passed forward to a small oxide purifier, where the sulphuretted hydrogen is removed by a specially active form of iron oxide prepared by Burkheiser. This purifier is duplicated, one always being at work on the gas main, the other meanwhile undergoing a rapid re-oxidation or re-vivification by a current of air. By this latter process, the iron sulphide formed in the purification is re-oxidized to oxide of iron, the sulphur going forward as SO_2, which is caught in an "air-scrubber" through which is passed the mother liquor to be described shortly. From the working purifier on the gas main, the gas free from H_2S passes into the saturator, which is fed with saturated liquor from the scrubber, into which the gas passes after leaving the saturator. Precipitation of ammonium sulphite takes place in the saturator, the salt is whizzed and the mother liquor drainings are sent to

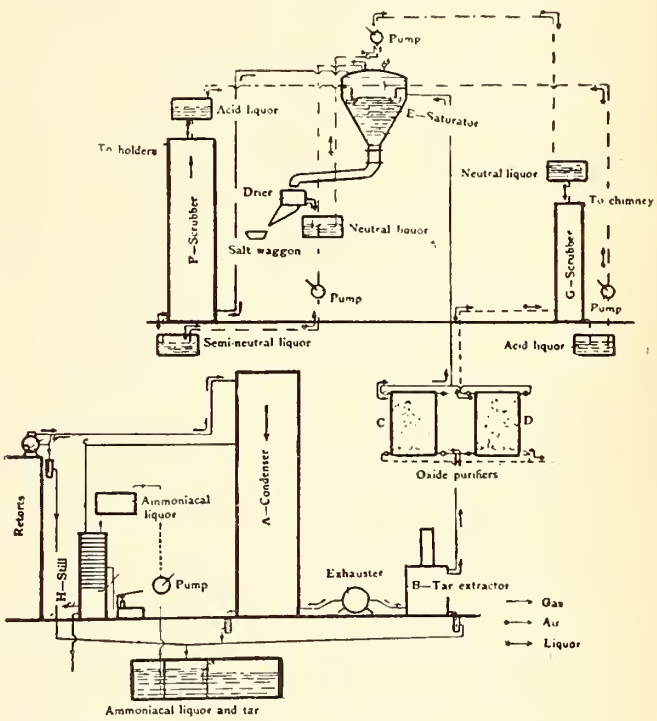


FIG. 1—DIAGRAMMATIC SKETCH OF BURKHEISER PLANT

the "air-scrubber" to take up more SO_2 from the revivifying oxide. In the air-scrubber the neutral ammonium sulphite in the mother liquor takes up SO_2 according to the following reaction:

$$(NH_4)_2\ SO_3+SO_2+H_2O=NH_4.HSO_3+NH_4.HSO_3$$

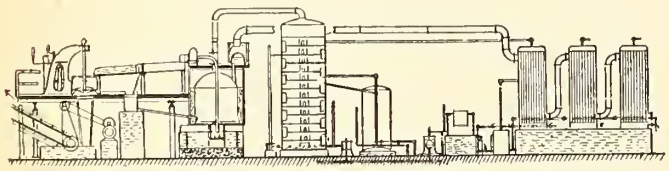
This acid ammonium sulphite solution is then sent to the ammonia scrubber through which are passed the gases coming from the saturator. Here the acid ammonium sulphite takes up the last of the ammonia, forming some neutral ammonium sulphite, and then into the saturator, where it is met by the bulk of the ammonia in the gas to be treated. In the saturator, the acid sulphite is completely changed to the neutral ammonium sulphite, which precipitates out in the manner aforesaid, the mother liquor being returned to the air-scrubber to take up more SO_2, and so on to repeat the cycle of operations.

The ammonium sulphite is converted to ammonium sulphate by repeated sublimation and oxidation in a

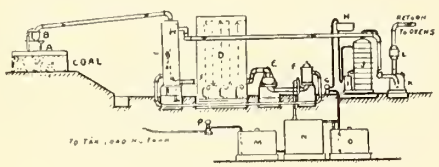
revolving drum. Burkheiser has improved on this, his original scheme, by passing his SO_2 from the purifiers together with excess of air over strongly heated iron oxide in a contact chamber, and thus converting the SO_2 to SO_3. On subsequently washing the gas with this SO_3 liquor, he obtains ammonium sulphate direct, without need for oxidation of the sulphite as in the former instance.

The writer submits for your inspection a sample of ammonium sulphate which he took from Burkheiser's plant at the Hamburg Gas Works.

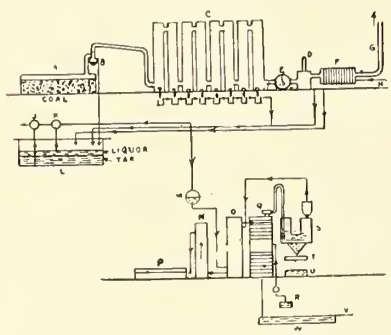
There are several important points about Burkheiser's process which are of interest to everyone connected with carbonizing plants of any kind. In the first place the natural sulphur content of the coal is utilized to manufacture sulphuric acid for sulphate re-



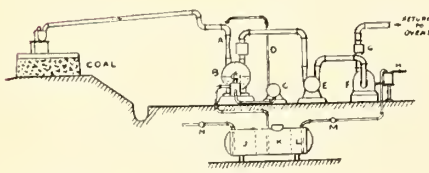
SULPHATE OF AMMONIA STILLS AND ACCESSORIES.



KOPPER'S PROCESS



OLD PROCESS



OTTO PROCESS

covery representing a sum from 30s. to 35s. per ton in the cost of manufacture of the latter product, besides affording a home made supply to those plants distant from sulphuric acid works. Secondly the recovery of sulphur or purification of the gas is accomplished in small vessels, thus avoiding the heavy cost of large ground space entailed by the usual massive box purifiers universally employed at gas works. The process is of particular interest to those who are confronted with sulphur troubles in dealing with coke-oven gas for large gas engines. Burkheiser's small purifiers would be of great benefit in such cases, even if the SO_2 were turned to waste and unrecovered, on account of their small first cost and the saving in ground space afforded.

Applications of the Process.

The Utilization of Coke Oven Gas for Town's Light

In spite of the big developments in America a Germany which have gone forward in the applicat of coke oven gas for the lighting of townships, v little has been done in the same direction in this co try. As long ago as 1901, Dr. Schniewind descri well established coke oven gas works at Everett, H ilton, Camden, and Sparrows Point in the Uni States; other works have followed at Milwaukee Detroit, and the movement has gone ahead. In G many at the present time progress in this directio extremely rapid, and many towns are arranging to t their supply from coke ovens. An important review this subject appeared in a recent issue of the Tir Engineering Supplement, pointing out that 212 mill cubic feet of gas of the quality usually supplied towns are daily wasted by the coke ovens of the R Basin, which at the low price of 7d. per 1,000 cu feet, represents a sum of £2,000,000 per annum. Es and Mulheim have commenced to utilize this waste closing down their town's gas works, and relying coke oven gas solely, the price of the gas wholes being 8½d. per 1,000 cubic feet. Bochum has follow suit by taking the gas from Krupp's Hanover and H nibal Collieries. Barmen, Velbert, and Heiligenh have likewise made contracts for the supply of c liery gas, and many others have made arrangemer or are negotiating to a similar end. In all, about million cubic feet per annum have been already plac

There have been a few isolated cases in this coun where coke oven gas has been employed for this p pose, but British gas engineers have not yet seriou considered the by-product coke oven as a possible to their industry. There are many instances wh collieries or blast furnaces possessing coke oven pla already provided for as regards their own power quirements, are situated near to large towns, and these cases the application of coke oven gas for tow lighting might with advantage be carefully looked to. The writer does not suggest that as a gas-maki machine, the by-product coke oven is the equal of modern gas retort. The point is, that as a commun we are carbonizing coal for two purposes. (a) F the manufacture of town's gas, coke being the by-p duct. (b) For the manufacture of metallurgical co gas being the by-product. From the point of view the economy of coal supplies, the two processes over so that if the by-product in either instance, coke or g respectively, can be substituted, a step towards nati al economy will result.

During the past generation, the main ambition the gas industry itself has been to derive from mother coal the maximum amount of gas obtainat and to this end gas engineers have devoted themsel to devising retorts which would produce the great amount of crackling of the volatile matters. A table instance of this development is the vertical tort, whereby 12,000 to 12,500 cubic feet of gas made per ton, compared with 10,000 to 10,500 cu feet when distilled in the old horizontal retort, i.e. very important movement to conserving our coal su plies. This development has only been made possi by the invention of the incandescent mantle, where the thinner gases made under more economical c ditions, may be made to give out three times amount of light for a given consumption of gas. T combined effect of the gas industry's progression m

be xpressed, that the yield has been increased by 20 cent., and that the total gas yield produced has turned to three times better account.

s a result of these economies, there has been gen- revision in the methods by which illuminating gas ow valued, and by the introduction of the Metro- an No. 2 Argand Burner, a large amount of gas is ow available, which before the invention of the descent mantle, would not have been admissible for town's lighting Already some 130 gas authori- ties have by the Standard Burner Bill, availed them- selves of power to supply gas under the new economic conditions, and the country may now be said to be free from the old candle-power superstitions, and in a position to make the most of the coal in the production of ghting gas.

rom the point of view of our paper, the progress made by the gas world has opened up large possibili- ties for those coke oven plants with surplus gas avail- able, which are situated in the neighbourhood of large townships. With the care of a gas manager bestowed on a modern coke oven installation, there is no diffi- culty in making town's gas of modern standard. I make bold to say that there is no plant which could not either by supply of the whole gas, by fractionation, or by enrichment, prove of great financial benefit to an adjacent community. The usual method by which the coke oven manager disposes of his gas is by burn- ing it under boilers, that is a purpose for which raw coal without carbonization charges, and expensive plant, would be equally suitable. At the colliery, re- fuse coal would replace the use of gas under boilers, and the value of the latter fuel for steam raising would not exceed 0.8d. per 1,000 cubic feet. At works to which coal would have to be transported, the steam raising value of the gas might be double, say 2d. per 1,000 cubic feet. Even if these figures are increased by 50 per cent., the present value is small compared with the cost of town's gas into the holder. The aver- age cost of town's gas put into the holder at 60 gas works in this kingdom averages 1s. 1d. per 1,000 cubic feet, which offers a handsome margin, after deducting cost of oxide purification (0.5d. per 1,000 cubic feet) between burning coke oven gas under boilers and us- ing it in the town's main. There is ample room for a gain to the coke oven plant, and a substantial reduc- tion to the consumer, and a good deal of overlapping in the matter of coal consumption would cease.

n the above the writer has mentioned the "frac- tionation" of coke oven gas in the consideration of its supply to towns. By this is meant the separation of the richer gases evolved during the earlier stages of car- bonization, for despatch to the town, the poorer gases during the latter stages being retained for oven heat- ing. This was the method employed by Schniewind in the United States, at Everett, Massachusetts, and is also employed by some coke oven gas works in Ger- many. In this matter and in the question of enrich- ment likewise, the quality of the coal, and the manner in which the carbonization is carried out, determines the course to be adopted. With very lean coals, one or both methods may have to be employed, in order to keep up the value of the gas. With richer coals, no fractionation, or enrichment is necessary in order to provide gas of present day standard. In the case of the Little Hulton Bill, with which the writer has been associated throughout, the quality of the whole gas made complies in every particular with the desired standards, and is, in fact, identical in character with the gas supplied in the Metropolis, and made by mod- ern vertical retorts, as will be seen from the following table:

	Brackley Gas	Coal Gas supplied by one of the Metropolitan Companies				Gas from Glover-West Vertical Retorts.
CO_2	2.15	1.48	1.75	2.11	2.85	1.00
O_2	0.31	0.25	0.52	1.05	0.20	0.05
Unsaturated hydrocarbons	3.81	3.39	4.73	2.98	3.60	2.85
CO	6.87	8.17	7.18	10.00	7.43	8.70
H_2	49.30	49.21	40.50	48.41	46.66	54.70
CH_4	31.00	31.22	39.50	30.80	31.54	29.05
N_2	6.56	6.27	5.82	4.65	7.66	3.20
Gross calorific value. Calories per cu. ft.	144.8	144.5	166.6	145.7	143.4	144.3
Illuminating power by Metropolitan No. 2 Argand burner, at 5 c.f. per hr.	16.0	18.6	18.21	14.48	14.65	15.56

From time to time objections have been launched against coke oven plant as a source of towns' supply. Recently a paper was read by Mr. J. S. Lucking, of Clay Cross, before the Midland Association of Gas Managers, which pointed to the unreliability of coke ovens as a source of towns' illumination. He says that "coke ovens are not worked so regularly as gas retorts, and when the ovens are stopped for three or four hours, it is often 36 hours or more before there is any surplus gas." This, no doubt, was the case in this particular instance, but the writer has not experienced any such serious irregularity. The obvious precaution of any coke oven plant taking upon itself the responsibility of supplying a township, is to so duplicate all the run- ning plant, that breakdowns and stoppages are re- duced to the safety margin provided by gas works themselves, and this the writer has found neither diffi- cult nor costly, when the advantages of continuous and steady running are considered. Mr. Lucking raises no point against the quality of coke oven gas, for which he gives the following analysis:

CO_2 0.5%
CO 9.0%
Unsaturated Hydrocarbons 3.0%
H_2 47.7%
CH_4 26.2%
N_2 13.0%

Calorific value=550 b.t.u. gross.
Minimum Candle Power=14.

In view of these considerations, the writer is of opin- ion that as regards the supply of gas to towns, there are many instances in which the coke-oven industry may be held to have future prospects. Metallurgical coke which cannot be made in gas retorts has to be produced, and since coke oven gas now comes within the class of towns' gases, it may be expected to be no longer a wasted by-product, but of use to metallurgi- cal communities. For instance, if Middlesbrough were supplied with coke oven gas at 6d. per 1,000 cubic feet into the holder, the township would be saved approxi- mately £7,000 per annum in the manufacturing cost. There are many coke oven plants who would be glad

to dispose of their gas in bulk to townships at the price named.

The Utilization of Coke Oven Gas for Power Development.

The writer has had no personal experience of very large gas engines running on coke oven gas, but desires to point to the rapid development in this direction which has taken place in recent years in Germany. It is true that the application of coke oven gas for this purpose is not so extensive as has been the case with blast furnace gas, but this is mainly for the reason that coke oven plants are set down as a rule at collieries, where the domestic need for power is not so great as at ironworks, where often big developments are in progress. The high percentage of hydrogen in coke oven gas is often alleged as the reason for the non-development of this branch of coke-oven possibility, and true it is that coke oven gas engines have to be run on lower compression than is the case with blast furnace gas. Nevertheless, this drawback has not debarred German engineers from utilizing coke oven gas wherever expedient. The Augsburg-Nurnberg firm alone has 49 engines, averaging 1,290 b.h.p., or a total of 63,270 b.h.p., employing coke oven gas solely. These engines, representing a capital expenditure of from £350,000 to £400,000, may surely be said to have placed coke oven gas for engine use beyond the pale of risky experiment. One firm, the Eschweiler Bergwerks Verein, has increased its installation step by step as follows:

2 Engines,	520 b.h.p.	=	1,040 b.h.p.
2 Engines,	1,110 b.h.p.	=	2,220 b.h.p.
1 Engine,	1,160 b.h.p.	=	1,160 b.h.p.
2 Engines,	2,330 b.h.p.	=	4,660 b.h.p.
2 Engines,	2,660 b.h.p.	=	5,320 b.h.p.

Total 14,400 for one station.

This should be sufficient proof of the practicability of coke oven gas driving.

Messrs. Enrhardt & Sehmer have erected 15 engines, developing a total of 17,980 b.h.p., all of which are running on coke oven gas, and at Heinitz, one of their stations, 7 engines are at work developing 11,000 b.h.p. At this latter plant, the annual average gas consumption is 0.57 cubic metres per b.h.p. hour, the composition of the gas being as follows:

CO_2	2.8%
O_2	1.0%
CO	7.6%
Unsaturated Hydrocarbons	3.7%
H_2	50.3%
CH_4	24.9%
N_2	9.7%

On this basis a modern regenerative coke oven plant carbonizing 400 tons of coal per day, would be capable of developing 5,000 b.h.p. Even by supposing only a yield of 50 per cent. surplus gas, and 25 cubic feet per b.h.p. hour, the total power output would be 3,300 b.h.p. for a plant of this size.

The writer believes that a large number of the troubles entailed in the use of coke oven gas, over and above those dependent on engine design, have lain in the want of thorough preparation of the gas before use.

The removal of tars and naphthalene, both of which produce valve troubles, is readily effected by a combination of modern tar extractors in the first instance, and by anthracene washing in the second (the latter being simultaneous with the removal of benzol). The sulphuretted hydrogen which would burn to SO_2 producing corrosion in a heavily water-cooled engine, may be removed either by the usual box-purifier containing oxide of iron, or by Burkheiser's method previously described. Apart from the purification itself, it is of advantage to remove the sulphuretted hydrogen from the gas for the manufacture of the sulphuric acid required by the sulphate of ammonia plant, so that the removal effects a double end. The maximum amount of tar allowed in the gas in German practice is 0.2 grm. per cubic m., and total sulphur 0.3 grm.

The Use of Coke Oven Gas for Furnace Heating.

The employment of coke oven gas mixed with blast furnace gas or producer gas, for the heating of smelting furnaces, is yet in its infancy, but the possibilities in this direction of a large iron and steel plant with by-product coke oven batteries as auxiliaries are not to be denied. If it is assumed that such a plant depends for its power on gas engine development throughout, it is quite within the bounds of probability that surplus gas will be available from both blast furnaces and coke oven plant, which, in the absence of town's gas schemes, would be available for furnace heating. To some extent this is already being done at Kattowitz, in Upper Silesia, where a mixture of coke oven gas and producer gas has been employed since 1906, with large economies in producer coal as a result, and Krupp's have recently adopted the Kattowitz method.

A mixture of three parts blast furnace gas and one part average coke oven gas would pan out as follows:

CO_2	9.0 %	
CO	22.75%	
H_2	13.25%	
CH_4	7.50%	
C_2H_4	.50%	(C_6H_6 having been removed from the coke oven gas).
	44.00%	Total combustibles.

the calorific value being 260 b.t.u. Average producer practice would give a gas between the following limits:

CO_2	= 3 to 6%
CO	= 22 to 28%
H_2	= 9 to 14%
CH_4	= 2 to 3.5%

or a calorific value of from 125 to 175 b.t.u. Say from 33 per cent. to 44 per cent. total combustibles. The only point in which the composite gas would be lacking would be the tars and soots which ordinarily pass over with the producer gas into the furnace. The calorific value of the tars is equal approximately to 11 b.t.u. per cubic foot of gas, thus raising the calorific value of best producer gas to 186 b.t.u. per cubic foot. This addition, however, does not increase the calorific power of best producer gas to the calorific power of the composite gas given, so that the loss of the tars in the latter are not of moment from a calorific standpoint. It may be objected that the absence of the tars might render the composite gas less luminous and more difficult to control in the furnace, but the writer would point out that washed Mond gas is successfully being used for furnace heating. It is also probable that when the composite gas is highly regenerated its high content of CH_4 with the small amount of ethylene it contains, would render the flame sufficiently luminous for its easy control.

mentioning this use for coke oven gas, the writer ly alive to its high hydrogen content, and the ble dangers resulting therefrom. Needless to say, by the employment of such a "composite" as sug- d the mixture of coke oven and furnace gases d have to be carefully regulated and governed. A haphazard mixture would be fatal to its success.

The advantages to be derived from following up this or coke oven gas are:

Substitution of the producers and the cost of work- he same and a gas of constant composition free steam, the latter being a contingency attendant most producers with a resulting cooling and oxi- dizing effect upon the furnace.

For the rest, given the successful application of this or coke oven gas, steel plants would be run on the us surplus from the blast furnace side, an aim to which our president referred in his opening address, which would result in an economy of 2s. to 3s. per f steel. A battery of coke ovens carbonizing 400 of coal per day, would produce sufficient surplus when mixed with three times its bulk of blast ace gas, to replace the ordinary producers required he manufacture of 1,700 tons of steel per week.

The Utilization of Benzol as a Motor Fuel.

During recent years the low prices ruling for benzol discouraged coke oven owners from its recovery, in most cases benzol has been allowed to pass for- with the gases as boiler fuel. At plants where is an abundance of cheap fuel this has always ared to the writer to be wasteful, though possibly me cases where there was a big demand for power, fuel prices were high, there may have been little ain by benzol recovery. The trouble has lain in a ieted market for the product. With the exception e relatively small quantities of benzol which are for solvent purposes, cleansing and the like, prac- ly the whole of our benzol goes to the dye industry. e has been little competition for the product and s have remained low.

Quite recently, however, there has been an upward ement, owing to the growing use of benzol for road rs. France has created a market for our product his direction, and the large quantities of benzol h are now being exported to that country have d the price of 90 per cent. benzol from 6d. per n to the present figure of 9d.—10d. In our own try, there has been nothing in the nature of a gen- movement for the employment of benzol in motor cles, though Messrs. Sadlers, of Middlesbrough, one or two other firms have made a start in this ction. Needless to say, some hard things have been against the new motor fuel, as is usual with all lties, and motor benzol is having a hot time. Pos- the vested interests may be at the root of the urbance, and the criticism may be unfair.

The writer has manufactured and had some experi- of the use of benzol in road motors of many s, and has found that where due regard is paid to greater density of benzol, that superior results are ined over the foreign product. Coke oven benzol sesses a specific gravity of 0.885, whereas the specific gravity of petrol ranges from 0.68 to 0.78. This being case, benzol contains a greater weight of combus- per unit volume, and, therefore, requires a greater unt of air for its perfect combustion. The sooty s and valves which have been complained of when g benzol, have been due to an entire disregard of essential point. With an auxiliary air supply on the induction pipe these troubles completely disappear. The greater density of benzol has likewise been a source of trouble to the unscientific chauffeur from a mechanical standpoint, since in the float carburetter a more rapid cut off of the fuel is effected by the denser benzol which leads to an insufficiency of supply to the cylinders. By a careful balancing of the carburetter float with suitable weights, the greater density of the benzol may be readily overcome, with the result that a greater weight of combustible is admitted to the engine, which, with the extra air supply before mentioned, will produce a far more effective result than is the case with the lighter spirit, petrol. Both petrol and benzol are sold per unit volume (i.e., per gallon), so that with petrol of gravity 0.7 and benzol 0.882, 1.82 pounds increase in weight of combustible are obtained per gallon in the case of benzol, i.e., an increase of 26 per cent. Making due allowance for the superior difference in calorific values of petrol, a net inducement of 20 per cent. is left to the consumer, reckoned on the volume content. As regards price, petrol is variously retailed in this country at 1s. 1d. to 1s. 3d. per gallon. Allowing 2d. per gallon to the middleman for handling, this would leave the wholesale price of petrol at 11d. to 1s. 1d. per gallon. Since benzol has now crept up to 10d. per gallon wholesale, there seems to have been a considerable amount of levelling up between the two commodities, which with continued perseverance on the part of benzol manufacturers is likely to last, but benzol could rise still further when recognized as a motor spirit.

The foreign interests have had numerous complaints to allege against the claims of the British spirit. It is stated to be highly sulphurous and therefore corrosive to motor engines. The writer prepared benzol containing 0.14 per cent. CS_2 against which this complaint was made, yet many cars have run continuously on such benzol for two years without any corrosive effect having been made manifest. It is not well to call the kettle black, but petrol is not altogether free from taint in this particular, as much as 0.1 per cent. to 0.2 per cent. of sulphur being present in the foreign spirit on some occasions. The last straw alleged by the opponents of benzol has been its foul smelling exhaust products. This is, indeed, calling the kettle black, petrol itself is not pleasant smelling; as regards this point, it is entirely a matter of usage. Exception has also been taken to the relatively high freezing point of pure benzol, whereby difficulties transpire in cold weather. On a few occasions the writer has met with this trouble, but by lowering the freezing point by admixture with naphthas, this difficulty has been overcome. In fact, in this connection, with suitable carburetters, crude coke oven naphtha may ultimately serve as a reliable motor spirit.

In order to set all doubts at rest concerning the applicability of benzol for motor use, the writer would suggest that comparative trials be made between petrol and benzol by the Automobile Association. The uses of benzol in internal combustion engines are not restricted to road motors. We live in an age in which air ships have been conceived, and the need for a national motor fuel is urgent. The writer is of the opinion that coke ovens will play an important part in this direction when their possibilities are fully realized.

The Use of By-Product Coke in Suction Producers and Stoves.

In many parts of the country, anthracite is extensively used in suction producers. Anthracite being a

searce commodity, its price is necessarily high. The writer has been driven to employ by-product coke made from bituminous coal in its stead, and would commend to those depending on anthracite, this future use for the produce of by-product coke ovens. Anthracite prices range from 25s. to 35s. per ton, compared with coke from 12s. to 18s., and the power development for this class of work obtainable from the two grades of fuel is altogether out of proportion to the difference in price. In Lancashire, the writer substituted coke for anthracite; the prices were as 12s. is to 33s., and the power developed as from 90 is to 100 respectively, ratios which speak for themselves. The main point in the substitution of by-product coke for anthracite, lies in the provision of a larger grate area in the former instance, whereby a larger surface of the lighter and harder fuel, coke, may be afforded to the ingoing draught. With hard burned coke no more scrubbing is required for coke-producer gas than is the case with anthracite, and perfeetly even running throughout months of work is ensured.

The writer has also found, that in the case of the domestic stoves which are coming into fashion, the same principles hold, that given sufficient grate area, coupled with sufficient depth of fuel, by-product coke will take the place of anthracite at a much redueed cost per calorie.

Finally, the writer would refer to the possibilities of by-product coke ovens as a solution for the conservation of coal supplies, and for the smoke problem. To many of you these questions may have beeome hackneyed, and to others they may even appear chimerieal, but whether we like it or not, the day when they will have to be considered is bound to come. That they are correct in theory no doubt can exist, and their practieal treatment will follow. Up to now few methods h been advanced for the ready combustion of h burned coke in household grates, and there has a tendeney towards the production of a soft low t perature domestie coke, e.g., coalite, which would suitable for grates of ordinary design. In the writ opinion this movement is retrograde, since it ent the production of large quantities of paraffiny tars w small yields of gas of very high candle power. By inception of the incandescent mantle, the need fo high candle gas is no longer of moment, and a la quantity of gas, in view of its application for power lighting purposes, is of more value to the country a whole than a large quantity of tars. Making due lowance for our requirements of tar-derivatives for textile industry, medicinal products, antiseptics, r treatment, etc., the aim of all carbonization proces should be, to obtain as much gas from as little coal possible, and since this entails (by the high tempe tures necessary for such gas production) the manuf ture of a hard coke, we must seek some means utilize the latter, and more economically produced f for every possible purpose. This is not so insupera as the tendency towards coalite production would h us believe. It is true that closed stoves would have be employed, and central heating, or a composite and coke fire might be essential, but all of these worth the trouble in the consideration of coal econo The change may not come about until as a race, deeide to abolish the blazing eoal fire, but that tim bound to eome, although legislation may be the l resort. When this new era in coal economy arrives, a all coal has to pass through a carbonization stage, by-product eoking process will lay still further cla to national utility.

The Problems of Tungsten Concentration

By H. C. PARMALEE.

The mining and milling of tungsten ores has been a growing industry in Boulder County, Colorado, since 1900. In the early days of gold and silver mining in this district the tungsten minerals were unrecognized, and they received various names from the prospeetors and miners. In general they were regarded as forms of iron, and were considered without value. In 1900, however, the first production of tungsten oeeurred, amounting to 40 tons of ore valued at $3,216. Since then the production of high-grade ore and eoneentrate has inereased annually, except during a depression in 1907-8.

The output for 1909 amounted to 1,100 tons of high-grade ore and eoncentrate, valued by the United States Geological Survey at $396,000. The total output in the United States for the same period was 1,607 tons, valued at $559,500. From this it will be seen that the Boulder County produetion is by far the most important in this eountry, amounting in 1909 to about 70 per cent. of the whole. In 1910 the output from Boulder was 1,530 tons of high-grade ore and eoneentrate, valued by the State Bureau of Mines at $736,700. During the same period the output of all other metals in the county was valued at $161,589.

The tungsten minerals in the Boulder field are three iron-manganese tungstates, ferberite, hubner and wolframite, and the calcium tungstate, scheel Ferberite predominates, but scheelite oeeurs in ma mines, as is shown by the occurrenee of lime in t analyses of ore and concentrate—there being no otl source of lime worthy of consideration. These min als are of high speeific gravity, scheelite being 6 a the other three ranging from 7.1 to 7.5. They are g erally soft and friable. The ferberite oecurs in th rather well defined forms which, however, frequen grade into each other. These are (1) Well-erystalliz crusts and layers covering the surface of rock fr ments and cementing them together; (2) massi granular ore occurring in more dense seams; and (the highly silieious ore in which ferberite occurs in fi grains scattered through the gangue.

In breaking ore in the mine the highest grade sorted and shipped without preliminary milling. present this grade must average 40 per cent. or mo tungstic acid. The lower grades, ranging from 3 p cent. to 15 per cent. tungstic acid, are concentrated wet methods. Two grades of concentrate are recover and shipped; the first contains 60 per eent. or mo tungstic acid, and the second ranges from 35 per ce to 40 per cent. The former is usually recovered coarse concentrate and the latter as slime.

*Reprinted from Metallurgical and Chemical Engineering.

The stability of the tungsten industry depends, of course, on the uses for the metal; and as these are not extensive and the demand is limited and variable, there always the possibility of intermittent operation of mines and mills. It is safe to say that were it not for the large companies operating in the Boulder district the industry would have a more variable career than it now enjoys. At the present writing there is a large tonnage of unused concentrates in the Eastern market, as well as at the mills, with no immediate demand in sight. The principal use of the metal is still confined to the manufacture of tungsten steel for high-speed tools. Minor quantities are used in dyeing textiles, glazing pottery, colouring glass and paper, making bronze powder, and weighting silks. The manufacture of tungsten electric lamps creates a slight demand, but a ton of high-grade concentrate will suffice for the manufacture of 15,000,000 to 18,000,000 lamps the quantity used is not important.

The reader who may be interested in other details of the Boulder County tungsten field, such as general and economic geology, mining, technology, ores, etc., is referred to the Colorado Geological Survey, which has published a complete report, from which some of the foregoing information has been abstracted.

Location of Mills.

The town of Nederland is centrally located with respect to the tungsten mills of Boulder County. It is reached by stage, 18 miles from Boulder, or by railroad to Cardinal station and thence by stage for 2 miles. At Nederland is the mill of the Wolf Tongue Mining Company. At present this company is running its mill on a custom basis, sampling and paying for the tungstic acid content according to a graduated scale of prices. On ore ranging from 1 per cent. to 30 per cent. WO_3 the price paid per ton increases with each per cent. tungstic acid contained, and above 30 per cent. WO_3 the price per pound of tungstic acid also increases with each additional per cent. This system of outright purchase of ore has superseded the former custom of milling the ore at a certain price and returning the concentrate recovered and is generally more satisfactory. It insures better work on the part of the mill and should make a better return to the miner.

At Cardinal, 2 miles west of Nederland, is the Cardinal mill of the Primos Chemical Company. This plant for the past eighteen months has been retreating the tailings made during four years' previous run, when the methods of saving were not as efficient as at present. The Lakewood mill of the Primos Chemical Company is located at Lakewood, about 2½ miles northeast of Nederland. It is the newest and most attractive of the mills in the district. The company's own ore is treated at present, although in the past a great deal of custom ore has been treated.

Between Cardinal and Nederland is the mill of the Eaton Mining & Milling Company, a small plant for company or custom work. On Beaver Creek, about 2 miles southeast of Nederland, are two small mills, one belonging to the Tungsten Mining & Milling Company, treating company ore, and the other owned by Smith & Ardourell, at present retreating the old tailings of the Wolf Tongue Mining Company. The Clarasdorf mill on lower Middle Boulder Creek is idle. In addition to the regular milling there is an effort in a small way to roughly concentrate some of the old mine dumps, either by screening and saving the fine mineral or by hang jigging. Any material obtained in this way is sold to the mills.

Difficulties of Concentration.

The concentration of tungsten ore presents difficulties not encountered with other base minerals. This is particularly true with some of the methods now in vogue. It is believed, however, that all of these obstacles can be largely overcome by applying principles and methods that have proved successful in dressing other ores. Excessive sliming is one difficulty, the cause of which is well set forth in the report of the State Geologist, previously mentioned.

"Ferberite is a rather soft mineral with one perfect cleavage, and generally one or more prominent partings. As a result the mineral is extremely friable even in the massive and massive-granular forms. Much of the ferberite was deposited as aggregates or loosely arranged crystals and crystal grains, forming crusts over the surfaces of rock fragments. One crust succeeded another until in many places the opening was filled. In other places the cavities remained open, but the walls were lined in the same manner. The crystal grains composing these crusts average not more than ⅛-inch in length and about 1/16-inch in diameter. In much of the ore where the crust is broken the crystal grains are easily separated from one another. When to this ready crumbling of the mass is added the extreme friability of the grains and crystals themselves it is easy to understand the excessive sliming. The finer parts of the slime form an almost impalpable mass which, when stirred in water, gives it an inky appearance, and the water remains turbid for ten days to two weeks. To save these slimes is one of the difficult problems with which the tungsten millman has to contend.

"Another serious problem is the successful treatment of the highly silicious ores. In almost all the tungsten mines there is a certain amount of highly silicious ore, consisting of minute grains of ferberite in a matrix of chalcedonic quartz or hornstone. The percentage of ferberite varies widely. Outside of certain limited areas this type of ore is fortunately not very abundant and rarely amounts to 20 per cent. of the product. Various methods of treatment have been tried, but none has given entirely satisfactory results. Even very fine crushing leaves a large part of the ferberite with particles of quartz attached. In concentrating, these grains consisting of quartz and ferberite will be disposed of according to their specific gravity. Those in which quartz is largely in excess will go with the tailings and ferberite will be lost, while those in which ferberite is abundant will go with the concentrates and help make a low-grade product."

Corroborative testimony on the difficulty of treating some of the ores is given by Mr. Victor G. Hills, who was connected with the Colorado Tungsten Corporation during 1905-7. This company treated custom ores, and at that time was doing the best work in the district. Careful records were kept and improvements were made wherever possible. From a list of twenty-one tests on custom lots the following are given as showing the extremes and average in percentage saving:

Lot.	Mine.	Crude Ore, % WO_3	Concentration ratio.	Concentrates.	Saving
4	D	8.07	8.69	62.17	88.90
3	C	6.07	181.81	40.37	5.03
15	E	9.51	8.93	62.59	75.11

In amount of tungstic acid in the crude ore Lot 3 compares favourably with average lots, but owing to its physical qualities it was a failure from a milling point of view. Mere assays would indicate that it was as good as any other ore, but milling tests proved its worthlessness.

The percentage of saving made in the Boulder County mills is largely a matter of conjecture in many instances. The smaller mills practise no regular control, and the larger concerns prefer to make no statement of their saving. Undoubtedly the efficiency is greater than it was four or five years ago, and as the best mill then operating made a customary saving of 75 per cent. to 85 per cent., it is probable that the claims of 90 per cent. saving may be realized in present practice. There is little loss in coarse tailing where that portion is allowed to go to waste, and the main loss is in the slime tailing. The statement is made that coarse tailing will assay as low as 0.1 per cent. WO_3 and that slime tailings from the best mills contain as little as 0.30 per cent. to 0.40 per cent. WO_3.

The mills are of small tonnage capacity. Four of them can treat about 5 tons in twenty-four hours, one of them 24 tons and another 40 tons in the same period. With two exceptions they are built especially for tungsten work and are new. The two old mills are remodelled gold mills, and while not as conveniently arranged as the newer plants, they are doing good work. A notable feature is the large table area required per ton of ore treated, which naturally reduces the tonnage capacity. In no instance is screen sizing being practised with a view to eliminating coarse material which might prove worthless. In view of the friable nature of the tungsten minerals it would seem that sizing should prove worthy of investigation, and certainly classification should be more widely practised.

The stamp is a time-honoured crushing device, and finds favour in some of the tungsten mills. Some of the considerations just given, however, indicate that the stamp is out of place in crushing tungsten ore. The minerals are friable and of high specific gravity. When crushed in stamps such material tends to slime excessively, both by reason of natural properties and the fact that it remains too long in the mortar. When this preliminary step has been taken it follows that elaborate provision must be made for saving fine mineral.

Another fact that indicates the wrong use of the stamp is that much of the mineral occurs in a condition which would permit of its liberation by coarse crushing. But, as a matter of fact, a screen analysis of table concentrates made from stamped ore will show about 60 per cent. passing a 150-mesh screen and almost 80 per cent. finer than 100 mesh. Modern ore-dressing practice would indicate some such method as follows on the average coarse-grained ore: Crushing by jaw crusher and rolls; screen sizing and jigging; regrinding jig tailing, with subsequent classification and table concentration; regrinding table middling, followed by slime concentration on belt machines, and, finally, treatment on canvas if found necessary. Screening might be combined with the classification in such a way as to eliminate a portion of coarse stuff carrying no value.

There is but one mill in the district that is successfully using the jig, and the results are satisfactory to the operators. Other plants are considering the use of coarse concentration, and a second mill will shortly go into commission on this basis.

There are, therefore, two distinct methods of treatment in vogue in the Boulder tungsten field. The first involves comparatively fine crushing with concentration on tables, vanners and canvas plant — the latter being a very important feature and extensive in area. The second includes stage crushing, jigging, concentration on tables and vanners, with a canvas plant as a minor adjunct. The adherents of each method claim an excellent saving, which is not questioned, but the advocates of stage crushing and coarse concentration claim a less expensive plant and cheaper operation. A further claim in favour of coarse crushing is that a greater percentage of high-grade concentrate is recovered, and, since the value of the concentrate is in direct proportion to its grade, it would seem rational to recover as much mineral of high grade as possible and reduce the percentage of fine or low grade concentrate.

But even with coarse crushing, and every effort made to reduce the quantity of slime, it is noticed that considerable fine mineral is produced which will float away, even from the boxes receiving coarse concentrates. One of the striking features of all the mills is the provision made for catching this fine floating mineral. Settling boxes of wood or cement are provided, and in one instance the water escaping from the settler passes through a cocoa matting filter. In this connection the idea suggests itself that the use of a coagulant might be beneficial. It is known that the tungsten concentrate will not settle perfectly clear for several days. The simple expedient of adding a small quantity of lime water will show how quickly the solution will be clarified. On a laboratory scale the mineral thus treated will settle and leave a clear solution in a few minutes. Experiments on a large scale might show that the addition of lime solution at the time of fine grinding would be beneficial in coagulating the mineral and aiding in its recovery. Or, the addition of clear lime water to the concentrate settling boxes might prevent the loss of fine and floating mineral after it had been separated from the gangue. Other salts than lime, which are of proved value in coagulating colloid mater, might be experimented with to advantage.

Magnetic separation has been applied successfully to tungsten ores, but it is not in vogue in the Boulder field. The Boulder ores are remarkably free from sulphides of iron, lead and zinc, cassiterite, arsenopyrite, etc., which usually call for magnetic separation, and this probably accounts for the non-use of expensive magnetic treatment.

Granby's Hidden Creek Copper Mine

As has already been announced, the Granby Consolidated Mining, Smelting & Power Company, Limited, has decided to complete the purchase of the Hidden Creek copper mine, situated near Goose Bay, Observatory Inlet, British Columbia. At the meeting of directors of the company held last month in New York to determine the course to be taken, payment of half the price of the four-fifths interest, due June 1, was authorized, bringing payments on account up to $215,000, and leaving $185,000 to be paid next December to clear the property of liability on this account. In addition, a sum of $200,000 was appropriated for more development work and necessary plant and in

vements. Further, the purchase of Mr. M. K. lgers' one-fifth interest was arranged for, so that whole interest in the property will be owned by the Granby Company after the final payment shall be de next December, or earlier if deemed desirable.

From Mr. Jay P. Graves, vice-president and general nager, it was learned recently that the reports of engineers were before the board of directors, when matter of purchase of the property was being fily considered. The estimates of available ore, compted from results of development work done on the perty and cores from diamond drill holes, varied m a minimum of 6,000,000 to a maximum of 12,-0,000 tons.

In regard to the appropriation for development work improvements, above mentioned, Mr. R. M. Sylster, assistant to the general manager; Mr. O. B. ith, Jr., superintendent of the company's mines, Mr. H. J. C. McDonald, one of the company's min engineers, have gone to Goose Bay to arrange for energetic prosecution of the work to be done above ound, so that full advantage may be taken of the e weather for surface operations; also to decide at new development shall be undertaken.

Mr. W. Yolen Williams, who has from the inception the Granby Company's Boundary district mining terprise been associated with Mr. Graves, is to at ce make Vancouver B.C., his headquarters with the ject of gathering exhaustive information relative to pper mining and smelting in the Coast district, so at, before determining upon the course to be adopted connection with the reduction of the Hidden Creek ne ores, the relative advantages of having them elted at one of the existing custom smelteries and establishing its own smeltery on the Coast, may be lly before the management of the company.

The events of the last few months have, therefore, veloped in a manner so satisfactory to the directors the Granby Company as to have influenced them to mmitting the company to what will without doubt ove its permanent operations on the Coast of an imrtant mining and smelting industry.

The Porcupine Fire.

Just as we are going to press news arrives that many orcupine mining camps have been utterly destroyed y forest fires. Word also arrives of the deaths of Veiss and Moore, both well known in mining circles.

So far there is no information as to many Toronto en who were in Porcupine.

It is possible, though not probable, that fully five hunred lives have been lost. The chances are that not nore than one hundred lives have been offered as sacrices to the monumental stupidity that made the disaster ossible. This moral stands out: We must absolutely pend money in safeguarding our forests before we can efer to them as assets.

We have dwelt upon commercial aspects designedly. But there is another view. Many brave men have lost heir lives in Porcupine. The history of the Porcupine ire will never be written adequately. There is no doubt hat an amazing amount of bravery was manifested throughout the whole sad episode. Men like Billy Moore lost their lives willingly in attempting to save others. It is one of the traditions of mining camps that men must be brave. Porcupine, from all accounts, lived up to that tradition.

It is necessary for all of us to put our cheque-books at the disposal of the Porcupine sufferers. The next few weeks will witness the keenest suffering. If we can do anything to alleviate that suffering, we must do it now.

We have made arrangements with the Imperial Bank of Canada whereby any branch of that institution will receive and transmit donations to the relief fund. The formal name of the fund is the Canadian Mining Journal Fire Relief Fund. It is especially desired that all mining men become identified with the movement.

Remittances may be sent to any branch of the Imperial Bank, or to this office. A full list of subscribers will be published in an early number of the CANADIAN MINING JOURNAL.

* * * *

The latest news at date of writing places the list of deaths at 87. This is by no means complete. Many of the survivors have suffered horribly. Whilst the loss of property has been severe, it is by no means as large as was at first believed. It is immensely distressing to know that the whole tragedy could have been prevented. Early precautions on the part of mine owners would have insured the immunity from fire of individual plants. An adequate system of fire-ranging would have limited the fire-swept zone.

Two facts are to be remembered. The same kind of holocaust may easily occur again. It is essential that advantage be taken of the experience of men who know the bush. Mining men from other countries rarely realize the urgent need of adopting preventive measures.

Upon the mining population itself and upon the Ontario Government rests the responsibility of acting at once and of continuing to act.

SILVERTON MINES, LIMITED.

The Silverton Mines, Limited, owns the Hewitt-Lorna Doone group, situated three or four miles from Silverton, Slocan Lake, B.C. Much development work has been done on this group during several years, under the direction of Mr. G. Stilwell. The following is an outline of what is now being done and what it is intended to do in the near future:

Mine.—Development work only is in progress. The ore taken out in the course of this work is hand-sorted and the high-grade sorted ore is shipped to the smeltery.

In earlier years several tunnels were driven from the western side of the mountain. Of late years all work has been done from the eastern side, on which a new camp was established to facilitate this development.

No. 4 tunnel has been connected with the work from the western side. Three orebodies have been opened

on this level; these are 115 to 155 feet in length and average 7 feet in width. Raises in these orebodies have been put through to No. 3.

The face of No. 6 tunnel is within about 200 feet of that of the drive from the west on the same level. When connection shall be made, this tunnel will be rather more than 3,000 feet in length through the mountain. Orebodies have been passed through, but only one has been proved up to No. 4.

No. 7 tunnel is 135 feet below No. 6; it has been driven about 700 feet, developing orebodies containing ore as good as any taken from other parts of the mine, for much ruby silver and grey copper occur in this ore.

Mill.—The company has the Wakefield concentrating mill, situated on Four-mile Creek. The equipment has been overhauled and the water supply ditch and flume repaired, ready for the season's run, but operations will not be commenced until about the middle of June, by which time, it is expected, one unit of the more Vacuum Process plant will have been instal the machinery, etc., for this having already been ceived at the mill. This plant will be used, in con tion with water concentration, to re-treat the mc middlings. Hewitt-Lorna Doone ores contain a la quantity of siderite, to deal with which the Elm plant has been obtained, and it is confidently expe that a zinc product, containing 45 per cent. or more zinc and 100 ounces of silver per ton, will be ma About 100 tons of ore will be put through the daily, but the higher-grade ore will be first sor out for shipping crude to the smeltery.

The mines of the Silverton Mines, Limited, have so much development work done in them, and so c siderable a quantity of ore is blocked out ready stoping, that a long mill run is looked forward to, profitable results are confidently expected.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Dominion Coal Outputs.

The outputs for June will total 365,000 tons, thus exceeding the best previous record for this month, namely, 358,069 tons in June, 1910. The aggregate outputs for the first half of the year during the past four years compare as follows:

1908	1,931,400
1909	1,628,161
1910	1,554,986
1911	1,889,539

New construction is now well under way around the mines. No. 14 colliery is about complete with the exception of the permanent hoisting engine. The output increased rapidly during the month and is now averaging between 700 and 800 tons per day. The new bankhead is working smoothly and with a remarkable economy of labour. The new compressor house at this colliery is as nice a colliery building as one need wish to see. The house is built of the slag-cement brick manufactured at Sydney, and is large and lofty. The compressor is electrically operated, taking current at 6,600 volts. It is built by the Canadian Rand Company, and consists of an alternating current motor of 600 horse power, and compressors with a capacity of 3,000 cubic feet per minute. The absence of heat and noise is very marked, and with the new clean and airy building this compressor-house marks a distinct advance. All the machinery with the exception of the temporary hoisting engine is run by electric power, including the bankhead and screening plant, the ventilating fan, lamphouse, etc., and as a result No. 14 is a remarkably clean and quiet colliery. The growing importance of the Lingan collieries may be gauged by the fact that it has been found necessary to install a telephone central to serve this district.

The tracks for the new pier at Sydney are under construction, and the sub-structure of the pier is being erected. Creosoted piles are being used, the creosoting being done at the neighbouring works of the Dominion Tar & Chemical Company. This is an instance of the self-contained character of the industries which are growing up around the Steel and Coal works. As previously mentioned, considerable use is being made of the slag-cement bricks of the Sydney Cement Company, which are made from the Steel Company's slag. In the same way the Tar & Chemical Company disposes of many of its manufactured products to the mines and works of the Steel Corporation, these being in their turn by-products of the main industries. Even the new houses which the Coal Company is building in such large numbers at Lingan are lined with tar-paper made in Sydney from one of the by-prod of the coke-ovens. The slag-fertilizer plant now under c struction in Sydney will add one other to the subsidiary dustries, and the product will doubtless find a ready local s

Editor's Note.—For comment upon the flooding of the P Hood-Richmond colliery, see editorial pages.

ONTARIO.

Cobalt and Gowganda.

The Buffalo mill report for May shows mill ran 615 hou ore treated, 3,335 tons; average assay before milling, 37 ounces; ounces recovered, 104,255; expenses, $4,925.

A new vein showing some leaf silver has been cut at t 300-foot level of the Ophir Cobalt shaft. The lead is wi but values are not very high so far.

With the 10 per cent. dividend cheque sent to McKinl Darragh-Savage shareholders, the following statement was s mitted: cash on hand, $383,024; ore at smelters, $115,600; at mine ready to ship, $38,500; total, $537,124, surplus June 15. For the first six months of the year there has be produced 1,300,000 ounces, at a cost of about the same as la year, or 17.50 cents per ounce.

The Kerry lease on Peterson Lake is getting some cob and silver shot rock from a winze sunk on its vein at the 12 foot level. The vein has been cut at the 200-foot level a here it shows silver.

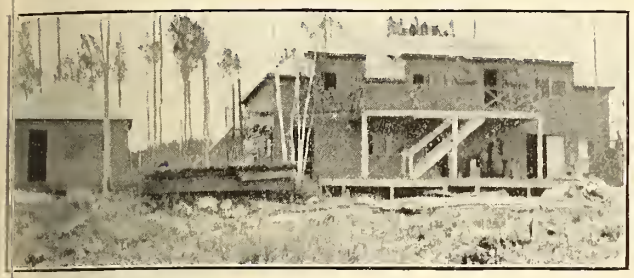
At the 150-foot level on their Peterson Lake lease the No Scotia Company has opened up 40 feet of ore. The vein from two to three inches wide and the wall rock for son distance will make good milling rock.

Before next month Mr. J. T. Englehart, chairman of t T. & N. O. Commission, will visit Elk Lake and Gowgand with a view to ascertaining the prospects for a railroad.

Porcupine and Swastika.

In the last week three excellent surface discoveries hav been made at the Swastika camp and there is now certai to be a centre of activity at this little station on the T. N. O. for some years. The Swastika mine was staked in 190 and has been worked for the last four years. The surfac discoveries at the Swastika were not nearly as spectacular a any of the three that have recently been made to the nort of the railroad. At the 100-foot level of the Swastika ther is an ore body 120 feet long and the bottom of the winz sunk to the 200-foot level shows quartz much richer than a any other point or level in the mine. A small stamp mill i operating, and until further development has been undertake

further addition will be made to it, though a 9-drill compressor has been ordered. The three finds which have attracted most attention to date are to the north of the track, which here runs east and west. Two of them are on the Hurd properties and one on the Miller, and all are promising. Other



Swastika Mining Co., Office and Store.

properties in this section with good leads are the Porcupine Swastika, the Homestead mines of Swastika, and the Reeves. A siding has just been completed, an hotel has been opened, and a little settlement is growing up near the tracks at a point about 25 miles north of Englehart.

A discovery has been made on the John Brydge claim in Bristol Township which has caused a great stampede and the staking of every acre of land and water within miles. The original discovery is described as meritorious, by witnesses competent to judge, a wide ore body showing free gold plentifully. The trail in is easily accomplished. A gasoline will carry all equipment down to Redsucker Creek on the Mattagami, when there is but one portage and a walk of two miles to the find. The owners are asking $5,000,000 for the claim.

The T. & N. O. Commission, accompanied by the Hon. Frank Cochrane, officially opened the Porcupine Railroad on Dominion

Outcrop on Martin Group. Swastika Region.

Swastika Region, No. 1 Vein Martin Group.

Day, and on July 3rd the regular service went into operation. Train arrives in Porcupine at ten o'clock at night, and leaves at 5.30 in the morning. Freight is taken into the Dome road. The extension of the steel to the Hollinger is promised for the first day of October, and already the right of way has been cut. To serve the needs of the Pearl Lake section two or three townsites have already been planned, one by the Timmins-McMartin-Dunlap syndicate on the Campbell veteran, another on the Schumacher veteran, and another on the Mattagami River itself. There has been a lumber famine in Porcupine, but now that freight can be brought in, buildings are going up with great rapidity. The census showed that there were 1,500 people living in the settlements round the lake and there are at least 3,000 men working in the mines and prospects of Tisdale and Whitney, so that it would be safe to estimate the present population in the district at between 6,000 and 7,000.

Fire again swept through Tisdale Township, but the only serious loss was at the Dome Extension, where everything was destroyed. Pearl Lake, the Jupiter, and camp 1 of Bewick-Moreing & Company, had very narrow escapes, and many isolated prospectors lost their tents and supplies.

Some very remarkable showings have been made on the McIntyre property on Pearl Lake in the last two weeks, both on the surface and underground. Some of the richest samples

yet encountered have been taken off the surface, and at the 100-foot level a drift on one vein shows free gold in both faces. The ore from a shot drill at 253 feet also shows gold. Two other shafts have been sunk on the property. A 12-drill compressor plant has been ordered.

On a claim just south of the Rea mines, the Armstrong-Booth has just uncovered a new vein which has yielded some very rich samples and pans remarkably. So rich is the dirt that a rocker has been installed and the dirt is being washed. The lead is about four feet wide of quartz and schist.

At the 200-foot level, while drifting on its vein, the Rea Mines has just run into ore as spectacular as the surface, where the vein was very rich and four feet wide.

Some rich specimens of quartz have been taken out of small stringers on the La Palme syndicate's property in northeast Whitney.

One of the veins on the Imperial Porcupine was cut at the 100-foot level this month. The vein shows gold. Some remarkable surface finds have been made on the Dome Extension, and both with diamond drill and in the shaft exploration work at the North Dome has been successful.

The fire at the Hollinger laid bare some very spectacular quartz stringers. Plans at this property are being very carefully laid before the reconstruction of the camp commences.

At a distance of 160 feet from the shaft the Foley-O'Brian cut into its vein, and it is said to be better than was anticipated by the owners. Mr. Harold Rickard, brother of Mr. T. A. Rickard, has now taken charge of the property in succession to Mr. A. F. Motz, who will open up the Shillington-Richardson claim near the Hollinger.

The American Goldfields Company, controlled by the Steindlers of New York, has decided to sink a shaft on its Tisdale property near the West Dome. Two shot drills have been working on the claims until now.

Despite reassuring rumours there has been no conciliation between the Pell and West Dome interests, who own a half share each in the big Curts vein on Edwards Lake. The West Dome Mining Company was offered the other half share at a certain price, which it refused to give, and the whole claim will now be auctioned to the highest bidder in the open market.

BRITISH COLUMBIA.

Mr. E. Jacobs, of Victoria, recently spent seven weeks in parts of West Kootenay, Boundary, and Similkameen districts. Of mining in the several districts he visited, he speaks hopefully. Much important development work is being done, and in several parts production is on a comparatively large scale with, in some instances, profitable results. Agricultural and horticultural matters were also found to be progressive in some of the parts in which time was spent, notably in the vicinity of Grand Forks and Keremeos, respectively.

Mr. Jacobs left Victoria for Kootenay on May 8 to attend a meeting of the Western Branch of the Canadian Mining Institute, convened to be held at Trail on May 18. Before proceeding to Trail, he spent several days obtaining information relative to progress at silver-lead mines and concentrating mills near New Denver and Silverton, Slocan Lake. He paid his third visit in eighteen months to the Standard mine, above Four-mile Creek, now being operated by the Spokane company organized early this year to acquire and work it. He was shown the face of No. 5 tunnel, a cross-cut at which had then opened about 85 feet of concentrating ore, in which occurred a fair proportion of clean ore suitable for shipping crude to the smeltery. At Spokane he was afterwards informed that the cross-cut had since proved the ore shoot to be 131 feet wide in this part of the mine. The work of constructing an aerial tramway from the mine to the mill site near the lake, of putting in a water supply system, and erecting a 100-ton concentrating mill, was being energetically proceeded with, the expectation being that all will be in working order during the ensuing fall.

The Van Roi mill, at which operations were commenced about the middle of March, was doing good concentrating work, making two marketable products, namely, silver-lead and silver-zinc concentrates. Mr. Douglas Lay, superintendent, expressed confidence that both mine and mill are in such a working condition that a long and profitable run may reasonably be expected. From Mr. G. Stilwell, manager of the Silverton Mines, Ltd., which has for years been opening the Hewitt-Lorna Doone mine, it was ascertained that the company has large reserves of ore available for extraction, and that during June, after installation of one unit of the Elvacuum process plant which is to be used for treating "middlings," the Wakefield mill would be running on ore from this mine.

At Trail, the meeting of the Canadian Mining Institute was well attended and a number of interesting papers on mining subjects were read and discussed. The provincial mineralogist, Mr. W. Fleet Robertson, of Victoria, the retiring chairman of the branch, presided until after announcement of the result of a ballot, which made Mr. Robert R. Hedley, of Vancouver, his successor, and the latter thereupon took the chair. Visits were paid to the Consolidated Mining & Smelting Company's big lead and copper reduction works at Trail, and the Centre Star group of mines at Rossland, all of which were found to be in a flourishing condition, with new and modern plant being put in at the former, and much ore of good grade opened in the latter.

In the Boundary district, the Granby Company was not operating its big smelting works at the time Mr. Jacobs was at Grand Forks, but coke had been ordered from Pennsylvania in order to admit of most of the blast furnaces being blown in again. Meanwhile the works needed repairs and renewals were being made, and plans for important betterments were being advanced. It was gratifying to have assurance that a considerable quantity of ore of higher grade than the average of recent years was being mined by the Granby Company at Phoenix. Later, at Spokane, Mr. Jacobs was informed by Mr. Jay P. Graves, general manager of the company, of the arrangements made by the directors in New York to complete and extensively work the Hidden Creek copper mine, on Observatory Inlet.

The British Columbia Copper Company was found to be using Pennsylvania coke at its smeltery at Greenwood, and acting general manager, Mr. E. G. Warren, gave the visitor particulars of the company's operations at its several mines in the Boundary district, and across the International boundary line in the neighbouring State of Washington. The company's Lone Star and Washington mines were visited, the trip over the intervening high mountains having been made in the company's automobile. From this mine to the C. P. R. Columbia & Western Railway at Boundary Falls, a well-constructed aerial tramway, five and a half miles in length, is now in use. The same company's Wellington camp group, also known as the Jackpot, was visited, and the big occurrence of oxidized ore seen.

Two other items of Greenwood intelligence will be noted—one, that some rich silver-gold ore is being taken out of the old Elkhorn mine, and the other that the Greenwood-Phoenix Tramway Company's big tunnel early in June was in 2,000 feet, with the expectation that 300 to 400 feet more driving will result in one of the ore veins of the Reliance claim being cut.

At Hedley, a day was spent, chiefly in examining the new stamp mill and cyanidation plant of the Hedley Gold Mining Company, to which important additions have been made during the last twelve months, with decidedly satisfactory results. The tonnage of ore milled and treated is now much larger than

lier, and the company is earning comparatively large profits, is manifest when it is seen that it has distributed already year $120,000 in dividends paid to its stockholders, this ng 10 per cent. on the issued capital.

Around Princeton, several of the coal mines that are being oned were visited; as also was the site of the British Columbia Cement Company's cement manufacturing works, the buildings for which are in course of erection. The Princeton Coal & Land Company, an auxiliary organization of the Vermilion Forks Mining & Development Company (owning the Princeton townsite and various mining properties in the vicinity), has made most progress towards development of coal mining, its mine in the immediate vicinity of the town having nearly a dozen working faces opened, with more that can be opened whenever there shall be a demand for the coal. The chief drawback to this company's material progress is the lack of plant and machinery for sizing and cleaning the coal. After these shall have been provided, a prosperous coal-mining industry will, no doubt, be established here. Among other properties worthy of mention are those of the Osoyoos Coal Company of Nelson, which has fully 60 feet in thickness of coal in a prospecting adit; the Princeton Collieries, Ltd., of Vancouver, and the Columbia Coal & Coke Company, of Winnipeg, which last is actively engaged in developing coal seams that have been opened from both Collins Gulch and Granite Creek sides of the basin in which they occur.

An important transaction now in course of negotiation is that for the purchase of the Voigt properties—copper claims, coal lands, timber lands, water rights, etc.—on Copper Mountain, situated a few miles from Princeton. Particulars of these properties will shortly be published; meanwhile Mr. Emil E. Voigt is in Spokane, continuing negotiations with representatives of the Boston and New York men who have made offers for the purchase of the property. The development of the mineral resources of Copper Mountain, with the necessary accompaniment of the establishment of a copper smeltery, would do much to advance the material interests of this part of the big Similkameen country.

Two days were occupied in visiting Tulameen, where Mr. Jacobs had the advantage of much conversation with Mr. Chas. Camsell, of the Canada Geological Survey. Mr. Camsell has spent five or six field-work seasons in the Similkameen, so is especially well informed concerning its geology and mineral resources. The Survey party was arranging to wash Tulameen gravels to try to find diamonds in the wash, it being thought probable that as diamonds are known to occur in the solid rock of the vicinity, there may be some found in the river gravels.

Mr. Jacobs returned to Princeton, and thence to Spokane, Seattle, and Vancouver, by rail. Among others seen in Spokane was the managing director of the Corbin Coal & Coke Company, which has during the last three years been working a coal mine in the Crow's Nest district, southeast Kootenay, and which has opened one of the most remarkable deposits of coal known to occur in the West. The proportions of this deposit are so large that the incredulity of those who are without opportunity to satisfy themselves of the statements concerning them is aroused; nevertheless it is a simple fact that there is on the Corbin Company's coal property a body of bituminous coal of phenomenal size, from which millions of tons can be easily extracted, and, too, of excellent average quality.

In Seattle, information was obtained relative to the work of the Geological Survey of the State of Washington, of the progress of the coal mining of that state, and concerning the work of the United States Geological Survey's mine-rescue training work, in connection with which about 20 men have already been trained and proved competent for rendering aid in case of emergency. Mr. Jacobs has returned to his headquarters in Victoria to there prepare for publication in detail much of the mass of information gathered by him during his trip.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—Advices from Port Hood state that the water is still rising rapidly in the mine, and that only the choking of the fissure can save the mine from being flooded to the high water mark.

Yesterday the water had risen to within 262 feet of the low level in No. 3 lift, and was rising vertically at the rate of one inch in seven minutes. The water will continue to rise at this rate for some days, and will reach the low level in No. 2 lift within five and one-half days.

The only hope to save the mine is for the fissure to become choked, otherwise the water will rise to the high water sea level, which is about 500 feet above No. 3 low level.

Glace Bay.—The construction of the Dominion Coal Company's new line of railway from Morien Junction to Birch Grove, the company's new colliery, No. 20, was started to-day. The line, which will be about four miles long, will be constructed by the company's own men. The development of this new mine will be rapid after the new railway is completed, and already the company is preparing to sink a new slope which will be started this week, and will be about 2,000 feet south of the present one. The coal at this mine is of the best quality, and it is expected that operations will be far enough advanced to begin the shipment of coal before the close of navigation.

ONTARIO.

Toronto.—After about a dozen postponements, the assets of the Standard Cobalt Mines, the old Cobalt Central, were sold by E. R. C. Clarkson to Philadelphia interests for $100,001. There was a reserve bid of $100,000, which was exceeded by $1.

Ottawa.—His Excellency the Governor-General in Council has ordered that the regulations for the disposal of quartz mining claims established by order-in-council of the 13th August, 1908, with the restriction of a subsequent order-in-council of the 16th February, 1909 extending such regulations to the reserves set apart by the Dominion Forest Reserve Act, be extended, and made applicable to lands within forest reserves and parks established by the Dominion Forest Reserves and Parks Act, of 1911, with the exception of Elk Park, within the Cooking Lake forest reserve, and the Buffalo Park reserve in the Province of Alberta.

Whereas, under the provisions of the Forest Reserves and Parks Act, 1911, all regulations with respect to the Canadian national parks have been rescinded, his Excellency in-council has been pleased to order that the regulations provided for in the following orders-in-council shall be re-established and made to apply to all Dominion parks proclaimed under the Forest Reserves and Parks Act:

1. The regulations of the national parks of Canada, approved 21st June, 1909.

2. Amendments to the above regulations approved September 26, 1910.

3. Regulations for the use of motor vehicles in the Rocky Mountain park, approved April 8, 1911.

4. Regulations for the management and control of the Dominion Government water and sewer systems and of plumbing and sanitation at Banff, approved June 23rd, 1908.

5. Amendments for the above water, sewer, and plumbing regulations approved March 10, 1909.

6. Regulations for the administration of timber within the Rocky Mountains, Yoho, and Glacier Parks, approved May 21, 1906.

7. Amendments to the above timber regulations approved February 15, 1911.

8. His Excelleney the Governor-General-in-Council has also ordered that the regulations established on the 20th April, 1910, for the leasing of Dominion lands for coal mining purposes, with the restrictions of the subsequent order-in council of February 28, 1911, shall be extended and made applicable to lands within forest reserves and parks established by the Dominion Forest Reserves and Parks Act of this year with the exeeption of Elk Park and the Buffalo Park reserve. A similar order-in-council has just been passed with reference to the leasing and use of lands containing limestone, granite, slate, marble, gypsum, marl, gravel, sand, or building stone. No lease for quarrying purposes shall be granted without the approval of the superintendent of the park or unless he is satisfied that the granting of such lease will not mar the beauty or the utility of the park or unduly interfere with the purposes for which it is established.

Still another order-in-council recently adopted at Ottawa provides that the waterpower regulations pursuant to the Lands Aet, 1908, and amendments, shall be held applicable to all Dominion forest reserves and parks.

Cobalt. — The Cobalt dividends to be disbursed during July are estimated at $1,785,000.

Cobalt.—In a crosscut from the 100-foot level of the No. 123 shaft of the Nipissing an excellent vein of high-grade ore has been eut. This is an entirely new lead and was picked up 150 feet east from the shaft near the O'Brien line. Another vein which did not make ore, was sunk upon, and this is the first tangible result of development near the O'Brien and Chambers-Ferland line in the Keewatin formation. No. 12 shaft of the same property has also been pumped out and some very pretty ore is being mined here.

Porcupine.—A private despatch from Porcupine states that about August 1st the Dome mine will start 20 stamps, and will begin the shipments of gold bars.

Toronto, July 5.—A suit has been instituted against the Kerr Lake Mining Company by the Hargraves Silver Mines, Limited, for the recovery of $150,000, being the valuation of the ores which the plaintiffs claim were taken out of a vein running into their property and at a point outside the boundaries of the Kerr Lake mine.

It is reported the Kerr Lake Company has offered to settle the claim by the payment of $25,000, but that the offer has been refused by the plaintiffs, who will carry the case through the courts.

BRITISH COLUMBIA.

Nelson, B.C., July 1.—With the object in view of the establishment of a school of mining for the Kootenay, the Nelson Board of Trade is in correspondence with the various institutions of learning and scientific institutions in Canada and the United States, respecting modes of organizing a school of this character, and the probable cost of creation and maintenance. The model that is favoured is that of the School of Mines at Sudbury, Ont., which is conducted as a special department of the Sudbury High School, and is the child jointly of the Sudbury School Board, the mining men of the district and the Ontario Government. This city has reached the stage where a new high school building is required, and after the summer term there will be four instructors on the staff. For some time fourth year work has been done by the Nelson High School, admitting its matriculants to the second year of McGill and Toronto Universities, and a department of mining, under a mining instructor, is therefore in line.

Vancouver.—The Inland Coal & Coke Company, Limited, capitalized at $1,500,000, with head offices in Vancouver, has been formed for the purpose of taking over the holdings of the Coal Hill Syndicate, southwest of the Nicola Valley Coal & Coke Company's Middlesboro properties. Joseph Graham, general manager of the Coal Hill Syndicate, is the general manager of the new corporation.

Mr. G. I. Wilson, of Vancouver, who was one of the principals in the Coal Hill Syndicate, and who has been interested in other properties in the Nicola coalfields, is the president of the new company; and W. L. Nicol, who was also interested in the Coal Hill Syndicate, is the vice-president.

It is the intention of the company to double the present output immediately. This is made possible by the development work already completed.

COMPANY NOTES

BUFFALO ANNUAL FOR 1910.

During the year the mill treated 41,484 tons, averaging 36.07 ounces of silver per ton, or 1,496,255 ounces, of which 80.07 per cent. was recovered as follows: 25,795 ounees in metallies, 540,078 ounces in jig concentrates, and 632,202 ounces in table eoneentrates, or a total of 1,198,075 ounces recovered, or 1,098 tons of concentrates, averaging 1,067 ounces per ton, and 1,880 pounds of bullion.

The cyanide plant treated during the year 11,700 tons of slime from the concentrator, averaging 13.06 ounces of silver per ton, or 152,783 ounces, of which 67.62 per cent. was recovered, or 103,321 ounces. The total recovery by mill and cyanide was 1,301,396 ounces, or 86.98 per cent.

The shipments during the year consisted of forty-five cars of ore, containing 1,079 tons of eoneentrates from the mill and 126½ tons of high-grade ore direct from the mine, or a total of 1,205½ tons of ore and concentrates shipped. There were also several small sales of native silver. The returns from these shipments and sales amounted to 1,392,700 ounces, of which approximately 279,852 ounees were contained in the ore and 1,112,848 ounces in the concentrates, or an average of 2,221 ounces per ton in the ore and an average of 1,031 ounces per ton in the eoncentrates. In addition to this there were shipped 9,170 pounds of bullion, the smelter returns from which amounted to 114,419 ounces.

Besides the shipments made there was on hand at the mine at the time the report was sent out 11,054 pounds of concentrates, containing 11,772 ounces, also 27,435 pounds of table concentrates, containing 11,276 ounces, and 837 pounds of bullion, containing 10,815 ounces, or a total of 33,863 ounces on hand.

During the year the ore reserves were increased by approximately 36,000 tons, or the equivalent of 1,118,000 ounces over that shown at the beginning of the year, which is a slight increase over the extraction for the previous year. This was principally on No. 10 vein. There is a decrease in stock piles on the surface of 7,779 tons, and an increase of broken in the mine ready for milling of 3,045 tons, making a total of ore broken in stopes ready for milling of 23,334 tons, in addition to the stock piles on the surface.

During the year the tonnage was broken as follows in the mine: In sinking, raising, and station cutting, 1,287 tons; in drilling, 4,942 tons; and in stoping, 30,521 tons, making a total of 26,750 tons of milling ore broken, of which 33,705 tons were hoisted and 3,055 tons left in the mine. In addition to the 33,705 tons hoisted from last year's tonnage, there were hoisted 7,779 tons from stock piles on the surface, making a total of 41,484 tons hoisted, all of which went to the mill.

Work Accomplished.

The total drifting during the year amounted to 1,412 fe

king, 44 feet; raising, 73 feet; station cutting, 54 feet; and ping, 53,321 square yards for the year. The totals to date lude 977 feet of shafts, 9,028 feet of drifts and 895,260 c feet of stoping done in the mine.

STEEL COMPANY DIVIDEND.

e Steel Company of Canada has declared the regular quar- dividend of 1¾ per cent. on the preferred stock, payable ust 1, to shareholders of record July 22.

MOND NICKEL.

ond Nickel Company is about to issue £250,000 5 per cent. mortgage debentures at par for the new enlarged smelt- works at Coniston, Ontario, and other purposes.

CANADIAN COAL & COKE COMPANY.

he shareholders of the Pacific Pass Coal Fields, at a special eral meeting, ratified the by-law passed by the directors acquiring securities of the Canadian Coal & Coke Company, for selling to that company securities of Pacific Pass Coal ds.

The question of the consolidation in the Canadian Coal & Coke Company, Limited, of the control of the large coal properties in the west at Lethbridge, Pincher, Edmonton, and Yellowhead Pass, on the G. T. P., was fully considered and discussed.

The meeting, by a majority of more than two-thirds of all the shares represented, confirmed the by-law, thus approving the consolidation as in the best interests of all parties concerned.

The consolidated companies will control four of the finest coal properties in Western Canada, developed and equipped under the direct supervision of Mr. Charles Fergie, M.E., an engineer of experience and high standing.

The combined capacity of the mines will be about equal to that of the Dominion Coal Company, and their location will permit of the western market being supplied with the shortest haul.

STATISTICS AND RETURNS

COBALT ORE SHIPMENTS.

llowing are the shipments from the Cobalt camp for the k ending June 30, and those from Jan. 1, 1911, to date:

	June 30. Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger		55,200
Bailey		40,000
Barber		6,000
Beaver	62,500	779,208
Buffalo		1,405,860
Chambers-Ferland	64,000	703,000
City of Cobalt		557,980
Cobalt Lake	145,760	2,269,450
Cobalt Townsite		480,700
Colonial		88,000
Coniagas	58,030	2,112,210
Crown Reserve		1,275,420
Hargraves		161,100
Hudson Bay		585,960
Kerr Lake	60,050	1,382,090
King Edward		40,000
La Rose	130,344	3,184,570
McKinley-Dar-Sav.	174,575	3,163,605
Nipissing	306,247	3,330,107
O'Brien		673,040
Peterson Lake (Little Nip.)		58,430
Provincial		40,510
Right-of-Way	63,388	642,948
Silver Cliff		106,680
Standard		102,813
Temiskaming		860,852
Trethewey		672,380
Wettlaufer		117,232

e shipments for the week were 1,064,894 pounds, or 532 tor

e shipments from Jan. 1 to June 30 were 24,875,349 po ds, or 12,437 tons.

llowing are the shipments from the Cobalt camp for the we ending July 7, and those from Jan. 1, 1911, to date:

	July 7. Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger		55,200
Bailey		40,000
Barber		6,000
Beaver		779,208
Buffalo		1,405,860
Chambers-Ferland		703,000
City of Cobalt		557,980
Cobalt Lake	124,356	2,393,806
Cobalt Townsite		480,700
Colonial		88,000
Coniagas	59,524	2,171,734
Crown Reserve		1,275,420
Hargraves		161,100
Hudson Bay		585,960
Kerr Lake	60,340	1,382,090
King Edward		40,000
La Rose	170,303	3,254,873
McKinley-Darragh-Savage		3,163,605
Nipissing	188,631	3,518,738
O'Brien		673,040
Peterson Lake (Little Nip.)		58,430
Provincial		40,510
Right of Way		642,948
Silver Cliff		106,680
Standard		102,813
Temiskaming		860,852
Trethewey		672,380
Wettlaufer		117,232

The shipments for the week were 603,154 pounds, or 301 tons.

The shipments from Jan. 1 to July 7 were 25,478,503 pounds, or 12,739 tons.

Following are the figures of German consumption of foreign copper for the months January to May, 1911:

Imports of copper	tons	74,313
Exports of copper	tons	3,211
Consumption	tons	71,102

as compared with consumption during the same period in 1910 of 66,388 tons.

Of the above quantity 64,555 tons were imported from the United States.

B. C. ORE SHIPMENTS.

The ore shipments for the week ending July 1 were 39,044 tons, and the tonnage smelted was 36,835. The following is the record to date:

Slocan-Kootenay Shipments.

Sullivan	659	17,366
Society Girl	20	321
Silver Leaf	5	5
Fern	8	8
Richmond-Eureka	27	1,345
Rambler-Cariboo	31	923
St. Eugene, milled	420	15,576
Queen, milled	420	10,710
Granite-Poorman, milled	250	6,500
Knob Hill	132	1,938
Nugget, milled	110	2,860
Van Roi, milled	800	11,449
Other mines	.....	5,868
Total	2,882	74,869

Boundary Shipments.

Granby	19,744	496,655
Mother Lode	5,334	165,559
Jackpot	525	16,450
Rawhide	4,229	99,166
Athelston	277	3,110
Napoleon	449	3,177
Unnamed	236	510
Other mines	.....	36,252
Totals	30,794	820,888

Rossland Shipments.

Centre Star	4,309	101,455
Le Roi No. 2	425	13,916
Le Roi No. 2, milled	300	7,800
Le Roi	327	6,529
I. X. L.	7	50
Other mines	.....	378
Total	5,368	130,128

Granby Smelter Receipts.

Grand Forks, B.C.

Granby	19,744	496,655

B. C. Copper Co.'s Receipts.

Greenwood, B.C.

Mother Lode	5,334	165,559
Jackpot	525	16,450
Rawhide	4,229	99,166
Napoleon	449	3,177
Athelston	277	3,119
Unnamed	236	510
Other mines	.....	3,485
Total	11,050	291,466

Consolidated Co.'s Receipts.

Trail, B. C.

Sullivan	659	17,366
Centre Star	4,309	101,455
Le Roi No. 2	425	13,916
St. Eugene	91	3,400
Society Girl	20	32[illegible]
Knob Hill	132	1,93[illegible]
Le Roi	327	6,52[illegible]
Silver Leaf	5	[illegible]
Fern	8	[illegible]
Richmond-Eureka	27	1,345
I. X. L.	7	50[illegible]
Rambler-Cariboo	31	923
Other mines	.....	37,427
Total	6,041	186,683

TORONTO MARKETS.

July 8, 1911.—(Quotations from Canada Metal Co., Toronto)

Spelter, 5.85 cents per pound.
Lead, 3.65 cents per pound.
Antimony, 8 to 9 cents per pound.
Tin, 46 cents per pound.
Copper, casting, 12.80 cents per pound.
Electrolytic, 12¾ cents per pound.
Ingot brass, 8 to 12 cents per pound.

July 8, 1911.—Pig Iron (Quotations from Drummond, McCall Company, Toronto):

Summerlee No. 1, $22.50 (f.o.b. Toronto).
Summerlee No. 2, $22.00 (f.o.b. Toronto).
Midland No. 1, $19.00 (f.o.b. Toronto).
Midland No. 2, $19.00 (f.o.b. Toronto).
Hamilton No. 1, $18.00 (f.o.b. Hamilton).
Hamilton No. 2, $17.50 (f.o.b. Hamilton).
Clarence, $19.00 (f.o.b. Toronto).
Cleveland, $19.00 (f.o.b. Toronto).

GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.

July 7.—Tin, Straits, 44.50 cents.
Copper, prime lake, 12.75 cents.
Electrolytic copper, 12.67½ cents.
Copper wire, 13.75 cents.
Lead, 4.50 cents.
Spelter, 5.80 cents.
Sheet zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.50 cents.
Aluminium, 19.75 to 20.25 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $42.50 per ounce.
Platinum, hard, $44.50 per ounce.
Bismuth, $1.80 to $2 per pound.
Quicksilver, $44.00 per 75-lb. flask.

SILVER PRICES.

	New York. cents.	London pence.
June 24	52¾	24⅜
" 26	52¾	24⅜
" 27	52⅞	24 7/16
" 28	52¾	24⅜
" 29	52¾	24 5/16
" 30	52¾	24 5/16
July 1	52¾	24⅜
" 3	52⅝	24 5/16
" 4	Holiday	24 5/16
" 5	52⅞	24 7/16
" 6	52¾	24⅜
" 7	52⅝	24 5/16

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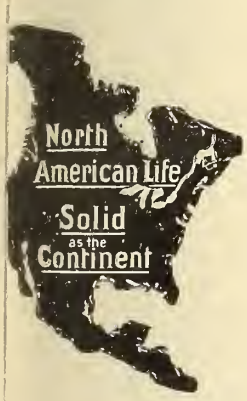

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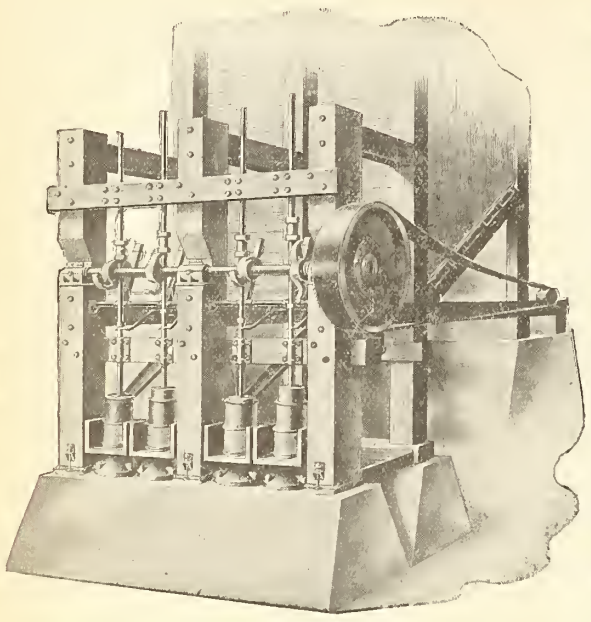

Nissen Stamp Mill

The Nissen Stamp Mil

STAMP. The Nissen Stamp drops with great crushing effect up a feed comparatively free of the fines caused by preceding impac This causes an actual splash which radiates from the centre of the d carrying the pulp to a circular screen, every aperture in which prese a full opening for the pulp which has already reached size to p through. As the stamp ascends preparatory for the succeeding blow, partial vacuum is formed under stamp shoe, which greatly assists the rapid return of the oversize to the die. The condition, the circular form of mortar, and the ascending stamp; lead to a suction effect which hastens the return of oversize to the die, a feature distinctive to the Nissen Stamp. Thus, a greater number of effective drops per minute is possible, resulting in greater capacity.

FEEDER. Each Nissen Stamp is provided with a tappet driven, automatic ore feeder of the Challenge type. This feeder is easily adjusted for different rates of feed, and is very sensitive in responding to the action of the stamp.

MORTAR. The Nissen Mortar is circular in plan and made to accommodate but one stamp, thus confining the crushing zone to a field of activity which forbids pulp coming to rest or becoming sluggish in that circulatory movement essential to efficiency.

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The screen of the Nissen Mortar is circular and extends more than half way around the mortar, forming an area of discharge for one Nissen Stamp equal to about two-thirds that employed for five stamps of the old type.

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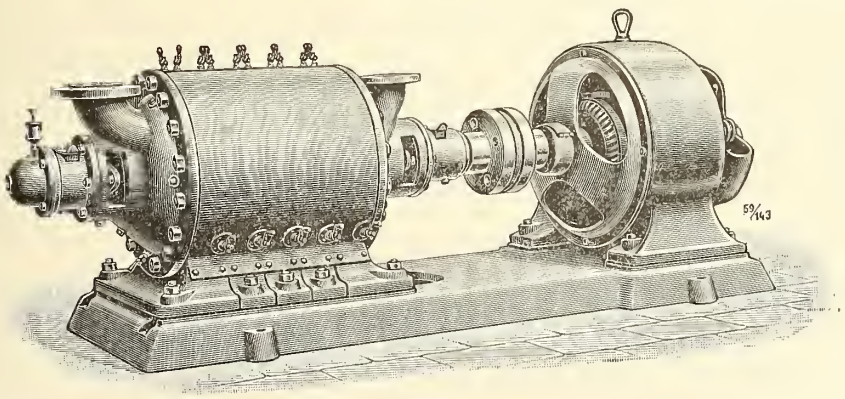

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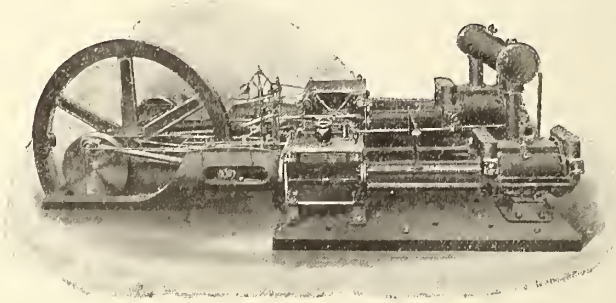

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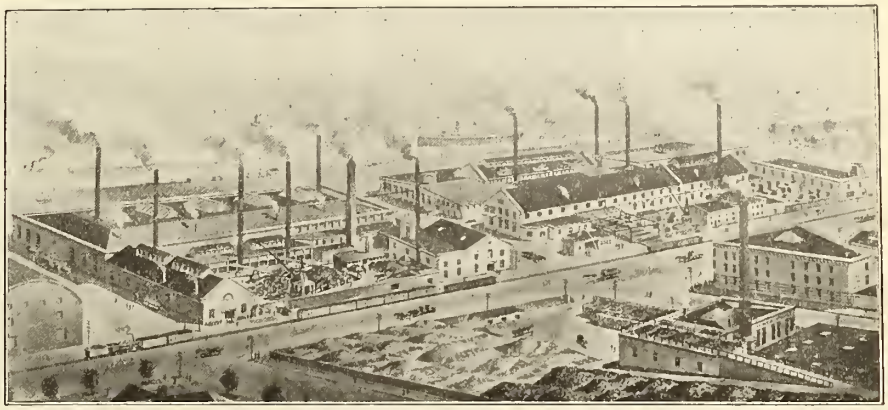

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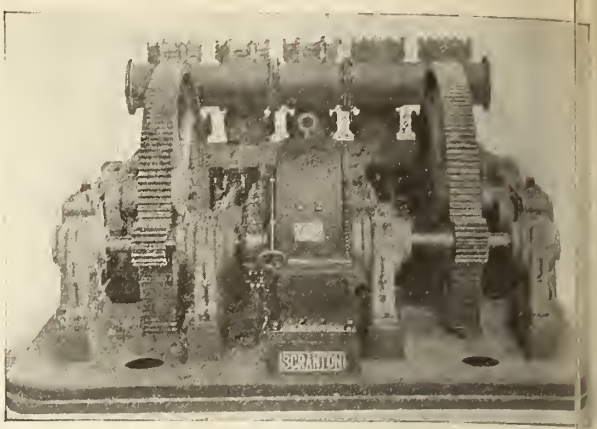

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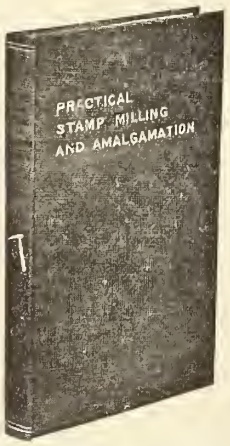

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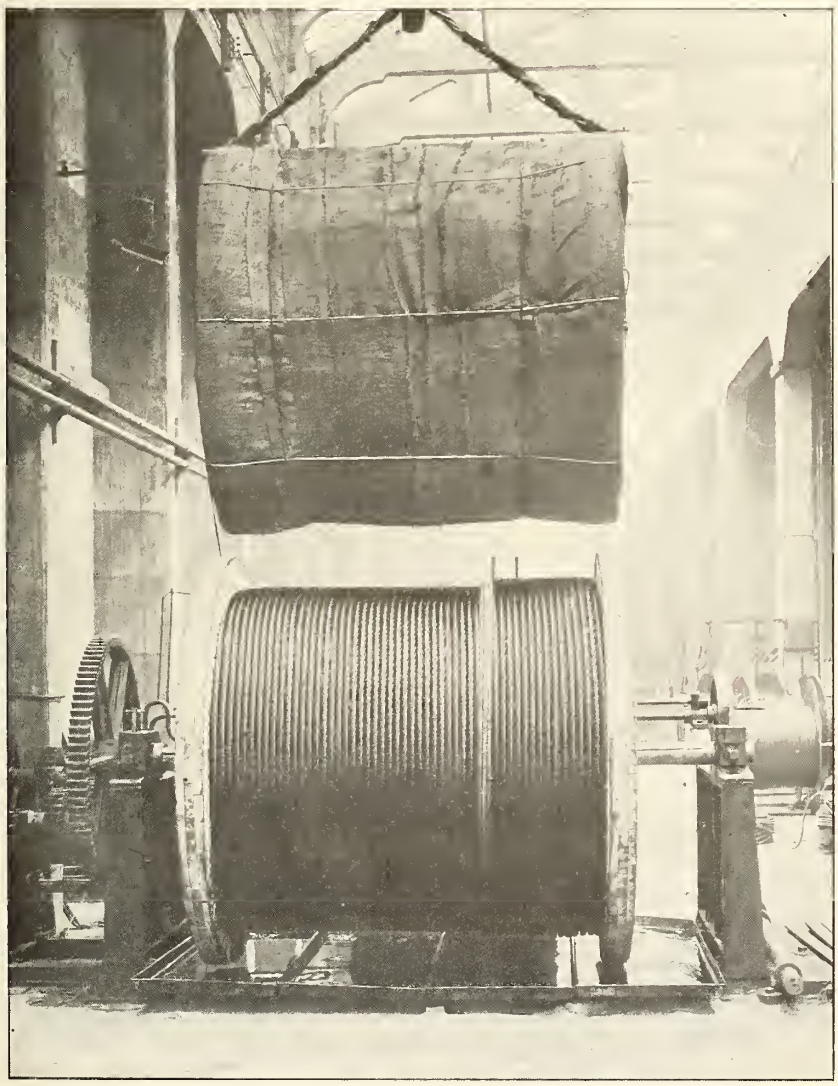

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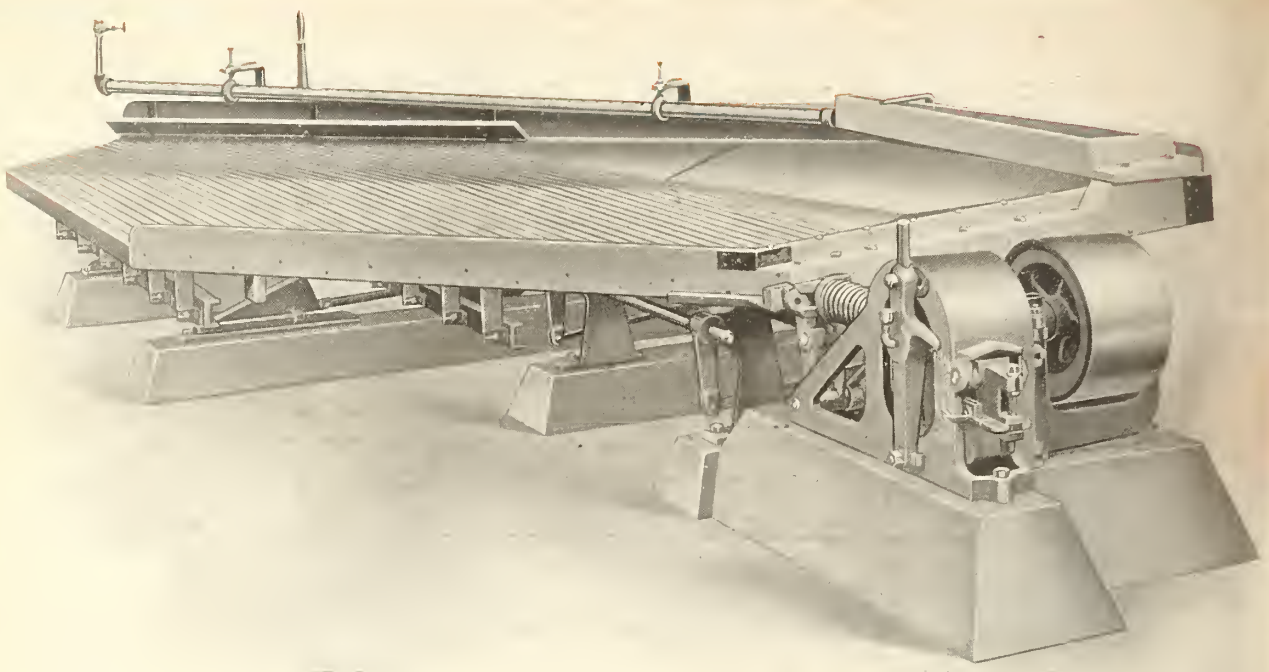

In a sixty day competitive test in the Coeur d' Alene District, the James No. 2 Sand table made a 20 per cent better extraction on the fine table feed than its four competing machines. We refer you to the Morning Mill, Wallace. Idaho; the Lead Silver Mining Company, Wallace, Idaho; the National Ore Concentration Company, Joplin, Mo., Cobalt Central Mill, Cobalt, Ont.; Nipissing Reduction Works, Cobalt, Ont.; Buffalo Mill, Cobalt, Ont.; Temiskaming Mill, Cobalt, Ont.; Trethewey Mill, Cobalt, Ont.; Hudson Bay Mine, Limited, Cobalt, Ont. Also the Balbach Smelting & Refining Company of Newark, N.J.

James Ore Concentrator Company, 35 Runyon St., Newark, N.J

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THE CANADIAN MINING JOURNAL

2 TORONTO No.

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CRUCIFORM
HOLLOW HEXAGON
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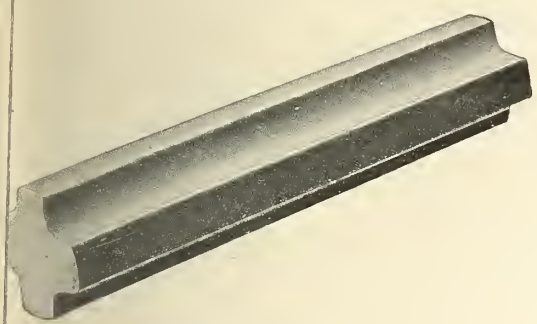

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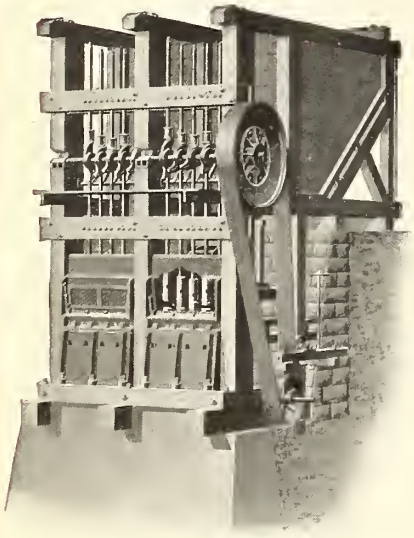
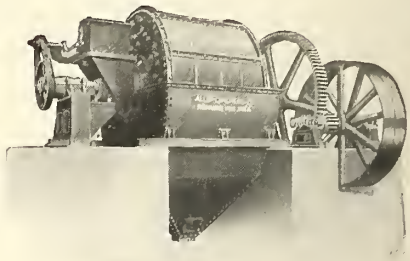
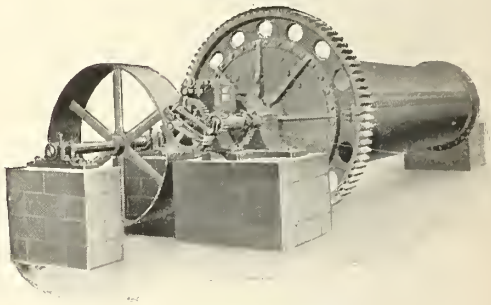


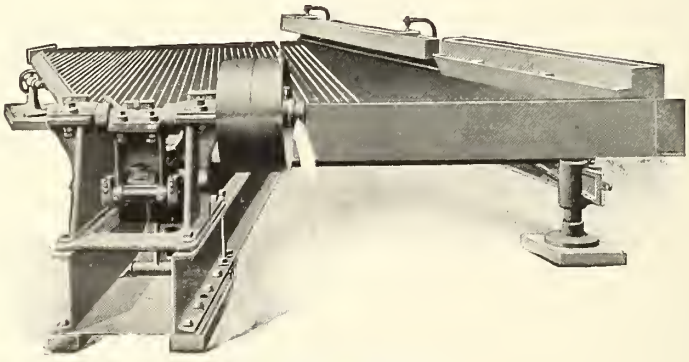
Stamp Mills
See Bulletin 1432



Ball Mills
See Bulletin 1444



Tube Mills
See Bulletin 1410



Frue Vanners
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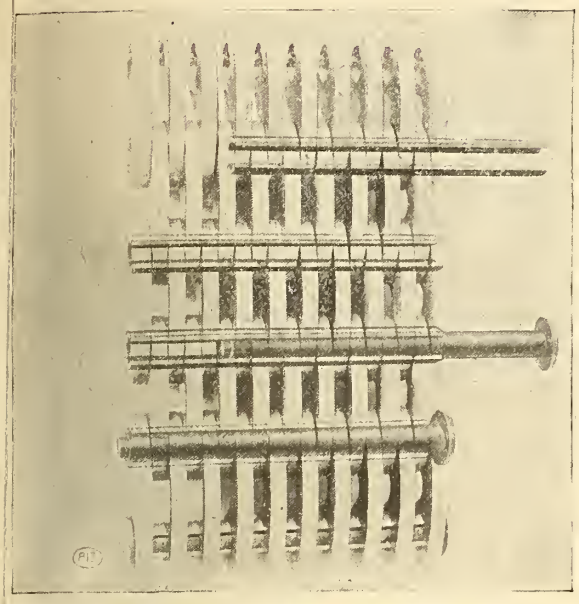

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THE SCREENLESS PATENTED

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ARE BUILT IN VARIOUS SIZES FOR

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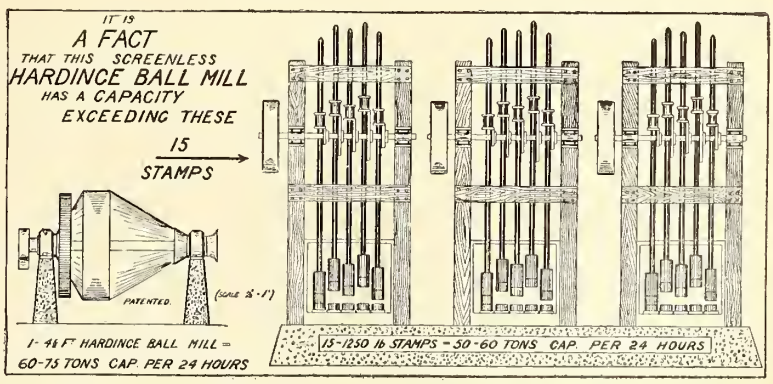

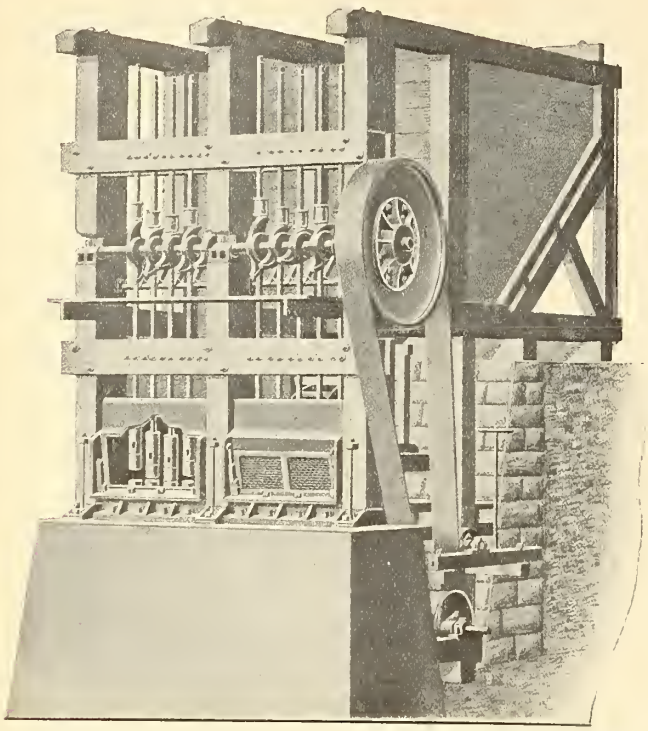

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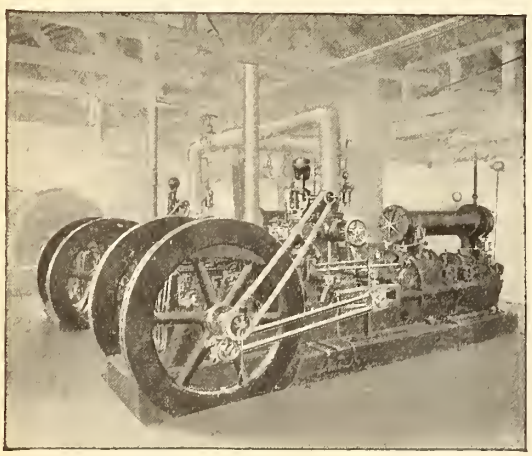

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New Bulletin No. 658-J.

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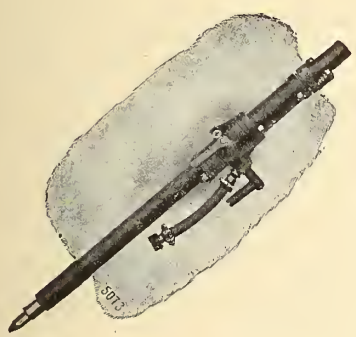

The action of the Telescope Feed Hammer Drill, for up holes is far more economical of power than that of the piston type.

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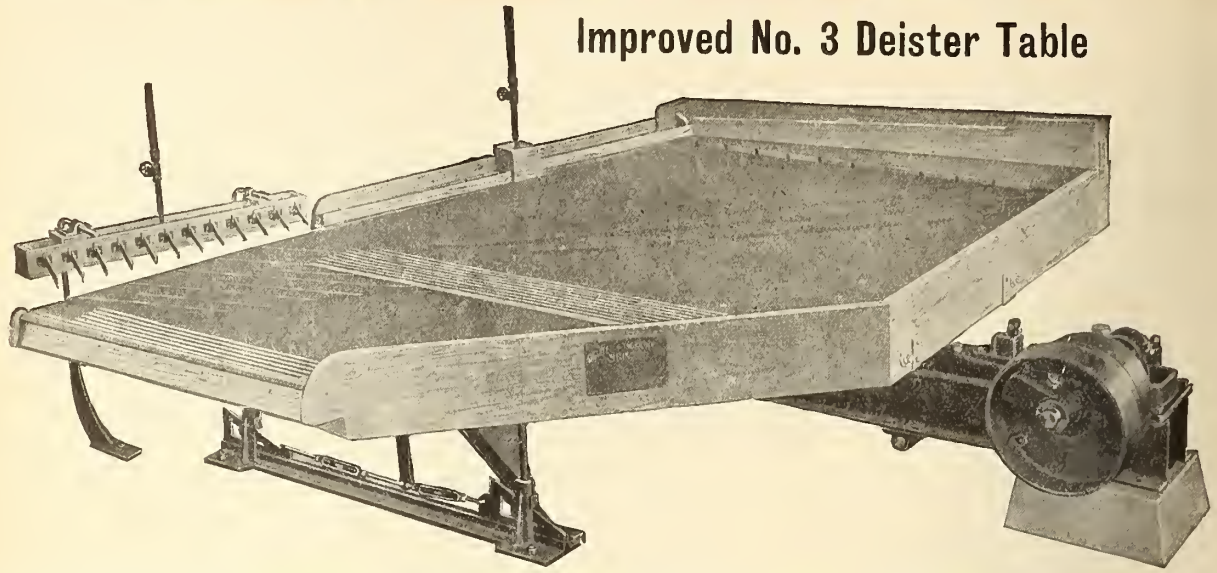

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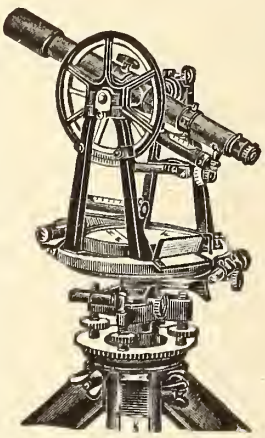

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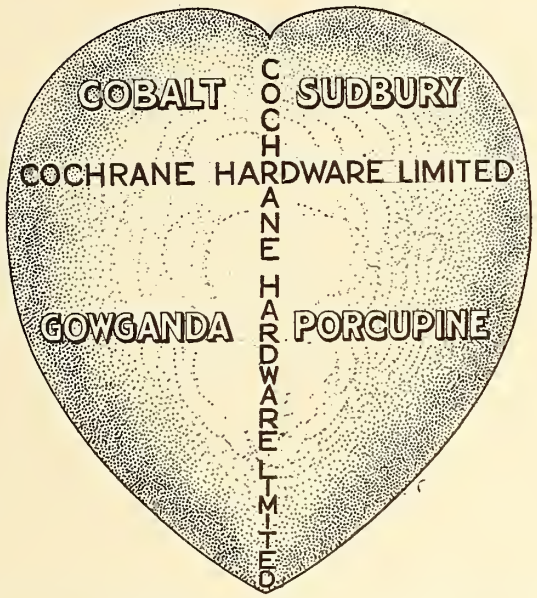

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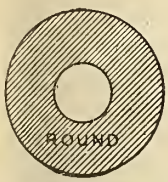

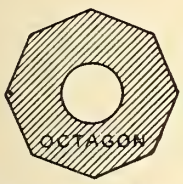

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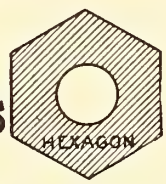

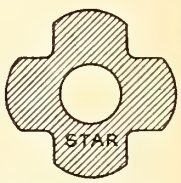

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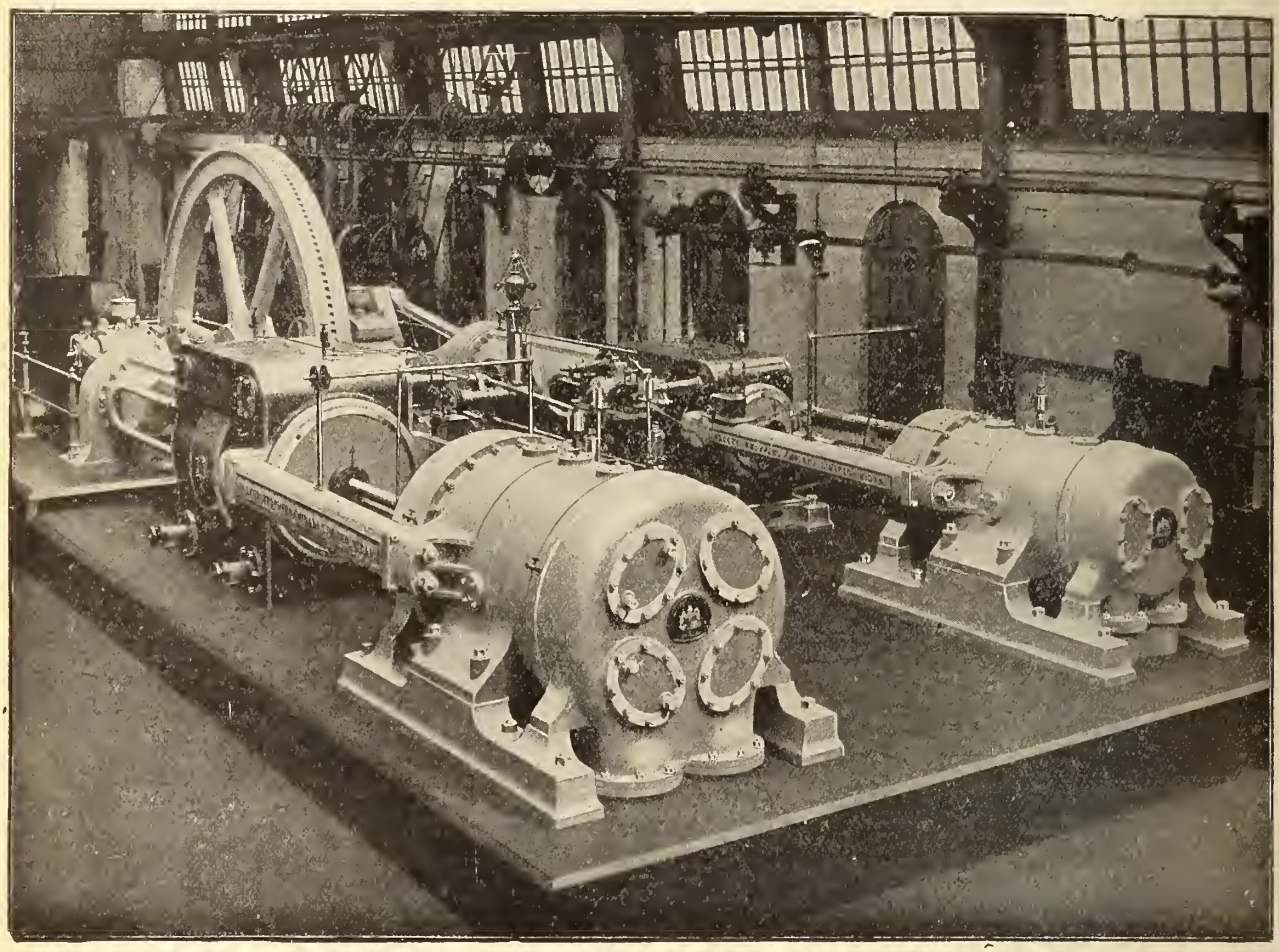

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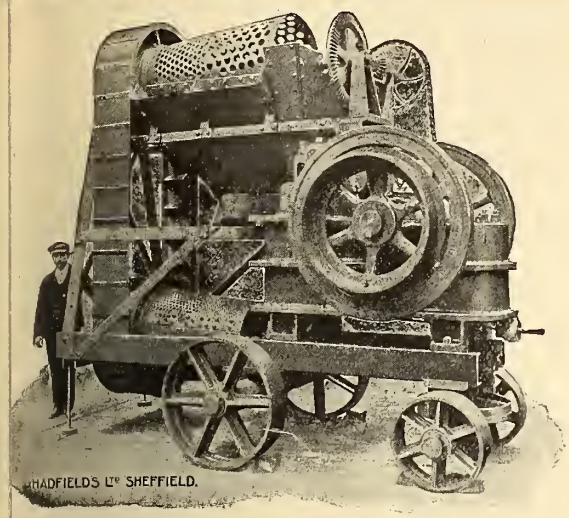

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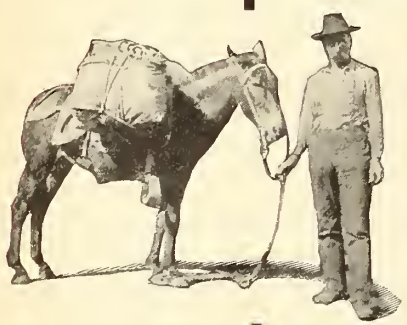
Going to the Hills?



Whether for pleasure or profit, you are sure to run across ore that will excite your curiosity. You may pick up a piece here, or a friend may hand you a sample there—you want to know what is in it—what it is worth. So why not take a

Way's Pocket Smelter

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this ad with your address or mail a postal, and we will send you our illustrated pamphlet—valuable in itself.

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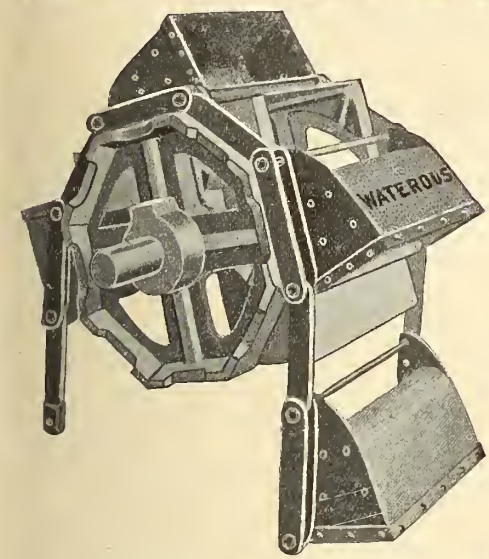
Ore Elevators



Our Chain Ore Elevators are made with or without geared heads and with either single or double strands of chains as requirements demand. Chains of special type or standard designs are furnished as desired.

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Standard and special designs, all sizes, adapted for handling ores, coal, stone, clinker and other bulky material. Our steel shop has the tool equipment and the men for turning out the highest grade of plate work of the most difficult kind.

We have the experience to back us up.

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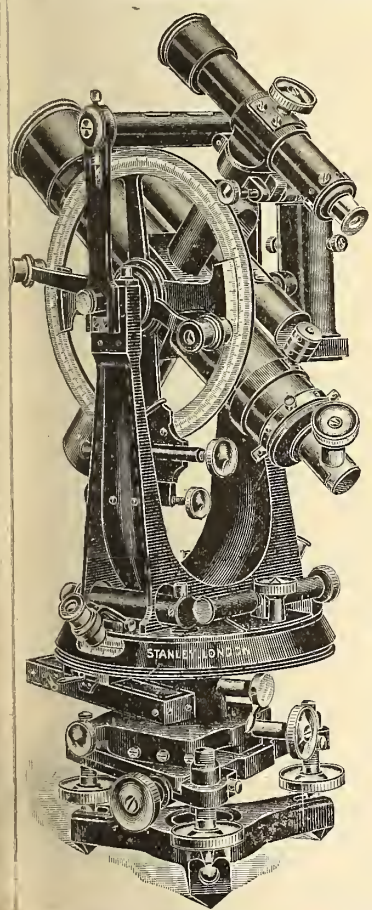

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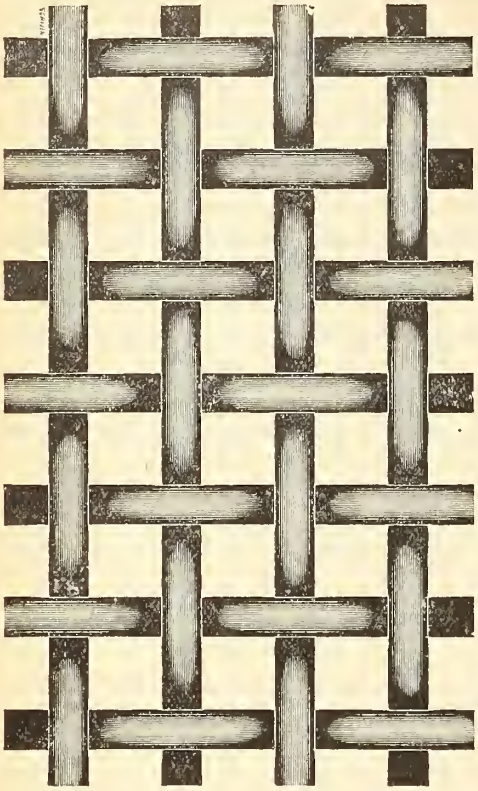

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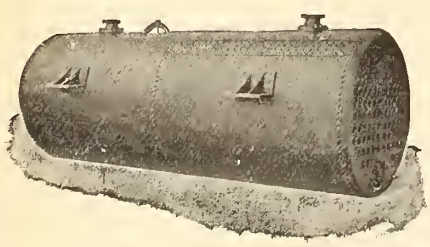

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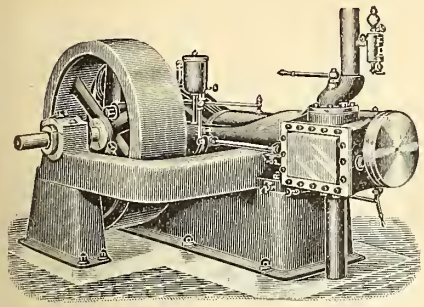

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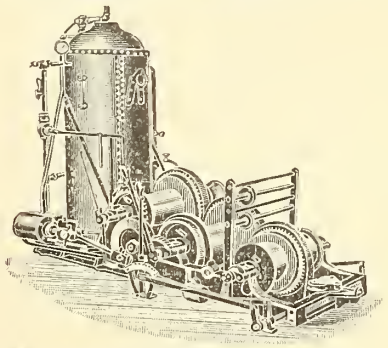

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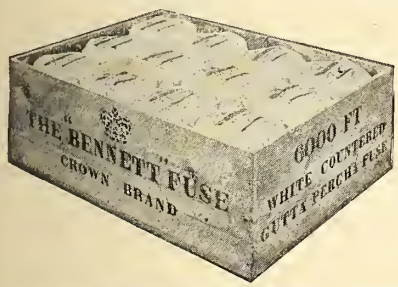

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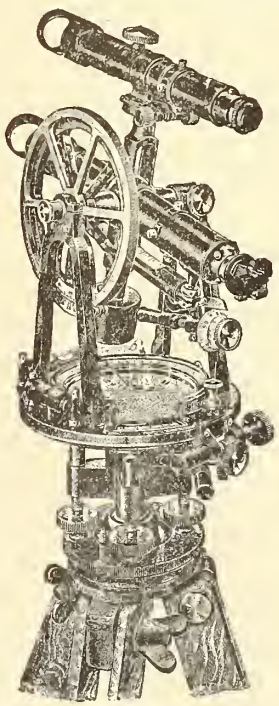

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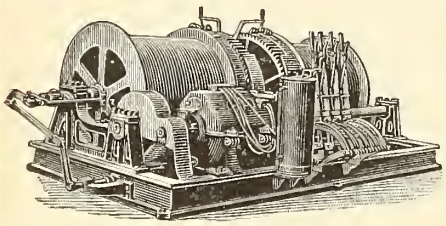

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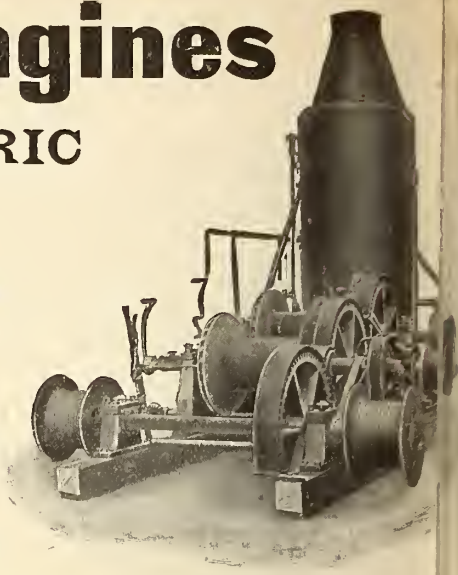

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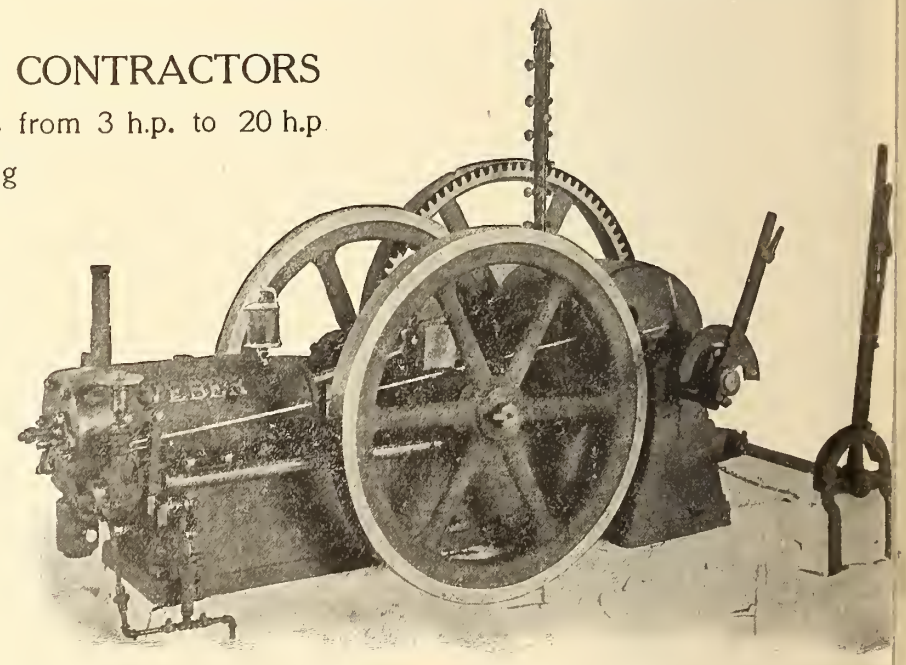

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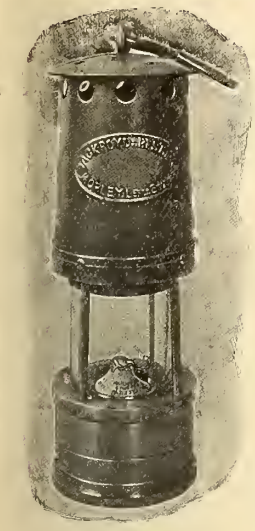

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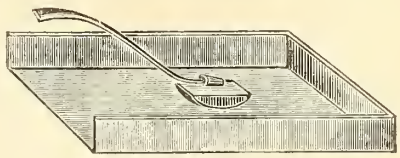

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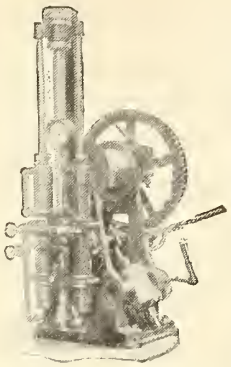

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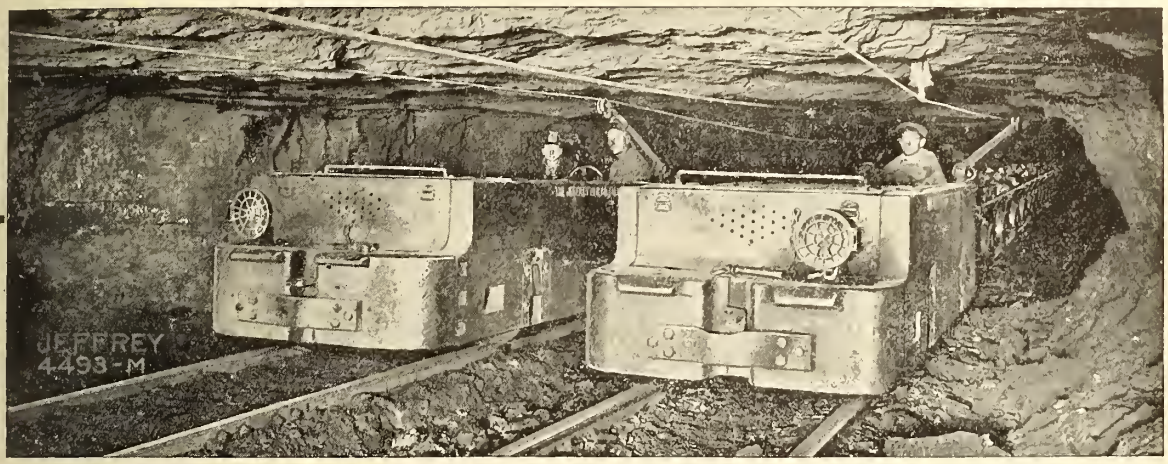

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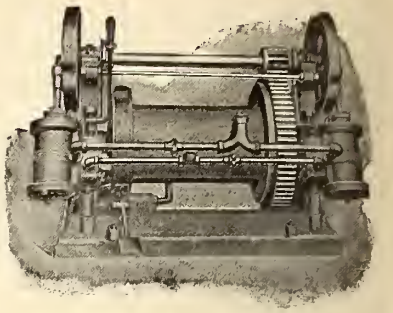

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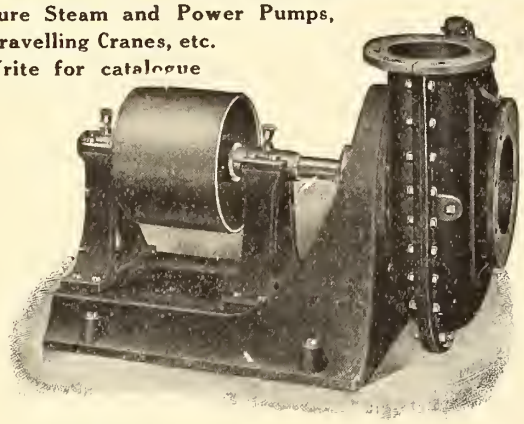

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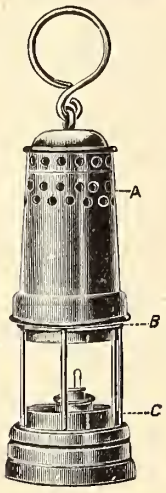

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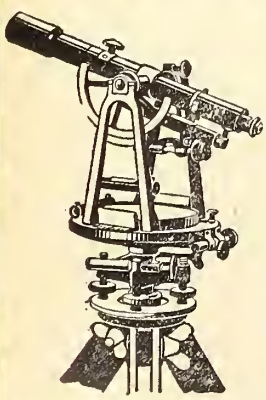

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VOL. XXXII. TORONTO, Aug. 1, 1911 No. 15

The Canadian Mining Journal

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Editor:

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THE PORCUPINE DISASTER.

It was with sincere relief that the public learned, a few days after the Porcupine region had been swept by fire, that the loss of life was not nearly so large as was at first reported. In the excitement of the moment fears became rumours, and rumours became apparently authenticated facts. But before three days had elapsed the list of fatalities had dwindled from the hundreds to less than seventy-five.

Amongst the many Canadian cities and towns that immediately contributed to the relief of Porcupine, it were invidious to select any for special mention. No second appeal was necessary. Supplies and money flowed into the stricken town from every quarter. Even from London and New York money contributions were sent.

It is not invidious to express warm appreciation of the prompt action of the Temiscaming and Northern Ontario Railway Commission. Under the direction of Chairman Englehart, the orders were at once issued to exact no railway fares from the survivors of the fire. In short, the whole service was placed, as far as necessary, at the disposal of the sufferers.

On other pages of this issue are personal accounts of the tragedy. It is needless here to recount the details. The loss of life has been stated. The property loss cannot be more than very roughly estimated. In all probability it amounts to $2,000,000. This is serious enough. But the loss of time is quite as serious.

On the credit side of the account is the fact that in future much greater care will be taken, both in prevention of fires and in the construction of permanent buildings. It is already announced that the Dome Mining Company will erect an entirely fire-proof mill to replace the building that was destroyed. No doubt other companies will follow this example. Doubtless, also, the Ontario Government will reorganize its forest-protection system. It will also do its duty in the matter of enforcing restrictive regulations upon the storage of explosives. It is only by sheer good luck that many lives were not lost through the explosion of large quantities of dynamite. The control of this question must be taken up at once.

* * * * * * *

Porcupine is being rebuilt with all haste. Next year hardly a trace of the havoc wrought will remain. The way of the prospector has been made easier. Large areas, almost impossible for the prospector before the fire, have been cleared. Yet it will not do to forget the awful lesson of July. Human life is infinitely more important than property. Places of refuge must be supplied at every forest-surrounded mine. The most practicable refuge is the "cyclone-cellar." In course

of time the mines themselves will be extensive enough to afford a safe breathing place for the men. Meanwhile, no chances need be taken.

GEOLOGY AND MINING.

That there must be a closer line of demarcation drawn between the mining geologist, the common or garden variety of geologist, and the mining engineer becomes every day more apparent. Not long ago the *Canadian Mining Journal* expressed the belief that no person who does not possess the academic degree has a right to append the letters "M.E." to his name. He may, of course, have every right to use the words "mining engineer."

It appears to us that of all professional men, the trained geologist does not require a superfluous queue of letters behind his cognomen. No matter how many alphabetic feathers may be stuck in his tail, they impress only the unthinking.

But the assumption of the title and status of mining engineer by the geologist is not merely a question of good taste. Not seldom it brings grave discredit upon both professions.

Recently we were shown several reports upon mining properties, reports written by a geologist. All of these properties lie in the same region. Each of these reports contained a summary of the superficial geology of the region, a summary couched in hypertechnical terms. To the mining possibilities one or two paragraphs were devoted. No recommendation was made as to methods of prospecting or scale of equipment. The whole pith of the document was contained in one sentence that indicated the writer's belief that the veins were of deep-seated origin.

Now this kind of thing may be "geology," but it is not "mining geology," nor is it "mining." As the reports in question were accompanied neither by assay-maps, nor by any data as to cost of supplies, transportation, labour, etc., etc., they were absolutely useless as guides to the investor. Whatever vague references to mining they contained were of such a nature as to furnish ammunition for colouring a prospectus.

* * * * * * *

It is far from our intention to cast stones at the geologist *per se*. In initiative and in practical service he is second to none. But he gets into deep water when he confounds his proper functions with those of the mining engineer. The mining engineer often needs and requests the aid of the geologist, both in the prospecting stage and the later development of the mine. We have yet to hear of a mining engineer usurping the field of the geologist.

With the mining geologist, who is a relatively modern product, the case is different. His advice is required when geological problems arise affecting the future of a working mine, or in identifying the geological features of territory near established mines. Whilst his work necessarily indicates the scale upon which development may proceed, the actual plans for the future are determined by the engineer and modified by financial c-sideration.

In conclusion, it may be reiterated that the time s come for careful differentiation between the th branches of the profession. There will always be a c-tain amount of overlapping because the attainments a experience of every professional man vary. But in undignified confusion of to-day there is little of rea and less of dignity.

IMPOSING ON EUROPE.

On another page will be noticed a letter, sign "Germanicus." The writer of this letter is intimat acquainted with conditions of promotion and inve-ment both in Canada and Europe. His opinions entitled to respectful consideration.

The four maxims that our correspondent develops as follows:

"1. Every promising Canadian venture, which d
" not require millions, can be financed in Canada or
" the United States.

"2. Every larger enterprise demanding millio
" that can not be financed in the United States, becau
" the promoters have not the required connections the
" can be financed in London, provided it is sound.

"3. Every Canadian proposition that is being
" fered on the other side of the ocean by Americans
" to be considered as suspicious.

"4. Every Canadian venture offered on the C
" tinent, without a substantial reason for its being
" fered there, or without a most intimate and dir
" connection between Paris, Brussels, or Berlin, a
" the promoters, is more than suspicious."

Strong exception may possibly be taken to the sweeping generalizations. For instance, we know isolated cases where the promoter could not get a hea ing in Canada or the United States, despite the fa that his scheme was exceptionally sound. Often, al the vendor of a meritorious property feels that he w get better treatment on the other side of the Atlantic.

These exceptions, however, help to prove the rul To-day when all kinds of industrial schemes and eve variety of mining ventures are being taken over to Gre Britain and Europe, when the whole of Canada is bei raked over to secure something to sell, when, in fac Canada has become the chief hunting-ground of t adventurer, the warnings of our correspondent are har ly exaggerated. Where they may be unfair to the fe they embody cautions that should be carefully observ with all.

As a matter of fact, Berlin and Paris seem to be t dumping-ground of bad Canadian enterprises. T average business man of both these cities is unbelievabl ignorant of Canada. He hears only good of this cou try. And he becomes the ready dupe of the u scrupulous.

There are many reputable Canadians, of course, whose European connections permit them to lay proposals for investment before foreign investors. Our correspondent's strictures are not meant for them.

A NEW MILL.

In South Africa the Giesecke mill, a new modification of the tube-mill, is being tried out by the Mines Trials Committee.

The manufacturers of the mill claim that one Giesecke, with a capacity corresponding to 50 to 60 stamps, costs less than one-half the price of a stamp-mill of the same capacity.

The trial of the Giesecke is being conducted at the Geldenhins Estate. Here 50 stamps are hung up and the ore is being diverted to the Giesecke. The ore is in lumps as large as 7-inch cubes. The pulp at the discharge end of the mill is so fine that more than 80 per cent. passes a 200-mesh screen. Late reports place the capacity of the mill at 370 tons per day, the amount of water used being only 30 tons for each 100 tons of ore crushed.

The Giesecke mill is shorter than the standard size Rand tube mill. Of its entire length of 24 feet, one-quarter is of greater diameter than the rest of the cylinder. The larger end contains the larger steel balls, the portion of smaller diameter the smaller balls. The balls are in eight sizes, from 4-inch to 1¼-inch diameter. The two sections are divided by a screen or sizing plate. The steel balls weigh 23 tons in all, the liners 16½ tons, and the cylinder 15¾ tons. The charge is 9 tons, and the motive power required about 250 horse-power.

Amongst other claims advanced for the new mill, it is asserted that only a minimum of supervision is required and that lubrication is entirely automatic.

The Rand is making rapid strides in the metallurgy of gold. The existence of an official committee, whose duty it is to examine and test each notable invention or process, lends weight to any departures from fixed practice.

THE WESTERN STRIKE.

The strike of the coal miners in the Crow's Nest and Western Alberta districts is causing very serious loss. According to the estimate of Mr. A. C. Flumerfelt, the miners and employers are dropping about $20,000 per day. As the strike began on April 1st, the grand total that the strikers will be out on August 1st reaches the aggregate of $2,000,000.

There seems to be no sufficient reason why work should not have continued whilst the dispute was being settled in a rational manner. If the Industrial Disputes Act means anything, if it is to be anything but an added source of expense and strife, it surely should be effective in promoting the continuance of work and the peaceful arbitration of differences.

What is really required is the abolition of the haphazard choice of inexperienced and inapt chairmen. This lesson was well illustrated by the satisfactory settlement of the Dominion Coal strike. In this case, Dr. Adam Shortt, an official of eminently sane and judicial mind, brought operators and employees together with a minimum of noise and friction. It is a grand pity that some similarly diplomatic person could not have been made chairman for the committee that reported upon the Western strike. Incidentally, all the futile exchange of amenities in the public press would then have been avoided.

It is clearly evident that Dr. Gordon, as chairman, was out of his depth. The wording of his report was indiscreet and painfully florid. Neither in experience nor in temperament is a man of his type suited to the task of dealing with problems in real life.

EXPORTS AND IMPORTS OF CANADIAN MINERALS.

During 43 years, covering the period 1868-1910, inclusive, according to the statisties collected in the Canada Year Book, a Government publication, Canada has exported mineral produce valued at $530,920,916. The great bulk of this has gone to the United States, that country taking no less than $475,292,324, or, roughly, 90 per cent. of the total. Great Britain is a bad second, with only $29,838,991 to her credit. The remainder, $25,789,601, was distributed in small amounts to many other countries. Thus, whilst we have shipped nine-tenths of our mineral exports to the United States, we have sent only 5.5 per cent. to Great Britain.

In the export returns for the year 1910, the relative position of Great Britain shows a slight improvement over the general average. Of our mineral exports she took about 9.5 per cent., whilst the United States took approximately 83.5 per cent.

Whatever errors there may be in these figures, and it is undeniable that our official statistics are far from correct, they are relatively accurate. In the aggregate, they probably do not wander from the truth by more than 10 or 15 per cent. A closer analysis of the distribution of exports is unnecessary. The comparison between our two chief customers is sufficient. And the facts must be faced, no matter what our feelings as private citizens may be.

There is room for speculation as to the probable effects of complete free trade in mineral commodities with Great Britain or the United States, or with both. There is no doubt about our present position.

A GENEROUS COMPANY.

More than passing notice is due the T. Eaton Company for the exemplary despatch with which a carload of provisions and clothing was sent to Porcupine. News of the fire reached Toronto on Tuesday evening, July 11th. On Wednesday a carload of 20,000 pounds

of provisions, clothing, blankets, bedding, and sundries, including large quantities of first-aid materials, was got together. On Thursday morning the whole lot was sent off by express, reaching Porcupine on Saturday morning. Nothing could have been more timely.

The incident shows what perfect organization, combined with human kindness, can accomplish.

EDITORIAL NOTES.

There are now 67 gold-producing companies operating in the Transvaal. Altogether 9,941 stamps are in commission.

What action the Government of Nova Scotia will take in regard to the flooding of the Port Hood submarine areas is not yet announced.

Keen interest is being manifested in gold mining in Lake of the Woods and Sturgeon Lake. A number of Toronto mining engineers and operators are developing prospects and re-opening abandoned mines.

Dr. A. S. Mackenzie has been elected president of Dalhousie University. Dr. Mackenzie's record in several professional chairs is thoroughly good. He is a Nova Scotian. He will probably occupy the chair of physics.

A strictly followed tradition has hitherto kept from the coinage of Mussulman countries the representation of living creatures. Now, however, the Bank of Morocco has placed with the Paris mint an order to strike silver coinage bearing the effigy of Mulai Hafid.

The British Radium Corporation, Ltd., a subsidiary of St. Ives Consolidated Mines, has already sold $50,000 worth of uranium oxide and radium extracted from pitchblende mined at the Trenwith mine, Cornwall, England.

Canadian coal is being tested by the United States navy. The flagship of the second division of the Pacific fleet, the "West Virginia," has taken on 900 tons each of Comox, Nanaimo, and South Wellington coal. The coal will be given a thorough test. Eleven days of steaming will be required to complete the trials.

The average annual profits of the Mond Nickel Company for the past five years have been £122,239. In 1911 the profits were £148,214. The authorized capital is £850,000. The preferred stock, £400,000 issued, pays 7 per cent. The ordinary shares have paid from 12½ to 16¼ per cent., and substantial dividends have been distributed on the £50,000 of deferred shares.

The Hillcrest Collieries, Limited, operating the Hillcrest coal mine, situated near Frank, Alberta, on July 15 paid its second dividend of 1¾ per cent. on its preferred stock. The total of dividend was $12,350. A similar amount having previously been paid, the total of dividends paid to date is $24,700.

Personal and General

Mr. J. B. Tyrrell has left for a short visit to Lon. He will return to Toronto in September. His Lo address is 224 Salisbury House, E.C.

Mr. R. B. Lamb, Toronto, is leaving on an exte trip to Cobalt, Porcupine and Swastika, to inspect properties with which he is connected.

Lieut.-Col. R. G. Edwards-Leckie and Captain H. Kirkpatriek are inspecting several Portland C mining properties, including the Lordigordy, F Portland, and American Creek.

Mr. Chester Wells Purington has taken office number 62 London Wall, London, E.C. Mr. Pu ton's specialty is the examination of mining prope in the Russian Empire.

Mr. C. F. Dike, jr., general manager the C Charter, Porcupine, visited Montreal and Toront business shortly after the fire. He has returned to cupine, accompanied by Mrs. Dike.

Mr. J. M. Turnbull, one of the mining engineer the staff of the Consolidated Mining and Smelting pany of Canada, Ltd., has lately been engage examining mining properties in the Skeena district,

Mr. M. K. Rodgers, of Seattle, Washington, who, working under a roving commission to find mines the late Mr. Marcus Daly, chose the Nickel Plate gr in the Similkameen district, and the Hidden C group, near Observatory inlet, as likely to meet th quirements of his principal, is still giving attentic British Columbia.

Mr. W. C. Thomas, formerly manager for Dominion Copper Company, at Boundary Falls, recently visited Portland Canal district, with a vie advising the company owning the Red Cliff copper concerning the selection of a site for a smeltery sh it be found desirable to establish local copper redu works for Red Cliff ore.

Mr. C. D. Emmons, of Eugene, Oregon, who is a in an advisory capacity to the B. C. Oilfields, Ltd Vancouver, B.C., recently again went north the scene of the company's operations, on west coast of Graham island, of the Queen Char group. A standard drilling plant is in use, and hoped oil will be found in the bores being put dow

Mr. W. H. Trewartha-James, general manager o Tyee Copper Co., Ltd., has returned to his head arters at Victoria, B.C., from a business visit to mi camps in south-eastern Alaska, southern Yukon, northern British Columbia. The Tyee Company's ing and smelting business covers practically the Pacific coast, from the west coast of Mexico to Al

Mr. W. Satchell Clarke, of Vancouver, B.C., charge of the B. C. Drilling and Dredging pany's drilling operations on Tulameen River, the gravel is being systematically tested in pros ing for placer gold and platinum. At present wo being done along the river above the town of Tulam long known as Otter flat. Several streams tributa the Tulameen yield both gold and platinum.

Mr. William Fleet Robertson, provincial mine gist for British Columbia, is engaged this summe examining, and obtaining information relative to mineral-bearing district around Hazelton, in the Sk River country, in which the occurrence of both me and non-metallic minerals is known, and prospe have been at work during parts of several recent y

Geological Survey of Canada is also continuing ork in this district.

cials of the Granby Consolidated M., S. and P. td., were at Goose bay, Observatory inlet, last , determining the nature of further development to be done on the mining property the com- has purchased from the Hidden Creek Copper g Co.; also deciding what surface improvements be made to ensure greater economy in the expen- of the comparatively large sum appropriated for the mine, with the object of making its immense of ore available for extraction at low cost.

D. A. McMillen, chief consulting engineer of the Exploration Company, 64 Wall Street, New City, is at present spending a few weeks in Cen- nd Southern Mexico, where he is examining pro- s for the interest of his company. About August e will go to the State of Sonora, where he will ue his investigations and examinations of cer- silver properties. Mr. Horace H. Howard, also lting engineer for the same company, is at pres- oing special consulting work in the Porcupine dis- He was in Porcupine at the time of the disas- forest fire and narrowly escaped death from ng.

Correspondence

CANADIAN PROJECTS AND THE EUROPEAN INVESTOR.

Editor Canadian Mining Journal, City.

,—The recent attempt to sell Porcupine mining on the Continent, stock in a prospect where no gold ings exist, on which no report of a mining engineer blished; and the further attempt to finance a coal- osition in the Crow's Nest area, where the owners only the hope of discovering the seams which their bours are supposed to have, induce me to issue a energetic warning on the Continent, in order to uard future *bona fide* Canadian enterprises. This ing I have couched in the following maxims:

1 Every promising Canadian venture, which does require millions, can be financed in Canada or in the ed States.

2 Every larger enterprise demanding millions that not be financed in the United States, because the oters have not the required connections there, can nanced in London, provided it is sound.

3 Every *Canadian* proposition that is being offered *Americans* on the other side of the Ocean is to be idered as suspicious.

4 Every Canadian venture offered on the Continent, out a substantial reason for its being offered there, ithout a most intimate and direct connection be- n Paris, Brussels, or Berlin, and the promoters, is than suspicious.

ll of us have every reason to stop such proceedings.

Yours truly,

GERMANICUS.

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he Spokane Asbestos Fire Brick Company will tly erect in Spokane, Washington, U.S.A., works will be equipped for the manufacture of various conducting materials. The asbestos property owned the company is situated 14 miles south-east of miah, Idaho.

ZINC ORE REDUCTION EXPERIMENTS.

In the course of an address on the Reciprocity issue he made at a public meeting held at Nelson, British Columbia, on July 10, Hon. Wm. Templeman, Dominion Minister of Mines, is reported by the Daily News to have said: "Some friends in this city asked me to-day concerning the matter of the experiments in connection with the reduction of zinc ores. Well, at present I have not very much that is specially new to say on this subject. I have some knowledge of the zinc question and also of lead. Some years ago we gave a bounty on the production of lead, and this has still a year or two to run. But what to do with our zinc ores has for years been a question with the miners of this country.

"At the request of the people of this city we took up the question of the electrical smelting of zinc ore. I had $50,000 set aside for carrying on experiments, and these experiments are still going on. I secured the services of W. R. Ingalls, of New York, who is said to be the greatest expert in zinc on this continent. We also submitted certain problems to be solved in the laboratory of McGill University by Professor Stansfield, a young electrical engineer, who has made great progress in the study of such problems, and the report of Dr. Haanel is that these experiments are meeting with considerable success, and he hopes at an early date to be able to make a report that will satisfy the mining interests, and that something definite will be achieved. However, I am frank to say that trying to discover a new process of zinc smelting is something that no one can say is certain to succeed.

"It has been suggested—why did we not negotiate an agreement with the United States for free admission of our zinc ore? Now that is something I am fully in favour of, until such time as we shall be able to smelt it successfully in Canada. Let me take you into my confidence and tell you this—that Hon. Mr. Fielding, at my request, pressed that very point on the American representatives, but was unable to get them to agree to admit zinc ores and lead, the interests on the other side being too strong. So we are still trying to discover a method of smelting our own zinc ores, and I hope we shall succeed. We shall keep on until the whole $50,000 shall have been spent, anyway; though we have not yet spent very much of the amount."

The opinion that bornite ore does not occur at depth is by no means uncommon, for it is frequently expressed in some copper mining districts. For instance, several years ago the manager of the Marble Bay mine, situated on Texada Island, British Columbia, was told by visiting mining men of experience and good professional standing that the bornite ore then being mined there would not "go down." However, it was afterwards proved that it did go down, for during the last year it has been mined on the 1,100-ft. level, and its continuation down to the 1,200-ft. level was expected with confidence. On July 1 The Mining Journal, London, England, included the following in its correspondence from Australia: "It is stated that at the North Mount Lyell mine, Tasmania, very rich ore continues to be won at the 1,100-ft. level. A specimen block of solid ore that has been brought to the surface is of marvellous richness. It weighs half a ton, and consists of bornite largely associated with copper glance, the copper contents being estimated at 60 per cent., while the approximate value of the specimen is £15. There are said to be hundreds, and probably thousands, of tons more of similarly rich ore existing in the stope whence came the specimen in question."

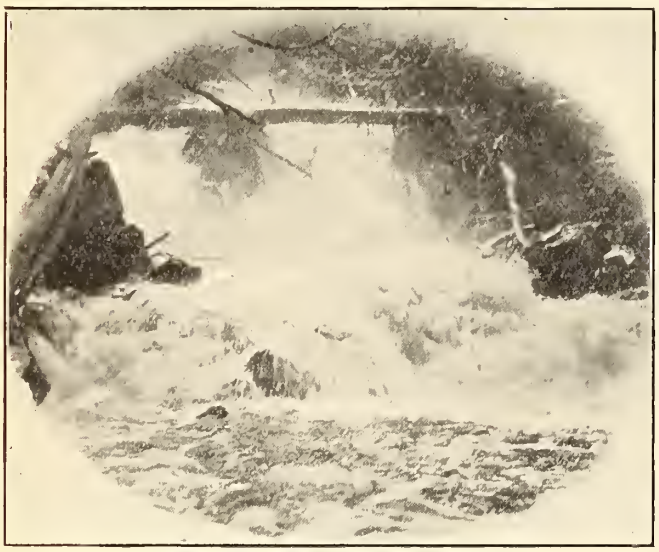
GOWGANDA & ELK LAKE RAILWAY

Special Report of A. B. Willmott for Operators.

Mr. M. L. Foley, President,
The Gowganda & Elk Lake Mining Association,
Toronto, Ontario.

DEAR SIR,—

From March 12th to March 24, in company with Messrs. Cole and Mickle, representing respectively the Temiskaming & Northern Ontario Railway and the Provincial Government, I made an inspection of the working mines and some of the prospects in Elk Lake and Gowganda. The object in view was the determination of the probable freight which a railroad would secure if built through that section of country. While the snow roads afforded a quick and easy means of transport, the snow itself prevented the examination of many promising properties. In a few cases the prospectors had cleared off the snow from promising shows at considerable labour and expense. More frequently nothing was to be seen at many of the most promising prospects. We visited 23 properties in all. The names of 36 others, which are said to have promising veins, were handed to us by the local committee. Scores of other claims have been staked in the country, many of which will doubtless prove of equal value when developed.



Hanging Stone Falls, Gowganda

Stoping out Concentrating Ore at Millerett Mine

The adverse conditions under which development work is progressing in this district are so well known to you that it is superfluous for me to mention them. Nor need I present any argument to you as to the necessity for a railroad if the region under discussion is not to go back into its original wildness. The argument should rather be directed to the people of the Province of Ontario, who are quite as much interested as you in the subjection and development of this wilderness.

Why the People of Ontario are Concerned.

From a sentimental reason Ontario as a whole is interested in the development of Northern Ontario which constitutes two-thirds of the Province. It is important to us as Canadians that the uninhabited territory north of the Great Lakes should be settled. Wherever resources occur, be they timber or mineral or agricultural lands, the people of the Province are interested in seeing these utilized and prosperous communities founded.

Apart from the sentimental reason the people of Ontario are concerned because the development of these resources adds to the revenue of the Province. The revenues from northern Ontario have in the past obviated the necessity of direct taxation. Elk Lake and Gowganda have contributed very largely, and these revenues are to continue better facilities for development of the country must be provided.

The whole of this territory is owned primarily by the people of Ontario. When a mining claim is leased to an individual they very properly require that assessment work shall be done, and that the property shall not lie idle. The principle lying back of the assessment work is that undeveloped properties are useless to the Province as a whole. The largest owner of undeveloped properties is the public itself. If it is right to require the private owners of mineral lands to develop these lands it is also right to require the public to develop their part. One cannot ask that the public shall go into the exploration of mining claims but one can demand, and quite fairly, that the public shall bear their part of the cost of development by providing proper transportation facilities.

The people in older Ontario fail to realize the great distances between railroads in the north country. For instance, from Charlton, the terminus of the railroad to Gowganda, a distance of about 45 miles, is considerably further than from Toronto to Hamilton, and owing to the character of the roads, is quite as serious in the matter of freight as to have to haul by team from Toronto to Brantford.

The teaming of 100 h.p. boilers and other machinery from Toronto to Brantford, would be a most serious drawback to the development of the latter city if that were the only means of transport, and yet that is the condition in Gowganda. It is thus not surprising that the people in the north want railroads built by the province or that public assistance be granted private companies to encourage them to build. The increase

in alue to the public of the unoccupied lands warran such action.

Why a Railway is Necessary.

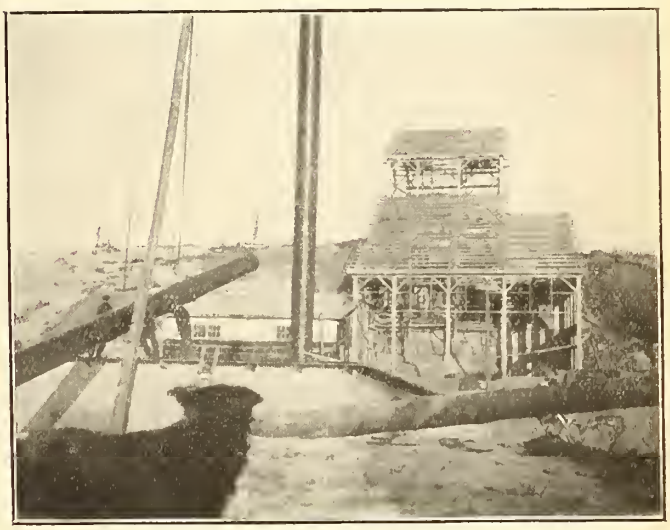
Compared with Cobalt, the Elk Lake-Gowganda district is a low grade camp, though in comparison with many silver districts of the world its ore would rank as high grade. Cobalt has the advantage not only of enormously rich ore, but of low freight rates, as compared with most mining camps. For this reason profits of mining there have been unusually great, and the necessity for close scrutiny of working costs has not arisen. In Elk Lake and Gowganda, on the contrary, the closest attention to detail is required and every expense must be carefully scrutinized just as in all industrial business. There are properties which could undoubtedly be made to pay, to the profit of their owners and to the advantage of the Province as well, if proper transportation facilities are afforded. The cost of supplies at present is tremendously high. For instance, hay at Charlton is worth $15 a ton, and at the Boyd-Gordon mine $38 a ton. One mine manager shoveled me ten tons of blacksmith coal which cost him in his shed $40 a ton. Properties on the west side of Gowganda Lake are paying $1.35 to $1.50 freight per hundredweight from the railway to their properties. At Hanging Stone the winter freight is $2 per hundredweight, and in summer $6 per hundredweight. When it is recalled that an average freight rate on Canadian railways is about 2 cents per ton-mile, and that the winter freight to the west side of Gowganda is 80 cents per ton-mile, or thirty times as much, the serious handicap from the lack of transportation is evident. Many items of consumption cannot be foreseen and have to be brought in in the summer time at a cost of $1.60 per ton-mile, or eighty times ordinary freight rates. This applies to the west side of Gowganda Lake. To Hanging-Stone Lake the charges are considerably higher.

Raising No. 1 Shaft house, and camp in background, Millerett Mine.

The cost of labour is also greatly increased by the remoteness from transportation. In the first place, 25 cents a day on the average over Cobalt prices is paid to all employees. Moreover, the cost of board averages fully 25 cents a day more per head. At a prospect employing 50 men, this amounts to an increased cost for labour of $25 per day, or $7,500 per annum. To this is to be added the increased cost of all mining supplies, as dynamite, steel, tools, and fuel.

Another adverse condition is the loss of time in securing men and supplies. The mail service, particularly spring and fall, is interrupted, and annoying delays occur in securing repair parts and supplies not foreseen. The loss of time in securing men to take the place of some who may have suddenly ceased work is also vexatious and costly.

Still another serious handicap to the development of this region is the difficulty of interesting capital. Promoters and investors were readily taken to Cobalt on comfortable trains, and so easily and quickly were shown the possibilities of that camp. Such men can only be taken to Gowganda with any comfort in the winter time, when the very things which it is desirous to show them are hidden by a thick mantle of snow. In the summer time slow and laborious canoe trips, with exposure to uncertain weather and insect pests, prevent many a possible investor from investigating the camp. Undoubtedly had Gowganda had the same advantage as Cobalt, much more capital would have been invested, to the advantage of the camp and the Province generally.

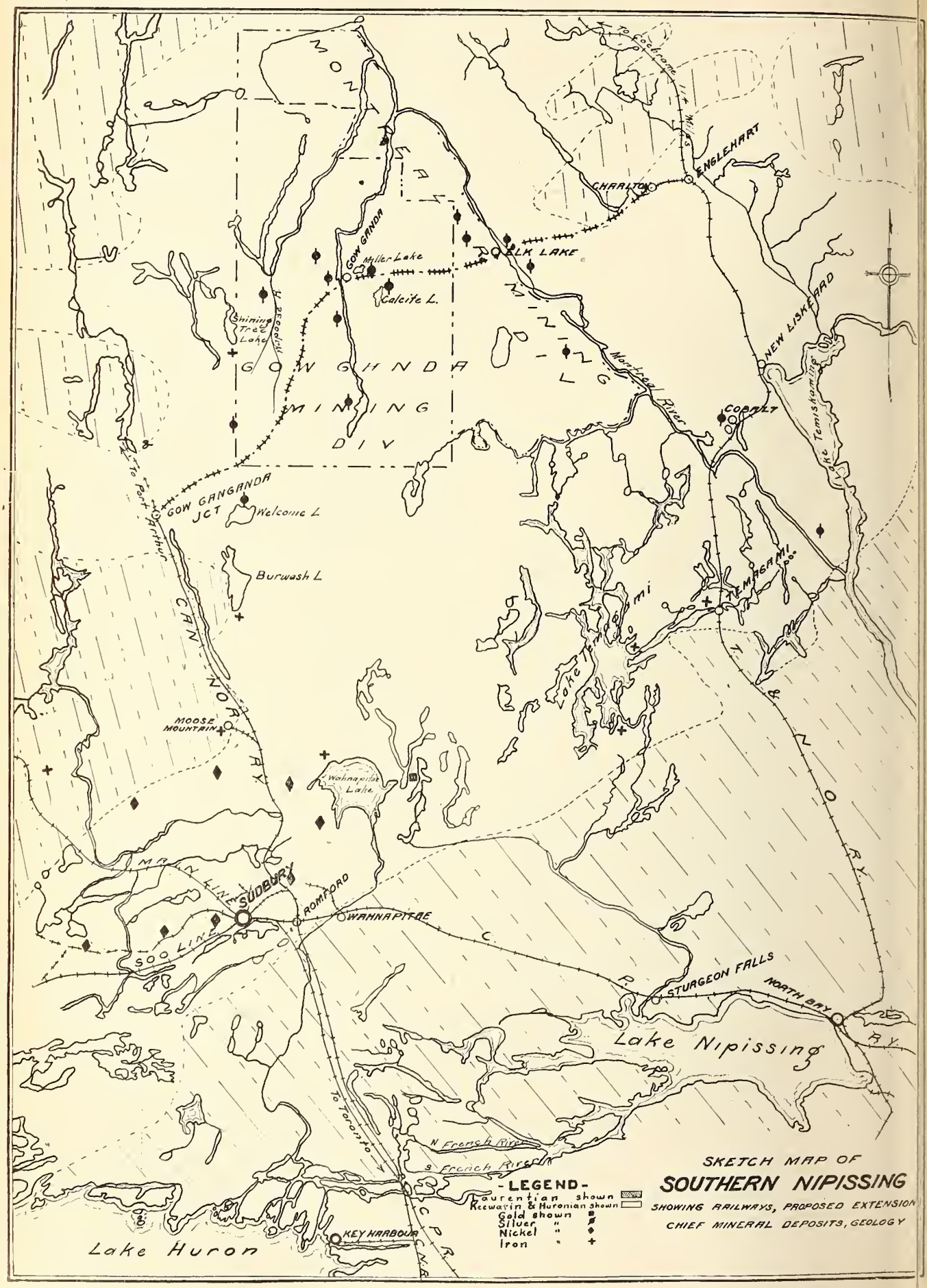


Raising a Stack on New Boiler House and Mill Framework behind

The Proposed Railroad.

On an accompanying sketch map the mining divisions of Gowganda and Montreal River are shown and the railroad facilities of the southern part of Nipissing district. It will be observed that the Temiskaming & Northern Ontario Railway runs a litle west of north from North Bay, and that the Canadian Northern Railway runs a little west of north from Sudbury. The first connects with the Grand Trunk Pacific at Cochrane, outside the limits of this map, and the second is to be extended north and west to Port Arthur. These two roads are approximately sixty to seventy miles apart. The proposed road from Charlton, on the Temiskaming & Northern Ontario Railway, to Gowganda Junction, on the Canadian Northern Railway, runs at right angles to the two roads, and would be about 95 miles in length. From Charlton via Elk Lake to Gowganda in a straight line is 40 miles. The country from Charlton to Elk Lake is fairly easy for railroad construction, but from Elk Lake to Gowganda numerous ridges have to be crossed, neeessitating a considerable increase in length of road. Surveys have been made by the Temiskaming & Northern Ontario Railway, and I understand the proposed road would have a length of about 50 miles.

From Gowganda city to Gowganda Junction, on the Canadian Northern, is 38 miles in a straight line, and


GOW GANDA MINING DIV
To Cochrane 114 Miles
ENGLEHART
CHARLTON
ELK LAKE
GOW GANDA
Miller Lake
Calcite L.
Shining Tree Lake
N. Broadcut
NEW LISKEARD
Montreal River
COBALT
Lake Temiskaming
GOW GANGANDA JCT
Welcome L.
To Port Arthur
Burwash L.
T. & N. O. RY.
CAN. NOR. RY.
TIMAGAMI
Lake Timagami
MOOSE MOUNTAIN
Wahnapitae Lake
MAIN LINE
SUDBURY
ROMFORD
WAHNAPITAE
SOO LINE
STURGEON FALLS
NORTH BAY
Lake Nipissing
To Toronto
N. French River
S. French River
KEY HARBOUR
Lake Huron
C.P.R.
SKETCH MAP OF
SOUTHERN NIPISSING
SHOWING RAILWAYS, PROPOSED EXTENSION
CHIEF MINERAL DEPOSITS, GEOLOGY
-LEGEND-
Laurentian shown
Keewatin & Huronian shown
Gold shown
Silver "
Nickel "
Iron "

ad would probably be built with a length not exing 45 miles. This road would largely follow the r valleys and would be easier constructed than that n Elk Lake to Gowganda city.

he eharaeter of railroad required may be a matter pinion. Personally, I believe that for the present heaply eonstrueted standard gauge road would e every purpose. With rails of 60-pound weight roadbed in proportion, eost of eonstruetion should bout $20,000 per mile. As traffie warranted it, road eould later be improved. If a road were pleted through from the Temiskaming & Northern ario to the Canadian Northern, the capital cost ld thus be $1,900,000. or say $2,000,000.

Richly Mineralized Area.

efore considering the amount of traffic for the proed road, it would be well to consider the character ountry through whieh it will run. On the accompying map it will be noted that a wide band of rocks Keewatin and Huronian age are shown as running theast from the Georgian Bay, past Sudbury and alt, to the Quebee boundary. These roeks are haded on the map. Adjoining them to the north l south, and cross-lined on the map, are granite and iss of Laurentian age. The latter are almost devoid economie minerals. The former are the great minl bearers of Ontario. These roeks earry the iron s of Miehipieoten and Moose Mountain, the copper of the north shore of the Georgian Bay, the nickelper ore of the Sudbury region, and the eobalt-silver s of Cobalt and adjoining regions. The total value the nickel and eopper production of Sudbury, as npiled from returns published by the Geological rvey of Canada, amounts to no less a figure than 8,773,700. The value of the total output of the Colt camp in silver amounts to $48,327,280, in which account is taken of the value of eobalt niekel and senic. After long investigation throughout the whole ovince, I am thoroughly convineed that the Huronin belt under eonsideration is the richest portion of e province in minerals.

On the map a few of the oeeurrences of silver roughout the Gowganda-Elk Lake district are own, from which a very wide distribution of that tal is apparent. Scores of claims have been staked this distriet with native silver showings, and many these have been developed into encouraging prosjcts Two, at least, are now in the position of produeg mines, with every probability of being dividend yers. It is to be noted that in these properties the ver ore oeeurs in diabase, and that, eontrary to genl impression, dividend-payers have been found in is formation. At least six properties are loeated in e diabase of Cobalt and Gowganda whieh are in the vidend class. Numerous occurrences of native silver rrying several thousand ounees to the ton, were own us. Undoubtedly some of these will make proeing mines. Only a small fraction of the eountry s been trenehed, and if the present population is inced to remain in the distriet through giving them ilroad facilities, rich discoveries of silver will be ade for years to come.

On the Wapoose River and near Shining Tree Lake, n formation oeeurs similar in eharaeter to the Michipoten iron range and the Vermilion iron range of innesota. I am told that one deposit on the Wapoose ver is as promising in its surfaee appearance as was oose Mountain. Unfortunately, none of our party s seen this property.

Fuel.

The prospects and mines are at present dependent on an inferior quality of wood as a souree of power. At least 2¼ cords, even after drying for six months, are required to yield the equivalent of one ton of good coal. The wood is soon eut off a 40-aere claim, and then purehase must be made from adjoining claims. At the Millerett the cost of wood was stated to be as follows:

Stumpage to the Booth Company	12½c a cord
Stumpage to the Provineial Government.	12½c a cord
Stumpage to claim owners	25c a cord
Total stumpage	$0.50
Cutting	1.25
Hauling	1 50
At the boiler in winter time	3.25
At the boiler in summer time	3.35
Average eost per cord	3.30
2¼ cords wood	7.42

Three-quarter lump best Pittsburg coal would be supplied at the Millerett for $4.25 by way of the Great Lakes, Key Harbour and the Canadian Northern or for $6.25 by all rail route via the Temiskaming & Northern Ontario Railway. The saving by the first route

Power plant, Mill, and No 1 Shaft. All dumps to left of shaft are Concentrating Ore.

over wood fuel amounts to $3.17 per ton of coal or on the estimated consumption of the Millerett yearly namely 1,900 tons, $6,023. The eost of coal by the two different routes is estimated as follows:

Price of coal, f.o.b. Suspension Bridge	$2.50
Duty	.53
Freight by G.T.R. and T. & N. O. to Charlton 455 miles, being one-half cent on the former and three-quarters cent on the latter per ton mile	2.85
Freight, Charlton to Millerett, 50 miles at three-quarters cent per ton-mile	.37
Total	$6.25
Coal, f.o.b. boat Cleveland	$2.25
Duty	.53
Boat to Key Harbour and unloading	.57
C. N. R. to Gowganda Jet. and Government extension to Millerett, 155 miles, being one-half eent on the former and three-quarters eent on the latter per ton-mile	.90
Total	$4.25

There are already installed in Gowganda and Elk Lake boilers rated at 3,300 h.p. These would require annually about 23,000 tons of coal were they supplied altogether by coal. Many of the smaller ones not di-

rectly on the railroad would probably continue to use wood. As there are few water powers in the district it is probable that for many years, mines in this district will be supplied largely by coal.

The coal requirements of the Temiskaming & Northern Ontario Railway at Englehart, which amounted last year to 22,645 tons, can also be much more cheaply supplied by way of the proposed railroad. The cost of coal delivered at Englehart by the present route and the proposed route work out as follows: Coal on board cars at Suspension Bridge costs 25 cents more per ton than the same coal on board boat at Cleveland. The freight rate on the Grand Trunk from Suspension Bridge to North Bay is $1.75, or approximately one-half cent a ton-mile. The same freight rate is allowed the Canadian Northern for a haul from Key Harbour to Gowganda Junction. The present rate on the Temiskaming & Northern Ontario from North Bay to Charlton is three-quarter cent per ton-mile, and for purposes of comparison this rate is assumed both on the present road and on the proposed road. Coal on board cars Suspension Bridge, duty paid $3.03, freight to North Bay $1.75, North Bay to Englehart $1., total $5.78. Coal, f.o.b. boat, Cleveland, duty paid $2.78, boat freight to Key Harbour and unloading 57 cents, Canadian Northern to Gowganda Junction 55 cents. Gowganda Junction to Englehart 78 cents, total $4.68. This shows a saving of $1.10 on every ton of coal required at Englehart. On a consumption of 22,645 tons, the saving per annum to the railway company on its own coal through importing by way of the new railroad, amounts to $24,909.50.

The coal requirements at Cochrane, a divisional point on the Grand Trunk Pacific, are now brought in all rail, by way of the Grand Trunk and the Temiskaming & Northern Ontario. A similar saving of $1.10 a ton can be made on all this coal by importing by way of Key Harbour. The probable consumption at Cochrane is unknown to me, but may be put at twice the consumption of Englehart. This should give the proposed road an additional freight tonnage of 50,000 tons, yielding in freight $38,500, at three-quarters cent per ton-mile. It is further to be noted that if the freight rate to Cochrane on coal can be reduced $1.10 a ton over the present rate a longer section of the Grand Trunk Pacific will be coaled from Cochrane, making that much more freight for the Temiskaming & Northern Ontario.

Probable Traffic.

The probable traffic for such a road is very hard to estimate accurately, and the figures given below must be accepted cautiously, but they are believed to be quite within the bounds of probabilities. The best developed mine in the region is the Millerett, and the manager of that property made the following estimate of the traffic he would furnish during the next two years:

Ore and concentrates, 400 to 500 tons per annum.
Coal, 1,800 to 2,000 tons per annum.
Supplies, 300 to 500 tons per annum.
An average of, say, 2,800 tons.

In addition he figured 400 to 500 passenger fares per annum between the Millerett and Charlton. He has paid out during the last two years for freight between the railroad and the mine $46,000. His freight in winter, when it is the cheapest, costs $20 a ton, or at the rate of 45 cents per ton-mile. He would consider that if his freights were divided by ten, that is, if brought down to $2 per ton, that it would be of the very greatest advantage. All operators recogn that the freight on the branch road should be hig than in older Ontario, and would raise no objecti to this.

After seeing a large number of the properties in district, I think one may fairly assume that with r sonable transportation facilities such as here ad cated, at least ten operating mines similar to the M lerett may be looked for within a few years. Tak the average tonnage of these properties at 2,800 t per annum and the average freight rate at $1.50 ton as the average haul would be less than to the M lerett, the total freight would amount to $42,000 annum. We may fairly assume that at least fo prospects would begin operation and that these wo each require one-eighth of the supplies required by better developed properties, making a total freight $21,000. To these probable freight receipts from mines must be added the freight requirements of towns of Gowganda and Elk Lake. There will a be passenger fares, which should amount to $10,00 year. Telegraph and express receipts should something additional. There will be further the frei on a certain amount of pulp. On coal for the Gra Trunk Pacific the additional receipts should be $ 000. The total receipts from all these sources sho be considerably over $100,000 annually. Should i ore in commercial quantity be found, the receipts n easily be doubled. Assuming that working expen will be sixty-five per cent., there would appear to a profit of $35,000 for interest on capital account. this is to be added the saving on coal for the m line of the Temiskaming & Northern Ontario, amou ing to $25,000.

Financial Considerations.

The revenue to the Province of Ontario from mining divisions of Montreal River and Gowganda past four years has been as follows:

	Montreal River	Gowganda	To
1907.	9,441.15		
1908.	25,177.25		
1909.	49,395.67	$42,583.65	
1910.	16,403.03	15,512.45	
	$100,417.10	$58,095.10	
Average	25,104.27	29,047.55	$54,151 2

This revenue included miners' licenses, fees and ceipts from sale of lands, but does not include recei from the sale of town lots in Smythe and Gowgan It does not include the receipts from part of the S bury mining district around Welcome Lake, wh would be served by the proposed railroad, but on contrary does include some receipts from the south part of the Montreal River division, which would be served by the railroad. Some receipts are not cluded which were collected at Toronto, and this particularly true of the first and second years.

I am convinced that if proper transportation fac ties are not given these two mining divisions, that receipts to the Province will rapidly dwindle alm to the vanishing point. If, on the contrary, a railw is built, the people who are in there will take fr heart and will interest more capital in their propert new properties will be discovered and the provinc revenue will continue. It will be noted that the av age receipts total a little over $54,000, and proba nearly $50,000 is net. No income is here included fr working mines. This might easily amount to $25, or more. It is very safe to assume that a railway

$50,000 per annum to the provincial revenues over it will be obtained without it.

Assuming that the railroad will cost $2,000,000 and interest is payable at the rate of four per cent., yearly charge will amount to $80,000. Against this have net profits on the operation of the railroad as shown above, amounting to $35,000, additional net profit from miners' licenses, etc., of $50,000, and saving in coal to the railway of $25,000, a total of $110,000.

Conclusions.

I am aware that the figures given as the probable profits may be challenged and that such estimates are uncertain. Even if no profit could be made on the railroad, I would still urge on the people of the Province the desirability of the construction of the railroad. A good start has been made on the development and permanent settlement of this section of the Province. Should the people now there become discouraged and leave, it will put back the development of that section half a century. An estimate prepared by ourselves shows that the principal companies have already expended in that country three and a half million dollars, and the expenditure by individuals must largely increase this amount. You have taken your share in the risk of development, the people of the Province should bear their share in the risk, by constructing the transportation facilities which are absolutely necessary Nor do I believe that this expenditure on the part of the Province would be any great risk. Every railroad which has traversed this mineral belt has developed remunerative traffic. The Canadian Pacific at Sudbury has been the means of developing the largest nickel field in the world. The Temiskaming & Northern Ontario Railway at Cobalt, crossing the same belt, has developed the richest silver camp in the world. The Canadian Northern, crossing the same belt, has opened up some of the richest nickel and iron mines of the Dominion. A road from Gowganda Junction to Charlton will in all probability be the means of opening up similar mineral riches.

Had the promoters of the Canadian Pacific hesitated to build from Ottawa to Port Arthur until payable traffic could be shown, there would have been no Sudbury and its nickel mines. Had the promoters of the Temiskaming & Northern Ontario waited until payable traffic could have been shown, there would have been no Cobalt. Railroads into new territories are in a measure speculative, but so many of them have made good, and particularly in this mineral belt, that I have no hesitation in urging on the people of Ontario that this road should be constructed. Several railroads now under construction in the Province by private capital do not promise nearly as well. If private companies are willing to take the risk involved in these railroad undertakings for the possible profits that may accrue, surely the great Province of Ontario can afford to build a railroad from the Temiskaming & Northern Ontario to the Canadian Northern at Gowganda Junction through the richest mineral area of the Province.

All of which is respectfully submitted.

404 Lumsden Building, A. B. WILLMOTT.
Toronto, April 3, 1911.

MINERAL PRODUCTION OF BRITISH COLUMBIA IN 1910

(By E. Jacobs, Victoria, B.C.)

The Annual Report of the Minister of Mines of British Columbia for the calendar year 1910 was issued early in July. The net results may be gathered from the first two sentences of the review of the year by the Provincial Mineralogist, Mr. William Fleet Robertson, under the head "Progress of Mining," as follows: "The value of the mineral products of the Province for the year 1910 amounts to $26,377,066, which is considerably greater than that of any previous year. The tonnage of ore mined in the lode mines during the year was 2,216,428 tons, an increase over that of the preceding year of 158,715 tons, or 7.7 per cent." It might have also been stated that this is the largest tonnage for any year since the commencement of lode mining in the Province.) A third sentence, appearing later in the review, is necessary to complete this brief summary of the year's results, namely, that "the production of coal made by the British Columbia collieries during 1910, amounting to 3,139,235 long tons, was the greatest in the history of coal mining in the Province."

Several of the statistical tables follow, these exhibiting, respectively, (1) the value of the mineral production of the Province for all years to 1910, inclusive; (2) the quantities and value of mineral products for three years, 1908-1910; and (3) the value of the production of the several districts and divisions into which the Province is officially divided.

In calculating the value of the products, the average prices for the year in the New York metal market, as shown by The Engineering and Mining Journal, have been used as a basis. For silver, 95 per cent.; for lead, 90 per cent.; and for zinc, 85 per cent. of such market prices have been taken. Treatment and other charges have not been deducted, except an allowance of 5 lbs. of copper to the ton of ore smelted for loss in the slags.

The quantity of ore shipped to smelteries or treated in concentrating or stamp mills has been obtained from certified returns received by the Provincial Department of Mines, as provided for by law. As regards "Other Materials" shown in the second table here reprinted, which item includes building-stone, lime, bricks, tiles, portland cement, etc., although it is not so stated in the report, it is known that the total value of these products appearing in the table is well within the actual value of the production of the year, additional details received after the table was made up having proved the estimate to be under, rather than over, the amount included.

Value of Total Production for all Years to 1910, Inclusive.

Gold, placer	$71,213,103
Gold, lode	60,811,067
Total gold	$132,024,170
Silver	31,095,602
Lead	24,645,605
Copper	60,743,405
Other metals (zinc, iron, etc.)	1,083,172
Total metalliferous	$249,591,954

Coal and coke	$114,012,596
Building materials, etc.	10,593,100
Total non-metalliferous	124,605,696
Aggregate value of production	$374,197,650

Summarizing the foregoing, the various classes of mineral production are as under:—

	Total value.
From placer mines	$ 71,213,103
From lode mines	178,378,851
From coal mines	114,012,596
From quarries, etc.	10,593,100
Aggregate value	$374,197,650

It is noteworthy that the aggregate value at the end of 1910 ($374,197,650) shows an increase in ten years of $222,042,442, or about 146 per cent., over that at the close of 1900 ($152,155,208). Comparing 1 ($248,663,176) with 1900, the increase in five years $96,507,968, or about 63.5 per cent., while the five-y period, 1906-1910, gave an increase of $125,534,474. nearly 51 per cent., the aggregates at the end of 1 and 1910, respectively, having been as shown above.

The quantities of the several minerals produced in the Province in all years is shown in the statistical tables to have been as under (placer gold, of which quantity is not stated, being here approximated):—

	Quant.
Placer gold (approximate estimate), oz.	4,000,0
Lode gold, oz.	2,952,6
Silver, oz.	54,648,7
Lead, lbs	613,914,0
Copper, lbs	415,353,9
Coal (net production, long tons), tons	32,429,1
Coke, tons	2,250,9

Quantities and value of mineral products for 1909 and 1910:—

	1909		1910	
	Quantity.	Value.	Quantity.	Value.
Gold, placer, oz.	.....	$ 477,000	.....	$ 540,000
Gold, lode, oz.	238,224	4,924,090	267,701	5,533,380
Totals, gold		$ 5,401,090		$ 6,073,380
Silver, oz.	2,532,742	1,239,270	2,450,241	1,245,016
Lead, lbs.	44,396,346	1,709,259	34,658,746	1,386,350
Copper, lbs.	45,597,245	5,918,522	38,243,934	4,871,512
Zinc, lbs.	.....	400,000	4,184,192	192,473
Totals, metalliferous		$14,668,141		$13,768,731
Coal, tons, 2,240 lbs.	2,006,476	7,022,666	2,800,046	9,800,161
Coke, tons, 2,240 lbs.	258,703	1,552,218	218,029	1,308,174
Totals		$ 8,574,884		$11,108,335
Other materials	.....	1,200,000	.....	1,500,000
Totals, non-metalliferous		$ 9,774,884		$12,608,335
Totals, metalliferous		14,668,141		13,768,731
Totals of yearly production		$24,443,025		$26,377,066

The foregoing table shows the production in 1910 as compared with 1909. In comparison with 1909, th following are the actual changes:—

	Quantities		Value	
	Increase.	Decrease.	Increase.	Decrease.
Gold, placer	.....	.....	$ 63,000	.....
Gold, lode, oz.	29,477	.....	609,290	.....
Total gold			$ 672,290	
Silver, oz.	.....	82,501	5,746	
Lead, lbs.	.....	9,737,600	.....	$ 322,909
Copper, lbs.	.....	7,353,311	.....	1,047,010
Zinc	.....	.....	.....	207,527
Total metalliferous			$ 678,036	$1,577,446
Coal, tons	793,570	.....	2,777,495	.....
Coke, tons	.....	40,674	.....	244,044
Other materials	.....	.....	300,000	.....
Totals			$3,755,531	$1,821,490
Less decreases			1,821,490	
Net increase			$1,934,041	

PRODUCTION OF MINERAL BY DISTRICTS AND DIVISIONS.

Names.	——Divisions—— 1909.	1910.	——Districts—— 1909.	1910.
Cariboo District	.....	.....	$ 247,000	$ 239,000
Cariboo Mining Division	$ 220,000	$ 218,000	.....	.....
Quesnel Mining Division	12,000	6,000	.....	.....
Omineca Mining Division	15,000	15,000	.....	.....
Cassiar District	.....	.....	234,498	283,807
East Kootenay District	.....	.....	4,766,215	6,121,832
West Kootenay District	.....	.....	5,169,749	5,088,186
Ainsworth Division	867,340	318,058	.....	.....
Slocan Division	704,737	845,106	.....	.....
Nelson Division	584,955	876,002	.....	.....
Trail Creek Division	2,875,084	2,966,096	.....	.....
Other parts	137,633	82,924	.....	.....
Boundary District	.....	.....	7,728,256	6,998,519
Osoyoos, Grand Forks & Greenwood Divisions	7,501,046	6,442,063	.....	.....
Similkameen, Nicola, Vernon	225,210	556,456	.....	.....
Yale, Ashcroft, Kamloops	2,000	.....	.....	.....
Lillooet District	.....	.....	16,676	9,832
Coast Districts (Nanaimo, Alberni, Clayoquot, Quatsino, Victoria)	.....	.....	6,280,631	7,635,890
			$24,443,025	$26,377,066

The quantity of lode gold was the largest produced in any year by 12,119 oz., the largest previous production having been in 1908, 255,582 oz.

The silver was the smallest production of that metal in 15 years, the highest having been in 1897, of 572,971 oz.

The output of lead was the smallest in any year since 1903, which was the year payment by the Dominion Government of bounty on lead mined in Canada was commenced. The maximum quantity produced in any year since 1903 was in 1905, 56,580,703 lbs. Before that, however, the maximum in all years had been reached, namely, in 1900, with a production of 6,358,621 lbs, which was prior to the practical closing by a tariff impost of the United States market to Canadian lead.

The production of copper was the smallest on official record in five years. The maximum yearly output shown in the report was that of 1908, of 47,274,614 lbs. The comparison, however, may not be a fair one, since it is understood that previous to 1910 the official figures showed the copper contained in the ore, as estimated by assay value, not that actually recovered by smelting. As mentioned earlier, a deduction was made last year, at the rate of 5 lbs. of copper per ton of ore smelted, for loss in the slags, so the 1910 figures are nearer those of actual production of marketable copper.

The decrease in output of zinc was due to forest fires having destroyed surface plants at the mines of two of the chief producers of this metal, and, as well, burned bridges and trestles along several miles of railway, thus depriving those mines of transportation facilities, which have not yet been renewed.

The net production of coal shows a comparatively large increase—of 793,579 long tons. A comparison of the figures of gross production, that is, including the coal made into coke, is rather less favorable, showing an increase of 738,635 tons. The gross output of the two years, respectively, was: For 1910, 3,139,235 long tons; for 1909, 2,400,600 tons. The quantities made into coke were: In 1910, 339,189 tons; in 1909, 394,124 tons.

Other materials, that is, non-metallic minerals, practically all for building purposes, are credited with a 25 per cent. increase. It is most likely these have been underestimated in quite recent years until 1910, for there has been a steadily enlarging use of materials in building and road and footpath construction in the larger cities of the Coast district during several years, and this is continuing in larger degree than in the past.

The comment of the Provincial Mineralogist on this table, which shows the proportions of the total mineral production of two successive years made in each of the mining districts and divisions into which the Province is divided, is as follows: "It will be noted that this year, for the first time in many years, the Coast district has the honor of first place on the list, followed, in order of importance, by the Boundary and East Kootenay districts, while West Kootenay—for many years the greatest producer of mineral in the Province—is relegated to fourth place. The Coast and East Kootenay districts owe a considerable percentage of their output to the coal mines situated within their limits, whereas in the other districts the production is almost entirely from metal mining."

The total tonnage of ore was produced by the several districts in the following proportions: Boundary, 76.75 per cent.; Rossland (Trail Creek div.), 11.35 per cent.; Fort Steele div. (East Kootenay), 5.22 per cent.; Coast, 1.90 per cent.; others, 4.7 per cent.

Mines that Shipped Ore in 1910.

The number of mines from which shipments of ore were made in 1910 was 83, and of those only 50 shipped more than 100 tons each during the year, while but 32 shipped in excess of 1,000 tons each. Of the latter, 8 are in Nelson mining division, 8 in Boundary district, 3 in Ainsworth division, 4 in Slocan district, 3 in Coast district, 3 in Trail Creek (Rossland) division, 2 in Fort Steele division (East Kootenay), and 1 in Trout Lake division (West Kootenay).

The following table shows the number of mines that shipped ore in 1910; the districts in which they are situated; the tonnage of ore produced in each district; and the number of men employed, both above and below ground:—

	Tons of Ore shipped.	No. of Mines shipping.	No. of Mines shipping more than 100 tons in 1910.	Men employed in these Mines. Below.	Above.	Total
Cassiar:						
Atlin, Skeena & Queen Charlotte	4	1	..	4	4	8
East Kootenay:						
Fort Steele	115,762	5	3	229	84	313
Windermere-Golden	53	1	..	6	4	10
West Kootenay:						
Ainsworth	21,850	11	5	66	39	105
Slocan	44,466	20	11	220	79	299
Nelson	36,203	14	10	178	77	255
Trail Creek	253,471	9	5	492	149	641
Other Divisions	971	1	1	40	12	52
Boundary:						
Grand Forks, Greenwood, and Osoyoos	1,701,113	13	10	781	374	1,155
Ashcroft-Kamloops	12	1	..	6	3	9
Similkameen-Vernon	.....	..	..	..	..	..
Lillooet	443	3	2	9	4	13
Coast	42,080	4	3	143	104	247
Total	2,216,428	83	50	2,174	933	3,107

"An analysis of the above table shows, approximately, that, taking the Province as a whole, there were 713 tons of ore mined a year for each man employed about the mines. In this respect, however, the districts vary very materially, since, in the Slocan, the figures show 148 tons mined to the man in a year; in Nelson district, 142 tons; in Trail Creek, 395 tons; and in Boundary, 1,472 tons mined to the man employed.

"Such generalization, of course, does not apply exactly to any one mine, but only to the district, and in the first two districts mentioned the mines vary in charaeter so greatly, some having high-grade shipping ores and others low-grade concentrating ores, that care must be taken not to earry these average figures too far."

Non-Shipping Mines.

Another table in the report shows the number of non-shipping mines in each of the several districts, including those idle, together with the number of men employed. There are in all 153 of sneh mines, of which 56 were worked last year and 97 were idle. In those worked, 304 men were employed above ground and 298 underground; total, 602.

Men Employed in Mining.

The total number of men employed in mining in the Province—in both coal and metal mines—is as under. It should be explained that in arriving at these figures the eustom of the Department of Mines is, for instance, where 12 men are employed in a mine for 4 months, to count that as 4 men employed for 12 months, so that the total given is less than the actual number of individuals who worked in the mines during the year:—

In Metalliferous mines—	Above ground.	Under ground.	Total.
Shipping mines	933	2,174	3,107
Non-shipping mines	304	298	602
Total	1,237	2,472	3,709
In Non-Metalliferous Mines—			
Collieries	1,855	5,903	7,758
Grand total	3,092	8,375	11,467

Summary Review of Production.

Under the head, "Progress of Mining," the Provincial Mineralogist reviews at some length the production of the several minerals. Only a brief summary of his comments ean be given here, though.

Placer Gold.—Cariboo's production was $8,000 less than in 1909, due to a light snowfall the previous winter, the eonsequent shortage of water not admitting of all the sluices being cleaned up at the end of the gravel-washing season, so some of the gold had to be left in them for recovery in 1911 season. In Quesnel division of this district, the Quesnelle Hydraulic Gold Mining Co., of Philadelphia, Pa., made much progress with construction in connection with its water supply system for hydraulicking gold-bearing gravel, and expects to commenee mining next autumn.

In Cassiar distriet, $275,000 was recovered in Atlin division, which sum shows an increase of $75,000 over the recovery of 1909 season. The North Columbia Gold Mining Co. took about $150,000 out of its Pine Creek mines. The Guggenheim placer mine was leased to and worked by the North Columbia Co. The Pittsburg-British Gold Co., which controls McKee creek, also had a good season, but its operations were on a smaller scale than those of the North Columbia. The total yield of other parts of Cassiar distriet was smaller than in 1910.

Of the $18,000 recovered in other parts of the Province, $7,000 was from Lillooet district and $3,000 from East Kootenay.

Lode Gold.—To a total of $5,533,380, Rossland mines eontributed $2,465,455, Boundary $2,176,427, and Nelson (including Sheep creek) $761,359, all three showing increases over their production in 1909. About 76 per cent. of the lode gold is obtained from smelting ores and copper-bearing. The Hedley Gold Mining Co., operating a 40-stamp mill at Hedley, Similkameen (included in Boundary district), produced about $530,000 from the Nickel Plate group of mines. Two 20-stamp and several smaller mills in Nelson mining division recovered most of the lode gold credited to that division. There was a falling-off in the Coast and some other gold-producing districts.

Silver.—Slocan district, including Ainsworth and Trout Lake divisions, produced about 54 per eent. of the year's total output of silver, and Fort Steele mining

division 20 per cent., all from argentiferous galena. Forest fires in Slocan, and a lessened ore output from the St. Eugene mine, East Kootenay, combined to make the production of this metal smaller than in 1909. As result of development, the outlook is good for an enlarged production in 1911, chiefly from Slocan mines.

Lead.—As in other years, most of the lead produced came from Fort Steele division, East Kootenay. The following table shows the production of the several mining divisions:—

Mining Division.	Lbs of lead.	Percentage of total.
Fort Steele	23,874,562	68.88
Ainsworth	2,558,353	7.38
Slocan	6,406,358	18.49
Nelson	1,245,844	3.59
Trout Lake	463,295	1.34
All others	110,334	0.32
Total	34,658,746	100.00

Copper.—The next following table shows the copper production of the various districts for the last three years:—

District.	1908. Lbs.	1909. Lbs.	1910. Lbs.
Boundary	40,181,790	40,603,042	31,354,985
Rossland	5,042,244	3,509,909	3,577,745
Coast and Cassiar.	1,997,337	1,297,722	3,078,090
Yale-Kamloops	.....	.....	1,178
Nelson	53,243	186,572	231,936
Total	47,274,614	45,597,245	38,243,934

The proportions of production in 1910 were: Boundary, 82 per cent.; Rossland, 9.35 per cent.; Coast and Cassiar, 8.05 per cent.; Nelson, 0.60 per cent.

The average assays of the copper ores of the several camps, based upon copper recovered, were as follows: Boundary, 0.995 per cent.; Coast, 3.67 per cent.; Rossland, 0.705 per cent.

Zinc.—The total zinc output is from the Whitewater and Whitewater Deep mines in Ainsworth division, and the Lucky Jim and Van-Roi mines in Slocan division; there has not been any output from the zinc claims near Arrow Lake, nor those in East Kootenay. Forest fires last summer destroyed the surface plants of all but the Van-Roi, and the lease of the concentrating mill used by that mine expired in August, so there was no production of zinc at all during the latter part of the season. Shipments will be resumed after renewal of the destroyed plants and railway, and completion of the Van-Roi Co.'s new mill.

Other Minerals.—No iron ore was produced, there not being any iron blast furnaces in operation in the Province. Preparations to recover platinum in 1911 were being made, but none was obtained in 1910. Building materials showed substantially increased production. Drilling for oil was in progress in Sooke district, Vancouver Island. A deposit of oil shales, carrying a fair percentage of oil, has been found on North Thompson river, but this has not yet been proved of commercial value.

Work of Bureau of Mines in 1910.

The Provincial Mineralogist examined and reported on a small coal property in Boundary district; went to Wyne island and examined a deposit of crude pumice there; made a long trip to Tatlayoko lake, the headwaters of Homathko river, which flows into Bute inlet, and made a preliminary report as to its mineral probabilities; examined various mineral claims in Lillooet district, returning to the Coast by Pemberton meadows and Green lake; and subsequently examined the more developed mining properties on Boar river and tributaries, Portland Canal district.

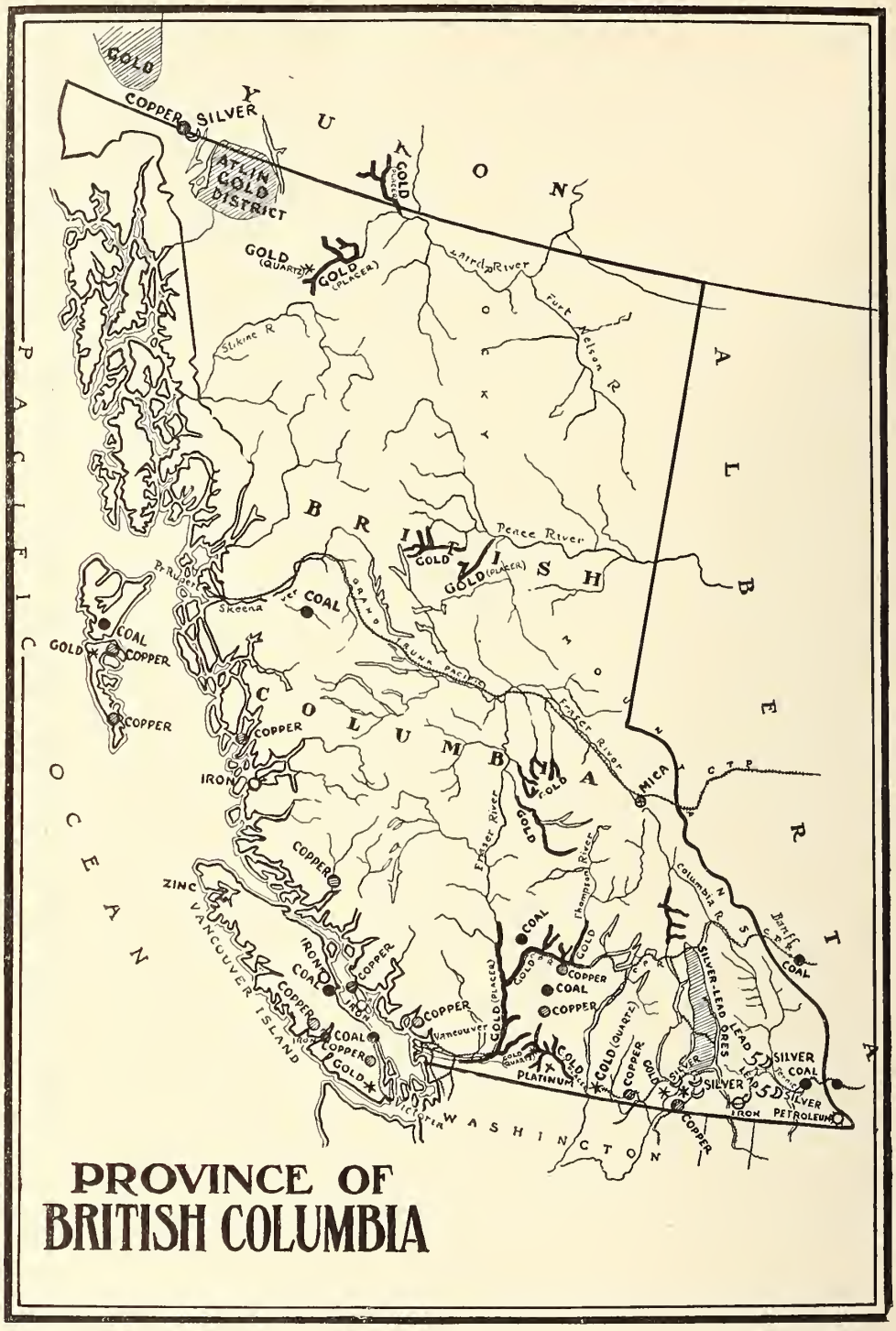
Two examinations for certificates of competency and license to practise assaying were held, in May and December, respectively, at the Provincial Assay Office, Victoria, and three candidates passed. Examinations for coal-mine officials—first—second—and third-class certificates—were held at Nanaimo and Cumberland, on Vancouver island; Merritt, in Nicola valley; and Fernie, Crow's Nest Pass. The total number of candidates was 78, as follows: For first-class, 20 (10 failed); for second-class, 20 (3 failed); for third-class, 38 (8 failed). Complete lists of licensed assayers and certificated coal-mine officials are printed in the Annual Report.

Reports of Mining Districts.

Reports of the Provincial Mineralogist and of the Gold Commissioners for the various districts and mining divisions fill 122 pp. of the report. Those on Cariboo district (including description of the Quesnelle Hydraulic Gold Mining Co.'s new hydraulic installation, in Quesnel division), Atlin division (with report of the Provincial Assayer on some rich gold-quartz claims on Taku arm); Portland Canal (with the Provincial Mineralogist's report on this division); Ainsworth, Slocan, Nelson (including Sheep Creek camp), Boundary, Lillooet (with the Provincial Mineralogist's special report), and Nanaimo (this last including reports by the Provincial Mineralogist on Tatlayoko district, and by the Provincial Assayer on Valdes and Lasqueti islands), are of much interest.

Inspection of Mines and Mine-Rescue Work.

The reports of the Chief Inspector of Mines and five district inspectors, respectively, give much information concerning the condition of both metalliferous and coal mines, lists and detailed statements of accidents in mines, etc. Information relative to mine-rescue work is also given by the Chief Inspector, who says: "It is very gratifying to be able to report that the several companies throughout the Province have responded very thoroughly to the statutory requirements of the Coal-mines Regulation Act as to the provision of mine-rescue appliances. The training of employees in mine-rescue work is progressing satisfactorily, though some difficulty is experienced in procuring a ready and economical supply of oxygen. The Hon. the Minister of Mines has caused enquiries to be made, with a view of establishing within the Province an oxygen-manufacturing and compressing plant, so that oxygen may be supplied readily and cheaply. This would seem to be absolutely necessary to efficiency and success. In addition to the colliery installations, the Department of Mines has established general installations of mine-rescue apparatus at Nanaimo and Cumberland (both on Vancouver island), Middlesboro (Nicola valley), and Hosmer (Crow's Nest Pass). Each of the various district inspectors of mines has graduated at a mine-rescue training course taken at the United States Mine-Rescue Training Station, at Seattle, Washington, and is consequently able to use, or direct the use of, the oxygen apparatus in an emergency." The Chief Inspector also gives a summary of the changes made in the Coal Mines Regulation Act when, last Spring, the act was consolidated and amended. In his introductory comments on this subject he says: "The various mining centres were visited by the Deputy Minister of Mines and the Chief Inspector, who held conferences with both the operators and the employees or their representatives. They re-



ceived numerous valuable suggestions, many of which were embodied in the completed bill, the main intent and purpose of which was to improve on the old act and introduce new measures for safety. Many valuable suggestions from the Report of the Royal Commission on Mines (Great Britain), 1906-1909, were also embodied in the bill, and upon all questions where any doubt existed the opinion of the Royal Commissioners was accepted as conclusive."

Miscellaneous Contents of Annual Report.

In addition to the contents already referred to, there is much other information contained in the Annual Report. Among other useful data are the lists of shipping mines, and of mineral claims Crown-granted in 19. A full index completes a report, which has been carefully prepared by the Provincial Mineralogist; illustrated by numerous excellent half-tone reproductions of photographs of country, surface works at mines and mills, and other appropriate subjects; also with maps, diagrams, graphic tables, etc.; and well printed at the Provincial Government Printing Office. The report is obtainable gratis on application to the Department of Mines, Victoria, B.C.

Notes on a Discovery of a Telluride Gold Ore at Opasatica, and its Probable Relation to the Gold Ores of the Porcupine and Neighbouring Districts.*

By Robert Harvie, Jr., Montreal.
(Transactions Canadian Mining Institute.)

In the course of a short examination of the geological conditions obtaining in the Opasatica district, undertaken by direction of the Quebec Department of Mines, the writer observed certain new points of interest which it has seemed well to present in correlation with information obtained in the not far distant and evidently similar districts of Ontario, namely, Larder Lake, Porcupine and Abitibi.

Relative Positions of the Districts.

The Opasatica district is in Quebec, on the height of land around the north end of Lake Opasatica, or about forty miles in a direction slightly east of north from the north end of Lake Temiskaming. From Opasatica, the Larder Lake district lies in Ontario about fifteen miles to the south-west, the Porcupine district is about 100 miles a little north of west, Abitibi is about fifty miles to the north-west.

As the general geology will not be discussed, this may be dismissed with the statement that the succession of Keewatin, Laurentian and Huronian is similar to that so frequently described for Cobalt and the other areas in this Temiskaming district.

Opasatica.—The gold is associated with quartz-ankerite fissure veins, although in one instance the ore body is a rusty weathering dike of a dioritie rock cut across by very numerous quartz veins, which carry the values. The country rocks are of Keewatin or Huronian age. The largest vein observed averaged about two and a half feet wide in an exposure of one chain in length, and it may be said that all of those examined hold their width well. The gangue is quartz, partly massive, partly in fine crystals, in both cases being commonly banded with ferruginous dolomite or ankerite and carrying sericite. In varying amount pyrite, chalcopyrite, petzite and free gold also occur. In some instances chalcopyrite forms a large proportion of the vein matter, and the wall rock on either side is also heavily charged with sulphides, probably chiefly iron pyrite.

The values are obtained both from free gold and from the telluride petzite, in which mineral there is about 24 per cent. of gold and 40 per cent. silver. The petzite was introduced later than the quartz and ankerite, being found in fractures in these minerals. The gold is chiefly in seams in the petzite. Petzite has a high metallic lustre of a steel grey colour, is heavy, has a low hardness, and altogether closely resembles galena, except that it lacks cleavage, and hence does not break into the cubes so characteristic of the latter. Owing to the small amount of work done so far, it is impossible to state what may be the relative importance of this telluride.

An assay of the pure chalcopyrite showed only half an ounce of silver and a trace of gold per ton; pyrite from the wall rock gave only 40 cents gold per ton. Apparently then, both these sulphides are unimportant as carriers of values.

*Larder Lake***—The gold is associated with irregular small quartz, or quartz and ankerite veins. The country rock is a rusty weathering rock consisting of ferruginous dolomite or ankerite, cut in a most complex manner by the gold-bearing veins mentioned above. In most localities it contains a large amount of chrome mica or fuchsite, from which the rock derives its characteristic green colour.

Porcupine.—The writer has not yet had an opportunity of visiting the Porcupine district, but the recent articles by R. E. Hore† seem to give an excellent account of the conditions, and his descriptions have been freely used for the present purposes.

The deposits at Porcupine are of various forms: single fissure veins, vein systems, large masses of irregular form, locally called "domes," and bands of carbonate rock so closely intersected by a multitude of small veins that the whole mass has to be mined together.

The country rock is usually either pyritie grey schist or rusty weathering mixed carbonates, belonging to the Keewatin. Less often it is a Huronian conglomerate. Serpentines also occur in the district.

The rusty weathering carbonate rocks are similar to those occurring at Larder Lake and contain the same green mica. The gangue is chiefly quartz and ankerite. In general the quartz is milky white and vitreous, but where it has been exposed to the weather it is coated with iron oxides. For a few feet from the surface, streaks and patches of this secondary material are found filling small cavities and crevices, evidently left by the weathering out of the ferrodolomite or ankerite. Pyrite is rather generally distributed through the quartz, but not in any great quantity. Copper pyrite is also found in small amount and occasionally galena and zinc blende. The gold occurs chiefly free, not only in minute fractures in the quartz, but more especially in the rusty cavities. It remains to be seen whether this seeming abundance in the cavities is actual, or only due to an apparent concentration as a residual after the weathering away of the ankerite.

Though no actual results have been published, it seems to be generally accepted that, while 50 per cent. to 65 per cent. of the gold is free milling, the remainder is held by the sulphides. On the other hand, mention is also made that "good assays have in several instances been obtained from very unlikely looking "bull" quartz." No report has yet been made of the presence of tellurides and it is quite possible, even probable, that having been overlooked they will account for the presence of gold in these veins.

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*By permission of the Superintendent of Mines of Quebec.

**See M. E. Wilson: Summary Reports Geol. Survey of Canada, 1908 and 1909. Also R. W. Brock, Rept. of the Ontario Bureau of Mines, 1907.

†R. E. Hore, Can. Min. Jour.: Oct., Nov., Dec. 1910; Jan., 1911; see also Notes on the "Map of the Porcupine Gold Area," by Ont. Bur. Mines, 1910.

Abitibi.—In the Abitibi district, in addition to other types of deposits, the rusty weathering carbonate rocks containing chrome mica, are typically developed, although on a small scale. The occurrence is quite close to a chromiferous peridotite.*

Significant Features.

Enough has probably been said in the above brief descriptions to show certain resemblances between the deposits of these four districts. More particularly, free gold is found in quartz ankerite veins in or near occurrences of a rusty weathering carbonate rock characterised by containing a bright green mica, and, while although so far tellurides have only been reported from Opasatica, still it seems probable that on closer examination they will be found in the other districts also. It is still more noteworthy that on these very same points an equally close parallel can be drawn with the deposits of the famous Mother Lode district of California. This will be done while considering a few special features in more detail.

Green Mica.—The beautiful bright green colour which the rusty weathering carbonate rock shows in so many places is due to a chrome bearing mica, fuchsite or mariposite. These minerals both contain chromium, but, in addition, mariposite also bears lithium. Mariposite is a very common mineral of the gold veins of the Mother Lode district in California.** Tests for chromium and lithium are readily obtained from the Canadian material and a rough comparison by the flame colouration test of the Larder Lake and Mother Lode materials shows the amount of lithium to be comparable.

The Carbonate Rock.—The rusty weathering carbonate rock has been given various names according to the origin to which it has been ascribed. In the Mother Lode district where similar masses of carbonate are found, it is now generally accepted that they are due to the carbonization of a serpentine or peridotite, intrusions of which are found in the district. Peridotite hydrated and oxidised gives a serpentine; serpentine carbonated gives magnesite, siderite, and quartz. This origin would seem best to explain the Canadian occurrences. Serpentines and peridotites are found at Porcupine and Abitibi, and are known to be widely distributed in the north country. Chromium, as is well known, is generally associated with peridotites so that the presence of the chromium bearing mariposite is explained and supports this view of the origin of the carbonate rock.

Ferruginous dolomites containing a chrome mica have been reported from Aird Island, near the Spanish River, in Lake Huron. This is suggestive of a wide distribution of these unusual rocks.x

Telluride Ores and Their Significance.

Among the minerals found in the Mother Lode ore are numerous varieties of tellurides. Although by far the greater proportion of gold won has been obtained free, yet in a few mines the tellurides have yielded very important amounts. This fact affords another interesting point for correlation, since, as was mentioned above, petzite, a gold-silver telluride, is found associated with the gold at Opasatica.

At Opasatica the free gold is found chiefly in fractures in the petzite, so that apparently here also, as has proved to be the case in other deposits of telluride ores, the telluride has precipitated the gold, but the evidence yet obtained is too scanty to warrant assertion as to whether or not this has given a secondary enriched zone. At Cripple Creek, Colorado, in the zone of oxidation above the level of the ground water, the gold occurs free, having been largely left behind during the leaching of the tellurides. Below ground water level, the tellurides have not been leached, and not only do they still contain their original gold content, but, in addition, they have caught and retained any free gold passing down in solutions from the zone of oxidation, thus causing an important secondary enrichment. The presence of tellurides at the surface at Lake Opasatica, indicates that the zone of oxidation has been removed by the heavy glaciation to which the district has been subjected. The present surface must therefore come either at the level of the zone of enrichment or below, but in either case from this argument, it seems unwarrantable to expect any great increase in values with depth, such as is regularly found to be the case in the mines of the Western States.

Tellurides have not been reported as yet from other districts, but it has been reported from Porcupine that some apparently unpromising veins have yielded good assay values, which values may well be due to the presence of tellurides. In other veins the free gold at the surface has been found to continue in slightly increasing quantity down to a depth of two hundred feet. It is quite impossible that in this instance the zone of oxidation has *not* been completely removed, in which case an enriched zone may be encountered beneath.

It may be mentioned that this is not the first discovery of a telluride in Eastern Canada. Petzite has been reported as occurring associated with argentite, galena, chalcopyrite and quartz in the gold ore of "Huronian Mine," near Lake Shebandowan, in Western Ontario.*

While it has not been decided what is the source of the gold and since, moreover, in the Mother Lode district, it is found that in general the serpentine or its products the carbonate rock is unfavourable to value it seems remarkable that, although some at least of the veins are of Post-Huronian age, still the gold seems to be most typically associated with Keewatin carbonate rocks. No explanation has been suggested for this.

Assaying and Milling.—The presence of tellurides complicates both the testing and the treatment of ores. The full value of the gold present cannot be judged from inspection or even by panning, because the amount contained in combination in the petzite is not shown by either of these processes. For this reason it is very essential that ores should always be tested by fire assay. Similarly when planning a mill, it must be kept in mind that simple amalgamation or cyaniding will not recover the gold and silver values of tellurides. The ore requires to be thoroughly roasted before employing these processes.

*Ont. Bur. of Mines, 16th An. Rept., Pt. I., p. 219; also 18th, pt. I., page 270.

**F. L. Ransome, folio 63, U. S. Geological Survey.

xAm. Journal Science, XXXIII., p. 284, 1887.

*Geol. Survey of Canada, New Series, Vol. III., p. 13, H.; Vol. IV., p. 61 T.; Vol. X., P. 59, H.

During the fiscal year ended June 30 last gold to the value of $10,273,000 was received at the United States assay office, Seattle, Washington. By far the greater part of this gold came from Alaska, but included in the total was $1,262,500 from British Columbia and Yukon Territory. As compared with the fiscal year ended June 30, 1910, there was a decrease of $1,858,000 in total value of gold received.

THE PORCUPINE FIRE.

By Alexander H. Smith.*

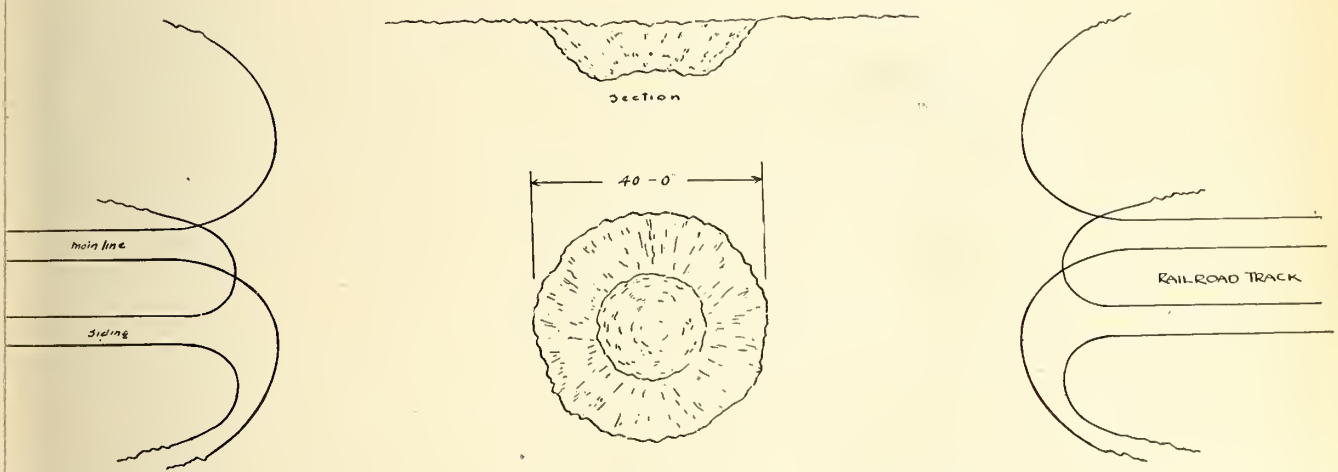
Porcupine, the first gold mining district in Ontario that has all the ear-marks of making good, has had more than its share of setbacks than it really deserves. The disastrous fire of July 11th, with its terrible toll of deaths by burning and drowning, must have saddened a large number who have taken an interest in its welfare and development.

Remains of Dome Plant.

For months the weather had been exceedingly dry, and numerous fires had destroyed timber and mining plants, culminating in the fires of the 11th inst. Sunday, the 9th, numerous fires were seen raging throughout the district, aggravated by a high wind from the south-west.

On Monday the wind was not so high, and the people felt more secure. On Tuesday a high wind started from the west, and by 11 a.m. was blowing a gale and increasing in violence every minute. From Porcupine Lake numerous heavy plumes of smoke could be seen in all directions, and everyone with a knowledge of forest fires in Ontario knew that the district was "in for it," and that stories of disaster were soon to come in after it was all over. No one, however, thought that such a terrible death list would be the result.

Shortly after 1 p.m. the Dome whistle was heard in South Porcupine, indicating that that part of the district was in danger. About 2 o'clock fire was sweeping south of the town of South Porcupine and people were hastily burying their belongings and escaping to the lake. Then the wind seemed to increase even more and heavy smoke swept through the streets and obscured the sun. The people from the outside and the village began to go out into the lake by canoes and launches, and even wading along the south side, where the water was shallow. Considerable confusion existed at the water front, and the explosion of a car of dynamite and black powder on the railroad siding to the south, about an eighth of a mile away, must have struck terror into many, who perhaps thought the end of the world had come.



EFFECT OF EXPLOSION OF CAR OF DYNAMITE AND BLACK POWDER
SOUTH PORCUPINE JULY 11TH 1911
SHOWING BENDING OF RAILS AND CRATER ABOUT 40 WIDE AND 10 DEEP

Almost immediately the fire reached the village and drove into the water those who did not manage to get in a boat or had not started wading. The crowd skirt-

*Mining Engineer, South Porcupine, Ont.

ing the south shore were all safe, as the water was shallow, and one could wade out far from shore. Those in canoes were less fortunate, as many canoes were overloaded and capsized by a sea so high as to be almost inconceivable in such a small lake. During this time various detonations were heard, evidently magazines; and about 6 p.m. a very heavy shock, which proved to be a large magazine owned by the Hamilton Powder Co., situated a mile west of the town. By evening the smoke had cleared and a few houses at the little village of Pottsville and practically the whole of Golden City were found intact by those who had escaped from the south end. This was a blessing, as food and accommodation were to be had for most of the refugees. If Golden City had been destroyed the people would have starved until outside aid could have reached them.

Preston East Dome.

Dynamite Explosion.

Big Dome Mill.

Dynamite Explosion.

Wild rumours were pouring into Golden City, and, unfortunately, people were sure that most of them were all too true. The list of mining plants and buildings that were completely wiped out was known early on the morning of the 12th, and was as follows:—Vipond, Aura Lake Post-office, West Dome, Preston East Dome, Standard, Imperial, Dome, Philadelphia, and some smaller plants. Not a building was left at South Porcupine and Pottsville was almost completely wiped out.

The saddest part, however, was the terrible list of dead. The West Dome, where 20 were found dead in the shaft and four above ground; nine at the Dome; five at South Porcupine, and many known to be drowned in the lake added to the horror of the fire. Wild estimates were made, in which the numbers ran up into the hundreds, and naturally the question was put as to whether most of these deaths could have been prevented.

It is only just to say that in numerous instances the people did not realize the danger. For instance, at the West Dome the manager had successfully fought f round his buildings and plant a number of times. the Dome they did not realize that a terrific wind blowing, and they had confidence in their fire-figh appliances. When the smoke got thick people bec confused and ran in wrong directions for safety.

On the evening of the 12th numerous tents w pitched at South Porcupine. On the 13th five bod had been collected, and dead horses were cremated. ready men were stumping a lot in preparation for bu ing. Parties were scouring the woods trying to loc missing ones, and the lake was being dragged. Home and hungry ones were being looked after as well possible.

Men who can start things going so soon after suc calamity must be fighters, and naturally will take ri timid folk will not. It is just this fighting spirit t caused such a terrible loss of life. Numerous criticis were offered in respect to the terrible loss of life at West Dome. Was the management going to pack and get to safety and not leave a hand to save pl and buildings? The same holds good for the Dome a also accounts for some of the lives lost in South Por pine.

This is not going to be the last fire in the Porcup district, but it is to be hoped that it will be the wo and that it will teach some lessons that are badly need A small reservoir on the Dome provided a safe ref for many men. A narrow creek did the same for ma near the Preston East Dome. The small lakes on east side would do the same. This means that larger a more thorough clearings must be done round the min plants to secure their safety. The same country can burned over more than once, as the Hollinger Compa knows well.

storing of high explosives in a heavily-wooded ry like Porcupine is not properly understood. That load of blaek powder and dynamite was left on a in the traek of a roaring bush fire shows either npt for its contents, or carelessness on the part of ilroad not even excusable on account of the exigen- f eonstruetion.

effect of this explosion was most interesting, as by the rough sketeh; but it was the cause of one The Hamilton Powder Company's magazine was danger point, with the erudest fire proteetion. It e more eare was given to storage of explosives, he Government would do well to examine, say, the South African regulations in this respect. The best lesson given by the fire was to prove the buoyant disposition of the people, who commenced clearing up and getting things into proper shape before the embers had cooled down. As time passes and the clearings grow bigger danger from fires of this description will vanish; but that will not be for some time. A death list of over seventy, and the destruetion of so many valuable plants is a blow that would stagger even a well-established camp. That Porcupine, not two years old, should suffer such a blow is a calamity. As pointed out, however, she is strong enough to stand it and revive.

THE PORCUPINE FIRE.

By G. R. Rogers.*

ring the month of June and the early part of many fires were known to be blazing or smoulderin a south-westerly direction from Porcupine. On ay, July 2nd, a fire swept through a portion of ol Township; and, up to the time of the terrible aust, fires were raging in that section of the dis- In Tisdale, Deloro, and Whitney Townships fires were causing eonsiderable trouble.

ing to the extremely dry and excessively hot torrents of flame the many smouldering fires in the district. Judging from the extraordinary rapidity at whieh the fire was approaching, it was inevitable that all efforts to save South Porcupine from the flames were futile. Nevertheless, a number of men were out trying to block the fire, whieh they found impossible in the faee of the raging wind and heavy volumes of black smoke.

Information gathered from some of the parties sent out by the Relief Committee goes to show that the main

Fire in Porcupine, July 11.

her experienced during the two months previous to ire, it was realized that, should a strong wind arise, situation in Porcupine would be critical.

the morning of Tuesday, July 11th, a soft south- wind was blowing until noon. It then suddenly loped into a hurricane, travelling at a velocity of t seventy miles an hour, quickly fanning to roaring body of the fire originated in the eastern portion of the Township of Carseallen, or near the south-west eorner of Bristol, and, rapidly spreading itself into a zone from twelve to fourteen miles wide, travelled in a northeasterly direetion.

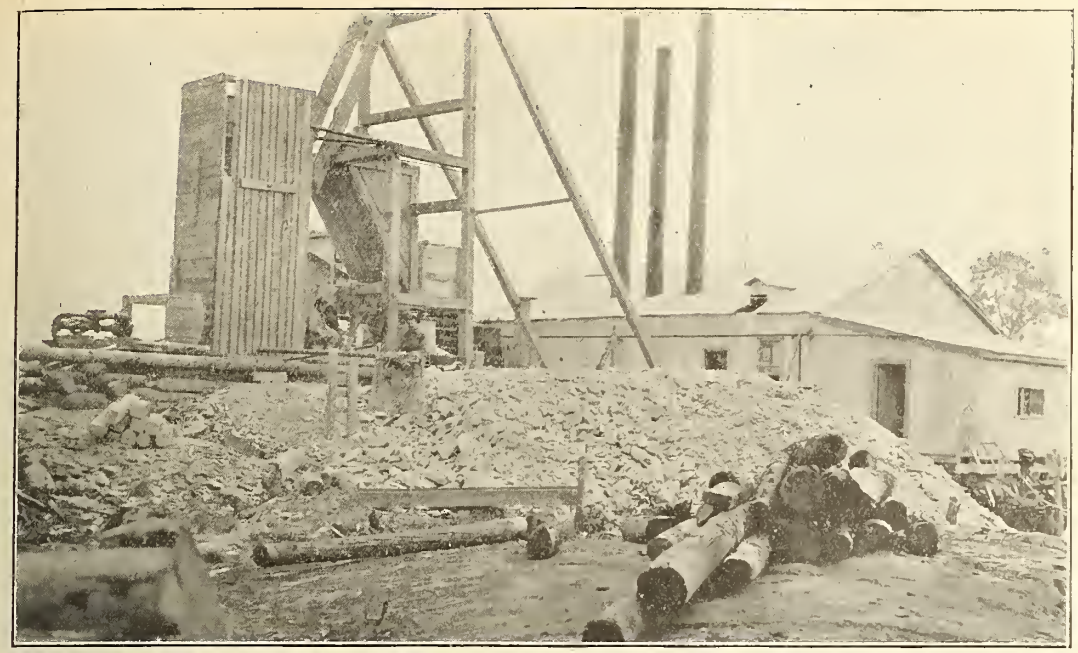
As nearly as ean be ascertained, the mines known as the "Standard," "Imperial," "Apex," "Dome Lake," "Preston East Dome," "West Dome," and the "Dome Mines" were in the centre of the fire zone.

Mining Engineer, 8 Torranee Avenue, Toronto.

Some idea of the rapidity with which the fire was driven before the furious gale may be gathered by the faet that scareely ninety minutes had elapsed from the time the plant of the "Poreupine Imperial Mines" was destroyed and the minute that South Porcupine and Pottsville were reduced to a smouldering bed of ashes, ineluding all the surface equipment and plants of the mines above mentioned. The "Hollinger," the "Rea Mines," the "Suceess Mines," the "Pearl Lake," and several others in the Gillies Lake seetion were saved from the fire. Not only did this fiery furnaee lap up with its hungry tongue of flame over two million dollars' worth of machinery and buildings, but it also carried with it the lives of a number of heroes who perished in a brave attem to save the property of their respeetive employers.

At South Porcupine and Pottsville men and w en stood at their posts of duty until the flames had al dy destroyed a number of shacks in the villages, and he fire eould be seen making its way at terrifie speed a ng the east shore of the lake in the direetion of G len City, and along the west shore to Pottsville. Realing that the battle against the devouring fire was lost, p- wards of a thousand terror-strieken people, inclu ng men, women, and children, made a wild rush to Po u- pine Lake, although the lake resembled a raging ea canopied with thiek volumes of black smoke, illumin ed

Bob Weiss, Wife, Child, Carlos Warfield, Tracy, and Millard at Weiss House, West Dome.



Last Picture Taken of West Dome, Main Shaft.

with ongues of flame that imparted the lurid colouring of a tropical sunset. But the lake afforded the only possible means of escape.

Gasoline launches, canoes, and hurriedly-constructed craft were quickly and willingly placed at the disposal of the women and children, who were taken to places of safety as soon as could be expected, considering that the men in charge of launches and canoes were working under appalling conditions. The manner in which the women and children were cared for can better be described by the fact that not one woman or child was drowned, while the lake is responsible for the deaths of several men, who lost their lives while endeavouring to cross the lake in canoes.

While hundreds of people were in the water of Porcupine Lake, waiting for the fire to complete its destruction in the villages, a car containing several tons of dynamite and a quantity of blasting powder, standing on a siding at Construction Camp 6, caught fire, causing the dynamite and black powder to explode, breaking many windows in Golden City, as well as blowing a hole fifteen feet deep and forty-seven feet in diameter in the soft earth.

The fire made its way along the west shore of the lake to Pottsville, and in less than fifteen minutes the village was completely wiped out. It worked its way round the north end of the lake, heading in the direction of Golden City. When it was seen that Golden City was in the path of the flames it was feared that an attempt to save the city would meet with results similar to those experienced in trying to save South Porcupine and Pottsville. However, a number of special constables were sworn in to keep order and assist the bucket brigade in fighting the fire to save, if possible, the only place of shelter left. The fire encircled Golden City with alarming rapidity, and it is only due to the indefatigable manner in which the many willing hands fought the fire that the new buildings in Golden City

Fire Wagons in Porcupine Lake.

were saved. All the buildings north of the Murphy House and north of the road, also a number on the south road that leads from the railway station, were burnt to the ground.

During the several hours of trial and terror, in which hundreds of terror-stricken people were engaged in saving each other from the merciless fire that left everything in devastation, upwards of seventy brave men and women perished from suffocation, drowning, or burning.

At the West Dome Mines, situated only five miles from Golden City, Robert A. Weiss, manager of the property, together with his wife and daughter, and seventeen others, including Mr. and Mrs. Burt, of Cobalt,

Golden Avenue, South Porcupine, Before the Fire.

Mr. and Mrs. D. M. McQueen, of Kippen, Scotland, were suffocated in the shaft, where they sought safety from the fire.

On the surface of the property, near the shaft, was found the body of William King, head prospector of the "West Dome," who remained at the shaft and sacrificed his own life in a brave attempt to save the lives of the twenty unfortunate people who were at the bottom. The bodies of four other men were found about the works in positions indicating the fact that they also died while endeavouring to save the property. The "Dome Mines," which is adjacent to the "West Dome," on the east, suffered loss by fire to the extent of its entire surface equipment, including the forty-stamp mill, which was in the course of erection, together with the lives of twelve men, who perished during the conflagration.

When word reached Golden City of the awful catastrophe at the Dome and West Dome Mines a number of men formed themselves into rescue parties and proceeded to the mines to assist those who were left on the property in the sorrowful task of extracting the bodies of the unfortunate men and women from the underground workings.

The following day a committee of seven men was formed, with Mr. Cyril T. Young, Ex-Mayor of Haileybury, as Chairman, for the purpose of taking care of the dead and injured; and, when addresses could be obtained, communicating with their friends and relations. Parties also were sent out in the different sections of the burnt area to search for those who were reported missing. This resulted in the recovery of several bodies that otherwise might not have been found.

Golden Avenue After the Fire.

Great credit is due Mr. Englehart, Chairman of the T. & N. O. Railroad Commission, for his prompt action in sending a special train to bring out the hundreds of people who were rendered homeless after the fire.

CANADIAN PATENTS

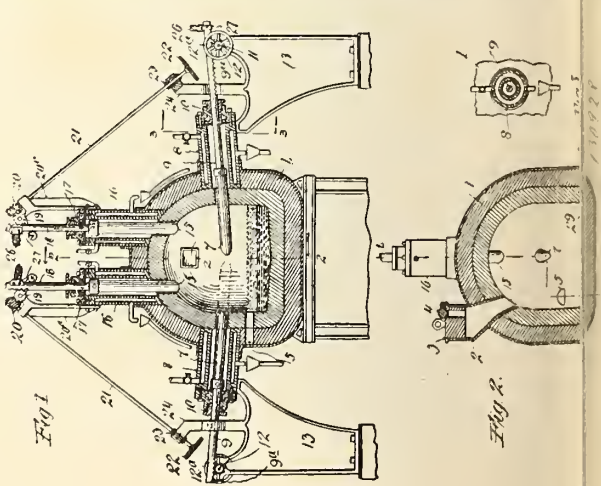
John W. Evans, Belleville, Ontario, Canada, 7th February, 1911, 6 years. Filed 14th January, 1911. Receipt No. 191,622.

Claim.—1. An electric furnace comprising a chamber, substantially horizontally disposed electrodes therein, a pair of separate electrodes independent of the first-named electrodes adapted to enter the material in the chamber, and means for operating said electrodes at will, the horizontal electrodes being arranged to produce an arc above the material in the chamber.

2. An electric furnace comprising a chamber, electrodes therein arranged to produce an arc above the material in the chamber, electrodes independent of the first-named electrodes adapted to enter the material in the chamber, and means for operating said electrodes independently.

3. An electric furnace comprising a chamber, a pair of electrodes adapted to produce an arc within said chamber, a separate pair of electrodes adapted to enter the material in said chamber, and means for individually operating said electrodes at will.

No. 130,928. Electric Furnace. *Four électrique*



4. An electric furnace comprising a chamber, electrodes adapted to extend across the same, and electrodes adapted to extend into the chamber at an angle to the named electrodes, one of the first and second-named electrodes being arranged to produce an arc between the second-named electrodes being arranged to heat the material in said chamber to pass electric current through said material.

5. An electric furnace comprising a chamber, substantially horizontally disposed electrodes adapted to enter said chamber to produce an arc, and a pair of electrodes arranged at opposite sides of the centre of the chamber and adapted to cross the path of the first-named electrodes, whereby an arc may be produced between one of the first and second-named electrodes and the second-named electrodes may enter the material to pass electric current through the same.

6. An electric furnace comprising a chamber, a pair of substantially horizontally disposed electrodes adapted to enter the chamber, and a pair of substantially vertically disposed electrodes adapted to enter the chamber and respectively aligned with the paths of the first-named electrodes, whereby arcs may be produced between one of the first and second-named electrodes at opposite sides of the furnace.

John W. Evans, Belleville, Ontario, Canada, 7th February, 1911; 6 years. Filed 14th January, 1911. Receipt No. 191,623.

Claim.—1. The method of reducing refractory material consisting in first applying heat to a body of material by an arc without the material to produce a molten mass, then cutting off such arc, and next heating said molten mass by passing electric current through a portion of the same.

2. The method of reducing refractory material consisting in subjecting the same to the action of an arc at approximately central portion of the body of material, subjecting said material to an arc at a distance from said central portion, and subjecting said heated mass to electric current passing through a portion of the same.

3. The method of reducing ore consisting in first subjecting a suitable ore mixture to the action of an arc to produce slag on the mass, then cutting off said arc, and next heating said mass by passing electric current through a portion of the same.

4. The method of reducing ore consisting in subjecting a suitable ore mixture to the action of an arc at an approximately central portion of said mixture to produce slag on the mass, subjecting said mass to an arc at a distance from said central portion, and subjecting said molten mass to electric current passing through the same.

5. The method of producing steel direct from iron ore consisting in first subjecting a mixture of iron ore, carbon and flux to the action of an arc to produce slag on the mass, then cutting off said arc, and next heating said molten mass by passing electric current through a portion of the same.

No. 130,929. Method of Reducing Refractory Materials.

Méthode de réduction de matériaux refractaires.

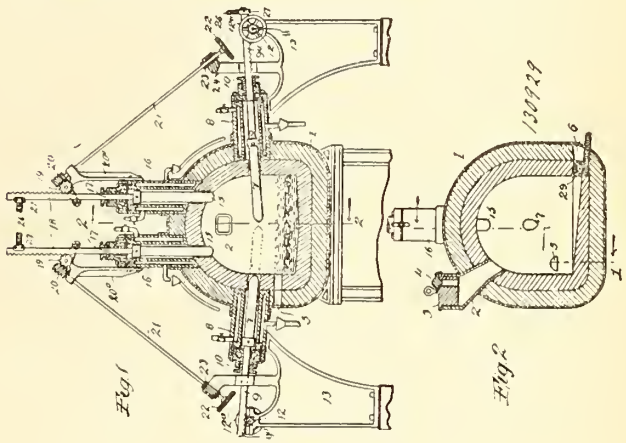


Fig 1 Fig 2

6. The method of producing steel direct from iron ore consisting in first subjecting a mixture of iron ore, carbon and flux to the action of the reflected heat from an arc at approximately the central portion of said mixture to produce a molten mass, subjecting said molten mass to an arc at a distance from said central portion, and subjecting said molten mass to electric current passing through the same.

7. The method of reducing refractory material consisting in first applying heat to a body of material by an arc to produce a molten mass, then cutting off such arc, and next heating said molten mass by passing electric current through a portion of the same, then cutting off said current and next refining said molten mass by applying heat to the same from an electric arc.

Voigt's Camp, Similkameen, B.C.

For some time negotiations have been in progress for the acquirement by New York and Boston men of the large mining property, situated on Copper Mountain in the vicinity of Princeton, Similkameen, B.C., together with other interests owned by Mr. Emil F. Voigt and associates. The transaction has not yet been completed, but it may be shortly, so the following information is published with a view to conveying an adequate idea of the prospective value of the property and the considerable importance of the projected enterprise which may be expected to lead to the effective development of the property and the utilization of the large mineral resources it is believed to possess. Much of the information has been abstracted from a comprehensive report on the property made by Mr. C. W. Wheelock, of New York City, whose work in this connection extended over a period of three months, from November, 1909, to January, 1910, inclusive:

Location.—Voigt's camp is situated in Similkameen mining division of Yale district, British Columbia. On an air line it is about 120 miles east of Vancouver, 30 miles north of the International Boundary line, about 100 miles west of the Boundary district (where are situated the mines and smelteries of the Granby and British Columbia Copper Companies), and 300 miles north by west of Spokane, Washington, U.S.A.

Similkameen River at this point, flowing towards the north, adjoins some of the property on the west

side of the camp. The nearest town is Princeton, which lies some 10 to 11 miles to the north, and is the present terminal of the Great Northern Railway. From the camp Princeton is reached by a good wagon road, crossing one divide.

Altitude.—The camp is about 2,600 feet above sea level, 800 feet above the smeltery site, and 1,000 feet above the Similkameen River.

Climate.—The climate is good, both summer and winter, permitting outdoor operations to be carried on practically throughout the entire year. The rainfall is moderate and snowfall light.

Transportation.—The Victoria, Vancouver & Eastern Railway (part of the Great Northern Railway system) is extending its line westward, making a direct route from Spokane, Wash., to Vancouver, B.C. The line has been completed to Princeton. Further construction will be proceeded with as rapidly as practicable until the line shall be completed. Previously the district had been without railway communication, making development or construction work economically prohibitive. With the advent of the railway these conditions have been changed.

History of Development.

The development of the mineral deposits of Voigt's camp was commenced 10 or 11 years ago. The country was difficult to prospect owing to its comparative inaccessibility, the steepness of its mountains, and the undergrowth and fallen timber. It was at first believed the mineral veins ran east and west. A considerable amount of clearing, trail-cutting, open-cut, and prospect work was required to reach the various mineral locations and to ascertain the trend of the veins and their probable size. This work has been carefully and intelligently carried out, with the result that the occurrence of enormous veins or mineralized zones has been demonstrated. Approximately $125,000 has been expended in bringing the property to its present condition, besides years of time.

In area and contents the veins would, so far as the development work has proceeded, appear to exceed in both size and value those of the Boundary district, where probably some $8,000,000, including cost of railway construction, had to be expended in order to bring the mining properties to their present profitable basis.

The Voigt properties had been examined on occasions prior to 1907, and are said to have been favourably reported on. The most extensive sampling is said to have been when approximately 100 samples were taken. An average of these samples is stated to have returned 3.10 per cent. copper and $5.15 per ton in gold and silver. While averaging samples is ordinarily very misleading practice, the extensive mineralized area proven in this camp would tend to minimize the errors that ordinarily would occur, relying upon this method. Under the conditions as they exist there, careful work along these lines is the only way that an intelligent approximation of the value can be determined.

At the time the former examinations were made the nearest railways were 75 to 120 miles away, making the handling of an undertaking of this character economically impossible. The general conditions obtaining the past two years (1907-1909), in conjunction with the lack of transportation, have been a bar to further work. Now that the construction and operation of the railway to within six miles of the property have been accomplished, and an extension thereto has been surveyed, this mining enterprise is made, fro transportation standpoint, simple and easy, espe when compared with much of the work that has done in many other places in British Columbi elsewhere.

Area, Topography, Geology, etc.

Property.—Embraced in Voigt's group, in p cally one compact body, are approximately 55 eral claims and fractions; a tract of coal lands; ber tract; a lake, and the land surrounding it, i ing smelter sites; and water-power rights on Si meen River. Of the 55 mineral claims include are Crown-granted, and others are ready for C grant.

Area.—The total area exceeds nine square mile acreage is as under:

Mineral claims	
Lake and surrounding lands controlling further mineral areas	
Coal lands	
Timber lands	
Total area	

Topography and Roads. — The physical conf tion of the country is characteristic of many pa British Columbia. The mountains are steep and ged, frequently cut by precipitous ravines. The of the sides runs from 25 to 30 deg. and in some 35 to 40 degrees.

Road-building, however, is for the most part paratively inexpensive, and the Government is ally ready to bear at least a part of the cost. dition to the excellent wagon road into camp, have been cut in all directions, making easy acc the various parts of the property.

Geology.—Geologically the district has featu unusual interest. Immediately to the north o Voigt property are extensive coal measures, thes tinuing more or less intermittently for a distan 50 or more miles to Nicola district, which has al been entered by the Canadian Pacific Railway. coal is at various places lignite, or bituminou spectively; some of it is coking coal. At G Creek, about 20 miles from Voigt's camp, ther large seams that are claimed to contain an exc quality of coking coal. At Princeton and sou the Voigt properties the coal is a good grade of li

Apparently the entire Voigt country was a time covered by sedimentary rocks, which have uplifted, broken, shattered, eroded, and carried by natural agencies, leaving exposures of mi bearing igneous and altered rocks, and dikes. mineralized area is 2 to 3 miles east and west, to 4 miles north and south. On the extreme e granite; on the west there is an extensive di porphyritic rock, probably rhyolite, about 1,500 in width. Next come the series of veins or miner zones, varying in width from 100 to 800 or 1,000 The western boundary is another porphyritic 1,200 to 1,500 feet wide, which crosses the river ing excellent exposures. Between these two dikes is the mineral belt, containing the several which are separated by smaller dikes, of like s varying in width so far as exposed from 20 to 60

Between the small dikes lie the veins of miner zones, some 26 in number. A striking feature i connection is that all the workings examined, no

ow barren-looking the surface might appear, were l to contain, at very shallow depth, either pro- ced evidence of copper rapidly coming in, or ac- ore of commercial and profitable value. When it nsidered that commercial ore is exposed in veins 00 feet wide and evidence exists of still wider of good ore, the size and great possibilities of ation may be better comprehended.

hile the dikes are apparently all of similar gen- character and origin, the composition of the vein gs varies greatly in character. Roughly, the east of the home camp are heavy in iron. In the al and southern parts more lime appears, princi- in the form of calcite. To the west the ores are silicious. Broadly, the gangue is a highly altered te, or coarse andesite. The metallic contents oc- as a replacement therein, due to the usual causes, mineralized solutions under heat and pressure. metals are principally chalcopyrite, bornite, ar- -pyrite, pyrite, hematite, magnetite, etc., with gold silver in profitable quantities.

Development of Mining Properties.

the aggregate a considerable amount of develop- t work has been done, probably at least $40,000 to 000 worth. When, however, it is remembered that work is scattered over several square miles it will ily be understood that it really amounts to little e than prospecting and does not give any adequate wing commensurate with the conditions at any one e. Such work as has been done is, though, of great e, and will simplify future development. Beside many trenches, and open-cuts, some of them 200 or more long, there are several adits or tunnels n 10 to 110 feet in length, and shafts from 25 to feet in depth. This work is all excellent in its way, wing as it does extensive orebodies, and demon- ting where the succeeding work should be done.

he deepest work in the camp has been done on ms south and southwest of Voigt's, but on the e line of mineralization. A shaft on the Sunset s sunk 190 feet; at 150 feet depth a cross-cut was ven 102 feet, all in ore without reaching the other ll. Diamond-drilling on other claims is reported to ve shown good results, in one instance to 500-600 t depth still showing good ore. This proves that e ore will go to depth. All geological conditions point a similar conclusion. If the veins on the Voigt pro- rty go no deeper than 500 feet there would still be sufficient for a large smelter for many years to me, due to the great width of the veins.

Sampling.—Technically, no fair estimate could be ade of developed tonnage. Considerable amounts of e of commercial value, however, are exposed. The mpling, therefore, had to be done, not with a view establishing tonnage, but rather to ascertain as far possible the ore value in the bodies already demon- rated. Samples were taken along a distance of out two-and-a-half miles. (Note.—Full details are ven in the report of results of assays of 27 samples, d of check assays). Eliminating four surfaces and ve high-grade samples, and taking the remainder as presentative of known orebodies of large dimen- ons. they show an average content of copper, 2.038 er cent., and gold and silver $0.968 per ton (calcu- ting silver at 50 cents per oz.). The veins from which he five high-grade samples were taken (not included the foregoing average value), will undoubtedly pro- uce a sufficient tonnage to substantially increase the average value, in both copper and gold. However, taking the average as given above and estimating copper at 12 cents per pound, it gives a gross value of $5.84 per ton. From a tonnage of this value sufficient to supply a 1,500-ton smelter, the following results may, with good management, safely be expected, if, as is estimated. 85 per cent. of the copper and 90 per cent. of the gold and silver be recovered, and total costs be $3.50 per ton.

	Per Ton.		
Copper at	Net recovery	Net profit.	Net per day
10 cents	$4.332	$0.832	$1248
11 cents	2.678	1.178	1767
12 cents	5.024	1.524	2286
13 cents	5.370	1.870	2805
14 cents	5.716	2.216	3324
15 cents	6.062	2.562	3843

For a year of 330 operating days the net profits would be, with copper at 10 cents, $411,840; at 11 cents, $583,110; at 12 cents, $754,380; at 13 cents, $925,650; at 14 cents, $1,096,920; at 15 cents, $1,268,190.

Should ore be developed in bodies as large as surface exposures would indicate them to be, there is no reason why, under good management, costs should not be made equally as low as those of the Boundary district, especially as several items of cost—power, coke transportation charges, and better local conditions—would be distinctly in favour of the Voigt property.

Summary of Other Matters.

Mr. Wheelock's report goes into much more detail than that already given, and, too, in regard to other matters not here quoted, and some of the latter will be very briefly summarized.

Analyses indicate that with the addition of a small percentage of lime the ores will work easily and directly in a blast furnace. There are two available lime deposits close at hand. Cost of coke from Granite Creek or Nicola will probably be not more than $5.50 per ton, which would be $1 less than cost of Crow's Nest coke to Boundary smelters. There are several sites, near Smelter Lake and but a short distance from the site, for a hydro-electric power station, suitable for a smeltery.

In further developing the property, the topography of the country affords favourable conditions, as depths of from 600 to 1,400 feet could be gained by driving adits or tunnels 2,000 to 6,000 feet. Nearly all work would be by adits largely in ore, and all ore be handled by gravity. Local conditions are such that beyond an electric tramway for conveying ore from mine to smeltery, the ore could be handled automatically by gravity and at low cost.

Ample hydro-electric power for all mine, smeltery, tramway, and lighting purposes can be developed at a reasonable cost for installation of plant, on Similkameen River. There is an excellent site for a dam, and 5,000 h.p. could be developed.

There is estimated to be about 7,000 feet per acre of timber — red fir, some pine, etc. — which would give cheap timber for mining and construction uses for years.

The coal lands have not yet been developed, so their value is unknown.

A careful study of the property and conditions leads to the opinion that with proper development and management it should become a large copper mine, and that copper could be produced at eight cents per lb., or possibly less.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Dominion Coal Output.

The production for the first half of July was uniformly good, being at the rate of 370,000 tons for the month. While the outputs this season are not actually as high as in some former years, their steadiness is remarkable, and the breaks caused by the pay-days are not so marked as in some previons seasons.

The new collieries at Lingan are beginning to count materially in the outpnt figures. No. 14 Colliery is now producing over 1,000 tons daily, and the output for one day from the four new collieries is now nearly 2,500 tons, about one-sixth of the entire output.

The branch line to the Birch Grove Colliery is under construction, and will be completed during the autumn. This mine is producing about 1,500 tons per month at the present time. It is now known as Dominion No. 21, and is the first of a new series of mine numbers.

The North Atlantic Collieries at Port Morien were advertised to be sold at auction by the sheriff on the 13th July, but the sale has now been postponed until the 29th September. About 150 tons a day is being mined, and the development work is being kept up.

The Springhill Collieries have been constitnted into a superintendence district under the scheme of organization used by the Dominion Coal Company, and will be known in future as "Dominion Coal Company District No. 5, Springhill." The output is rapidly increasing, and from the two slopes is now 1,200 tons daily.

The examinations for provincial certificates of competency for mine officials were largely attended. For managers' certificates 34 candidates presented themselves, of whom 16 were successful. For underground managers' papers 15 candidates were successful out of 31 applicants. For overmen's papers 21 passed out of 31 who sat for the examination. The rapid opening up of new collieries in Cape Breton has necessitated the appointing of many new managers, and the large number of aspirants for certificates of competency is evidence of the growing importance of the industry. When the Dominion Coal Company was incorporated in 1893 it operated only four collieries, namely, Dominion No. 1, Caledonia (No. 4), Reserve (No. 5), and International (No. 8). To-day this company has no less than 15 collieries, for each of which a manager is required. Cape Breton men will also play a large part in the opening up of the coalfields of the West, only now properly commencing. It is a very short-sighted national policy which requires miners to obtain certificates of competency for every Province of the Dominion in which they may elect to exercise their profession.

The Commissioner of Mines for Nova Scotia has engaged Mr. A. L. McCallum, of Halifax, to visit the coal mines of the Province and take barometric and thermometer readings underground, ascertain the humidity of the ventilating current and its velocity, and to take observations of the amount of dust in suspension in the mine air.

The British Home Office recently passed an order directing that a sufficient number of canaries, linnets, or other small birds, should be kept near the pit-top at every British colliery, in readiness for the use of rescue parties should the necessity for them arise. It has long been the custom for parties entering a mine after an explosion or fire to carry with them a small bird in a cage, and to judge by its behaviour whether or not the air was poisonous. The chief danger to such parties arises, of course, from carbon-monoxide, which cannot be detected by the ordinary evidence of the senses, as it is odourless and will support combustion. In the presence of carbon-monoxide a canary or linnet will fall from its perch long before men are affected, and by so doing give the signal for retreat. The Dominion Coal Company has obtained a number of canaries that are to be kept at the Central Rescue Station at No. 2 Colliery.

ONTARIO.

Porcupine, Swastika, and Gowganda.

For some weeks to come public interest will be divided almost entirely from the activity of the mines to the reconstruction of the camp as a community. A drenching rain is now falling and the great uneasiness that has prevailed everywhere owing to the materials for another awful blaze is disappearing, and every man is getting extremely busy in his business. It is certain that the disaster has taught the miners of Northern Ontario a lesson that they will never forget. The fire here from Cochrane and north of the Transcontinental to Sudbury was not merely a bush fire in the ordinary acceptation of the term, but a cyclone fanning all the combustible materials in the virgin forest till it was like a blast furnace. The flames did not creep along the ground, but the carbon dust driven on the wings of the wind in the air roared out in great masses of detached flames. Good clearings were of no avail. At the Dome Mines, where 160 acres were swept clear of trees, the air was on fire. Flames shot out of the various buildings at once, and men fighting the blaze were at once surrounded and ringed in. Three-quarters of the loss of life was due directly to the attempt to beat back the waves of flame and smoke, and never again in the north country will it be possible to get a mining force to combat the fire unless they have some place of retreat.

This very matter is under consideration at the present time. Mr. Ambrose Monell, of the Dome Mines, now personally superintending the construction of the Dome Mines, is possibly responsible for the suggestion. He maintains that a root house were provided at every mine where the men could retreat under circumstances such as occurred last week, not only would lives be saved but the men, knowing they had a safe retreat, would defend the property till the last moment. To be effective, however, every property and every prospect in northern Ontario so surrounded by the bush must be obliged to have this retreat where water should always be kept and proper ventilation provided. It should come under the supervision of the Inspector of Mines, and be as essentially a part of the equipment as a proper hoist and safety appliance on the cage. After such an awful lesson it is not likely that Porcupine mines will take any risks, but throughout the north as fresh camps spring up, the materials for further tragedies are provided unless some such cyclone cellar is provided.

At the Dome Mines it is hoped that the compressor will be running again in a month's time, and the perfect organization which the Canadian Copper Company has at its call is being invoked to repair the damage as quickly as possible. Of the machinery, so intense was the heat, very little will be saved; but the foundations of the big mill appear to be sound. It is now expected that the mill will be constructed and ready to drop stamps by Christmas. While the design of the mill will be identical with that destroyed, the construction of the building will be entirely of concrete, steel and brick, so that in this case the Dome men will have a haven of refuge in the event should there again be such a whirlwind of fire as swept over this country. In the eastern and southern portions of the Dome further bodies of quartz and schist have been opened up by the fire, and a gang of prospectors under Mr. Brand, former manager of the Standard Porcupine, will be put at work prospecting and sampling, while as soon as the compressor is working, test pits will be sunk. It is also desired to attack the 300-foot level in the three Dome shafts as soon as possible.

It is safe to say that no miner in northern Ontario will ever take shelter in a shaft again in case of fire. In the holoc

of July 11, not one man who went down a shaft and stayed escaped suffocation. In the Pearl Lake area, with the ion of the Vipond, mining activity has not been inter- one day. Until the T. & N. O. line is extended to Miller the Hollinger is content to prospect and sample and e plans for the new and larger mill. When better trans- ion is provided the machinery is to be hauled in.

McIntyre has had a series of very rich and spectacular eries, both on the surface and underground. In a drift 100-foot the quartz veiu sunk upon is now showing re- ble ore in both faces.

Uder the control of the Drummonds the Jupiter is now as- of the systematic mining that its surface showings de- serv News has just been received that at sixteen feet from the haft at the 100-foot level driftiug north the vein has been ut. It exhibits four feet of as remarkable ore as on the sur- face and there is now very little possibility that the option will not be taken up.

Armstrong-Booth, in which Mr. E. P. Earle, of the Nipis- ng Mr. Frank Armstrong, of New York, and Mr. David sn, of Toronto, are interested, has made remarkable pro- re: It definitely has the extension of the Jupiter on f its claims and good assays have been obtained both e surface and with the diamond drill at 180 feet. On aim on the edge of Pearl Lake, near the No. 1 camp of ewick-Moreing, the four to six-foot lead of quartz is rich sible gold. Near its own camp, just south of the Rea, atest discovery has been made. The vein is much broken the surface but yields very rich specimens and the dirt ins so much gold that a rocker has been installed to pan

At the north end of Porcupine Lake, the Porcupine Lake Mines will install a four to six drill compressor as soon e machinery can be rushed in. While there is very little le gold in the large ore body uearly every specimen of tz panned gives a rich tail aud the assays are always factory.

e fire has aggravated the freight congestion at Porcupine at the present time 150 cars are on the road to the camp een North Bay and Golden City. A siding to contain cars is to be constructed, and even this accommodation be strained, so large is the amount of business that will one before the snow falls. As soon as lumber can be ob- d South Porcupine will be rebuilt, and before the first the settlement will probably be almost as big as ever.

THE FATALITIES.

ereunder is given a list, corrected up to date of going to s, of the Porcupine fire casualties. It is possible, but uot able, that this list may receive additions. Since the res- parties, sent out to determine the fate of isolated pros- ors, found no one in need of assistance, it is hoped that tale of deaths is complete. The excitement caused by the catastrophe news is, perhaps, sufficient excuse for the s exaggerations that appeared in the newspapers.

Death List.

ules Metayer (Le Bretton), telegraph French Consul at treal; buried northeast side lake.

ndre Le Roux, telegraph to manager Metropole Hotel, Mont- , was waiter there; effects giveu to wife here; buried Ed- ds Point.

rpila Mondoux, Cobalt, telegraph to Lang McNabb ad- ed; age 50; recovered.

harles E. Adams, Phoenixville, Pa.; relatives advised; age shipped by friends to McNabb.

William Taylor, Pearl Lake; telegraph to wife and ee children in Reading, England (wired Lord Strathcona); ried at Pearl Lake.

R. A. Dwyer; Lawton wired brother in Butte, Montana; found and buried on Uuited Porc. Gold Mines property.

Jos. Flynn, Bracebridge, Ont.; found and buried on United Porc. Gold Mines property.

Audy Youill, superintendent, Toronto; found and buried on Uuited Porc. Gold Miues property.

Joe Fletcher, Cockermouth, Cumberland Co., England; sister, Mrs. B. Allen (same address); found and buried ou United Porc. Gold Mines property.

One unidentified, found and buried on United Porc. Gold Mines property.

Pat Dwyer.

Wm. Moore, Cobalt; age 35; shipped.

Melvin Strain, Porcupine; relatives here; recovered.

Nathan Haas, Spokane, Wash.; brother, Ed Haas, Houghton, Mich., here; shipped.

Stan. Nicholson, Guelph; wife in Guelph advised; age 28; shipped.

Wm. Gore; wife here; age 43; buried.

T. R. Geddes; age 54; buried on Foley-O'Brien.

Mack Smith, New Liskeard; relatives advised; buried on Foley-O'Brien.

Thos. Bodin, man of same name living; buried on Foley-O'Brien.

Capt. Thos. Duubar, of Kennedy & Dunbar, Pembroke; buried on Foley-O'Brien.

Harry Hardy, Dome Miues; telegraph P. M. Bath, England, assayer; boarded at southeast coruer Adelaide and Peter Sts., Toronto (wired Lord Strathcona); buried here.

Fritz Manse, Dome Mines; Melbourne, Australia; aged 18; Buried at Dome.

John Whatmaugh, Dome Mines; Toronto student; age 22; buried at Dome.

Thos. John King, Dome Mines; Copper Cliff; age 55; buried at Dome.

Charles Jackson, Dome Mines; coloured; Pittsburg, Pa.; buried at Dome.

Archie Johnston, Dome Mines; Sudbury, Ont.; buried at Dome.

Leo H. Sulman, Dome Miues; Loudon, Eng.; assayer; body shipped.

Stanley Fitzmaage, Dome Mines; Melbourne; age 27; buried.

Arta Alhod, Dome Mines; Kelso; died in transit.

Didelo Diepro, Dome Mines; died in Liskeard hospital.

Robert Weiss, West Dome; Butte, Mont.; age 60; buried.

Mrs. Robert Weiss, West Dome; Butte, Mont.; buried.

Weiss' child, West Dome; Butte, Mont.; buried.

James Reunie, West Dome; Edinburgh, Scot.; buried.

R. J. Welch, West Dome; Cache Bay, Ont.; buried.

John McLaughlin, West Dome; Venisoti, Ont.; shipped.

Wm. King, West Dome; Los Angeles, Cal.; buried.

Angus McDonald, West Dome; Turner Street, Ottawa; buried.

Mr. and Mrs. A. E. Burt, West Dome; Cobalt; buried.

John Destern, West Dome; Toronto student; buried.

Mr. and Mrs. D. M. Macqueen, West Dome; Kippen, Scot.; buried.

John Wall, West Dome; buried.

Harry Brookins, West Dome; wife here; buried.

John Saunch, West Dome; buried.

Hugh McLeod, West Dome; Glencoe Mills, Cape Breton; buried.

Lester Heuninger, West Dome; buried.

J. W. Cranshaw, West Dome; Phoenix, Ariz.; buried.

Wm. McLean, West Dome; buried.

J. Paulin, West Dome; Montcerf, Ont.; buried.

Unidentified man, West Dome; buried.

J. Orr, West Dome; buried.

W. Beeita, West Dome; buried.

A. J. Ryan, West Dome; notified T. A. Dobbins, Manhattan Drilling Company, 50 Church St., New York; buried.

Victor Puera, West Dome; buried.

E. Sherrien, Ottawa; died in transit.

Hugh Meehan, Sudbury; brother notified at Sudbury; buried half mile south Goose Lake, in Shaw.

John McDonald, Eaginville; wife, same address, notified; brother in Deloro; buried half mile south Goose Lake, in Shaw.

Mike Johnson, found on Trout Creek, Nighthawk district; supposed to have committed suicide.

Marshall Morrison, Haileybury; found at corner Tisdale, Whitney, Shaw, and Deloro.

Fred Herbert, England; found at corner Tisdale, Whitney, Shaw, and Deloro.

Edward Cullen, Haileybury; Eagan claims.

Ormond Butler, Tangier, southeast Shaw.

Thomas Cooper, died New Liskeard.

John Bowers, died New Liskeard.

Pretro, Depaoli, died Copper Cliff.

John Bilo, died New Liskeard.

Arthur Hale, died Copper Cliff.

REPORTED MISSING.

Those missing, and where supposed to have been.

George Snowden Andrews; Pigeon Rapids, Mattagami.

Malcolm Black; Kamescotia.

William Black; Kamescotia.

Frank Byron.

Oscar Butler, of Tangier; found dead.

Harry Bruce.

Desire Bourdon.

— Barrette.

Tom Bascom; Bristol.

Sam Brown; working on Rowe claims, Langmuir.

Herbert Bentley; Price Township.

Roy Brady and companion, of Toronto; probably camping on Claim 3103-P, Shaw Township.

Fred Bidgood; advise John Bidgood, King Edward Hotel, Sudbury.

J. Coyne; Powell claims, Deloro.

Edward Cullen; 2021 Broadway, New York City; found dead.

T. Condil, Haileybury.

Thos. Croon; working on Rowe claims, Langmuir.

Fred Clarke, Brockville.

Russell Dale.

Harry Darce, or Dance; working for Martin Vair.

John S. Dekker, Porcupine; Cripple Creek.

Joe. Dudley; Price.

Joradius Darling; Telegram Merrill.

— Dalby; South Langmuir.

A. W. Dexter, Folkestone, Kent, England; Powell claims, Deloro.

Bill O'Flynn.

Flanerty Crawford; West Dome.

C. S. Feslier, Butte, Montana.

T. Gravelle; Whitesides-Cripple Creek.

Howard Genchon; wire Car Inspector C. P. R., Alex Mac.

Fred Herbert, found dead; 2 miles west of Shaw, near Powell claims, Deloro.

Henry Robert; Pearl Lake

T. W. C. Hutchins; Cripple Creek with Fred Hamilton.

Fred Hamilton; Cripple Creek.

Sylvia Hortell, of Sudbury.

O. Jelly.

Sam Jeveraux, Cobalt: Cripple Creek.

James Lefranier, Quebec.

— Lacroix, Haileybury.

Morris Mofft.

O. Morrison.

Wm Mogridge.

Arthur Motye.

John Murray.

John McKay, Cobalt; Deloro.

Tom McLeod; working on Rowe claims, Langmuir.

Marshall Morrison (found dead); last seen between Deloro and Tisdale lines.

A. Seirey McDonald, of Port Hawkesbury, informer.

J. Moss, Reno, Nevada.

— Murray, South Porcupine.

Hugh O'Donnell; Bristol.

Michael O'Neill, carpenter Foley-O'Brien; was with Ryan.

Oscar Patrice, Haileybury.

Geo. Payette; advise E. Payette, Haileybury.

James Sweeney.

Andrew Quesnel, of Sudbury.

Dennis Roberts, of Newfoundland; last seen in Lang and Carman.

Tim Robinson

A. W. Ross; Bristol.

Scotty Robb: Bristol.

Charlie Ross; Bristol-Cripple Creek.

Eric Ryerson.

J. J. Shea; Eldorado.

Ed. Sinclair, of Sault Ste. Marie, Mich; went to Cripple Creek.

Willie Thackery.

William Anthony Thompson.

C. Villeyea.

Chas. Villagracia; Powell claims, Deloro.

Cobalt.

The striking of good ore in the No. 23 shaft of the Nipissing opens up yet another section of this great property for profitable mining. A shaft was sunk to 100 feet and the ore drifted upon for some distance before good ore was struck. Such progress has been made at the new mill that more than half of the high grade ore now goes out in the shape of bullion.

At La Rose the two subsidiary properties of the La Rose and the Princess are providing more than half the output. The Princess now has a vein 120 feet long, resembling the McKinley-Darragh veins in character, namely rich stringers in an ore body twelve feet wide in some places. At the La Rose good ore is being taken out of the roof of No. 8, and development has now proceeded to such a point that No. 8 and No. 9 veins should soon be cut at the 200-foot level.

So far development at the 575-foot level of the Temiskaming has proven disappointing. While several rich patches of ore have been encountered no definite ore body has been located.

BRITISH COLUMBIA.

Last field-work season Mr. John A. Allan, of the Geological Survey of Canada, commenced a survey for a sheet that will include the Ice River district and an area about Field, B.C. The following are excerpts from his preliminary report, as printed in the "Summary Report" for 1910: "July and August were spent in the Ice River area proper, which is important because it contains one of the very few igneous intrusive masses which are at present known in the whole of the Rocky Mountain belt. This igneous mass is of the alkaline type, and contains sodalite deposits. This mineral has a limited

occurrence in Canada. . . . This district is especially known because of the somewhat rare occurrence of sodalite, which is found in the intrusive mass. This beautiful blue mineral has attracted many tourists into the valley, who wished to obtain specimens of this decorative stone.'' Following a further description of the occurrence of sodalite, Mr. Allan concludes his report thus: ''Before the material can be considered of economic importance, it will be necessary to find out its extent, which can only be ascertained by development of the property. This occurrence is worthy of consideration, as the material can be inexpensively worked, and the transportation problem is not a difficult one.''

Southeast Kootenay.—While occasional mention has been made in mining journals of the great size of the deposit of coal the Corbin Coal & Coke Company, of Spokane, Washington, has during the last three years been engaged in opening in the southern part of the Crow's Nest district, no conception of its astonishingly large proportions has been generally obtained. One principal reason for the comparative lack of information relative to this altogether unusual occurrence of coal is the fact that the Corbin company has persistently avoided publicity in this connection. Nevertheless, it is a fact that a phenomenally large body of coal is being explored, though as yet without any clear idea of how big it really it, development work not yet having reached the limits of the coal. From Mr. E. J. Roberts, managing director of the company, particulars of operations were recently obtained. Summarizing the information then supplied, the following brief account of the present situation at the company's mines is submitted: The mine that has during the last two years been producing coal is at a comparatively low elevation—about 500 feet above the tippie. The main entry there has been driven approximately 2,000 feet and the coal deposit found to be at its widest part on this level fully 300 feet in width. Beyond this wide part it has narrowed considerably, what appears to be a large point of rock having come into the coal. Development work is not being continued here, however, for there is so much coal available for mining that the driving of additional length of entry would only involve maintenance costs that are quite unnecessary so long as the further opening of the coal body in that part of the mine is not required to keep up the supply for shipment. At an elevation of about 1,200 feet above the main entry, on Coal Mountain, there occurs what is known locally as the ''upper big showing.'' About 400 feet lower down the mountain, or 800 feet above the main tunnel, there is another big outcrop of coal, known as the ''lower big showing.'' During the last six months these ''big showings'' have been partially prospected. An underground cross-cut proves the coal of the upper showing to be 96 feet in width where prospected by this working. Analyses of every 10 feet of coal give the following average percentages for 12 tests: Moisture, 0.87; volatile combustible, 18.47; fixed carbon, 67.86; ash, 12.80. The highest results were from the sample taken from the last 9 feet of coal cut in this tunnel, namely: Moisture, 0.45; volatile combustible, 15.70; fixed carbon, 77.40; ash, 6.45. The lower big showing has been cross-cut by an adit which at 370 feet from its portal entered slate rock. Analyses, 37 in number, of every 10 feet of coal passed through, gave the following general average percentages: Moisture, 0.73; volatile combustible, 20.03; fixed carbon, 64.25; ash, 15.00. The highest results were from coal cut between 20 and 30 feet in from the portal of the adit. They were as follows: Moisture, 0.60; volatile combustible, 22.49; fixed carbon, 68.31; ash, 8.60. This lower showing of coal has also been cut in pits sunk through the surface wash depths varying down to 15 feet, and the vertical depth of the underground working where it entered the slate is approximately 200 feet below the coal cropping in the pit immediately above it. This enormous deposit of coal continues to be a problem to those engaged in exploring it, and much more development work will be necessary ere it will be understood. Meanwhile, a commencement has been made to hydraulic the surface wash off it.

Tulameen.—The Similkameen Star says: ''Chas. Camsell has taken about half a ton of alluvial from the Tulameen diamond belt to be assayed at Ottawa.'' This is probably a somewhat inaccurate statement, but it is known that it was Mr. Camsell's intention to spend the latter part of June in searching for diamonds in the placer deposits in the vicinity of Olivine Mountain, from the peridotite of which mountain were last year taken the samples of chromite in which Mr. R. A. A. Johnston, mineralogist of the Geological Survey of Canada, when determining the nature of the chromium minerals, secured some insoluble crystals which, on subjecting them to further tests, he found to be diamonds. In his report on last year's field work, printed in the 1910 ''Summary Report'' of the Survey, Mr. Camsell observed: ''Placer deposits have been found in the streams which drain the peridotite, and in these it is to be expected that diamonds comparable in size and quality with those obtained in the laboratory will be found. These deposits may also contain stones of greater size, but in the placer mining for gold and platinum which has been carried on in these streams for a number of years, although stones of commercial size on the sluice boxes should have attracted the attention of miners, the discovery of a diamond has not yet been recorded.'' The mineralogist of the Survey will closely examine all material that shall be sent to him from the Tulameen placer deposits. It is hoped that later in the season some black sand saved from placer mining operations, will be available for close examination for evidences of the occurrence of diamonds in the drift.

General News.—Six more men have been sent from Alberni to the Big Interior copper mine, Great Central Lake district, Vancouver Island. These will increase the working force to 14. The Alberni News says that 40 to 50 men will be employed all summer.

The next general meeting of the Western Branch of the Canadian Mining Institute will be held at New Denver, Slocan Lake. The date has not yet been definitely determined, but it will be during either the second or third week in September. It is intended to give especial attention to the reading and discussion of papers on subjects connected with mining in Slocan district.

From Barkerville comes information that after one of the deepest snowfalls experienced in Cariboo district for years, the spring was late and backward, so much time was lost in the early part of the hydraulicking season. However, when the letter containing this news was written, work was in full swing, the only fear being that warm rains and hot weather would melt the snow very quickly. Fortunately, though, a cool change had been experienced, so that fears of a short season were lessened for the time. The opening of some new placer mines was contemplated, but men were scarce, so that it was not then practicable to put in the requisite hydraulicking equipment and get water on the ground. Several parties had been trying to arrange for opening quartz properties, but it did not seem likely that much money would be spent this year in systematic and well-directed lode mining.

Mr. S. F. Griswold, managing director of the Inland Empire Mining and Milling Company, owning a property situated on Grenville Mountain, in the extreme western portion of the Rossland district, was recently reported to have said, for publication in Spokane, Washington; ''We are installing a 10-stamp mill, supplied by the United Iron Works of Spokane, on the Inland Empire Company's property. The mine is developed by a shaft to 300 feet, with 400 feet of drifting on three levels.

These workings show a 14-foot ledge, carrying free-milling ore, which we believe will average $30 a ton. The shareholders of the company, with the exception of my son and myself, are all Walla Walla (Washington) people. They have been interested in the property and quietly developing it for seven or eight years. The company is capitalized at $1,000,000, in shares of the par value of $100 each. Ten or twelve years ago there was considerable activity in the district, and the Provincial Government built a wagon road seven miles long, which passes our property and extends on to the Bonanza and Cascade mines. Both those properties at one time shipped considerable ore, and I have reason to believe that a Philadelphia operator will shortly arrive in Rossland to get them in shape for a resumption of production."

GENERAL MINING NEWS.

NOVA SCOTIA.

North Sydney, July 20.—A fatal accident occurred at Sydney Mines at 1.30 this morning, the victim being John McIntyre, a resident of the Cranberry district. McIntyre was lying across the track at a point known as the hollow, when the two o'clock workingman's train bound to No. 1 Colliery passed over him, severing his legs just above the ankles. He lived only twenty minutes after the accident. The train was drawn by engine No. 11, in charge of Daniel Nicholson and John W. Young, and was making the run at barely an average speed.

Another accident attended with fatal results occurred at Reserve last evening which caused the death of Joseph Hennessy. The deceased had been working on a level and had a leg badly crushed by a heavy stone falling on it, which rendered amputation necessary. The shock of amputation proved too much for the young man, and he succumbed. The deceased was 28 years old.

The latest reports from Port Hood mine, which was flooded recently, indicate that the mine may yet be saved.

A well known mining man who returned from there yesterday, spoke interestingly of the situation. Panic is on, and the people are leaving the town as fast as they can get away. The merchants are left in a bad predicament, not only on their future business but on their accounts, as the miners are leaving the town.

The traveller referred to spoke of being in one man's store who had been starting an addition to his place when the disaster occurred, and of seeing the tears roll down his cheeks as he tried to tell how his plans had been shattered.

There seems to be still some reason to hope that the mines can be saved. The water flows in at the rate of 35,000 gallons a minute, but there are at Inverness two pumps which are each capable of taking out that much water in the same time. They were sent down to Inverness last year by the Government and were used there.

Halifax.—The Board of Examiners of Mine Managers, Underground Managers, and Overmen has completed the examining of the papers of the candidates for such positions in the coal mines of Cape Breton, Inverness, Pictou, and Cumberland. The number to take the examinations this year was the largest yet, and out of the 126 men to take the examinations, 71 were successful in passing. The large number to take the examinations is due to the interest that the men take in their work, and to the mining schools throughout the Province is due the credit for the large percentage of successful candidates.

Those who were successful in the examinations were as follows:

Cumberland County—For Underground Managers — James Fairlay, Moses Jones; For Overman — Jos. H. Smith, Edward Bradley.

Inverness County — For Manager — D. A. McCuish; For Overman — Mark Davidson.

Pictou County — For Manager — Robert Henderson, James Brown, E. E. O'Reilley, M. E. Copeley, Dan. Gillis, Henry Henderson, John H. McNeil, James F. McDonald; For Underground Manager — Phillip Kennedy, George W. Burnley, Jos. Chisholm, James A. Clarke; For Overman — Jno. H. McDonald.

Cape Breton County — For Manager — F. B. Ferguson, Thomas Merritt, D. H. McLean, James Connors, Alex. McDonald, Ed. Lockman, John Hunter, John A. McLellan, William R. Coll, Thomas M. Kavanagh, William T. Chew, F. R. Dunn, W. G. Ross, A. D. Matheson, P. E. Morrison, Angus McDonald.

For Underground Manager — Phillip Kelly, James Costello, John Bisson, John Young, John A. Ferguson, David Morrison, James W. Spencer, W. E. L. Hall, John D. McNeil, Michael J. McNeil, Edward Cameron, Alex. McKay, Rory V. McNeil, Scott M. Irvin, Alex. H. McVicar; For Overman — Fraser Hynes, John F. McKinnon, Thomas J. Casey, David A. Robertson, Edward Casey, Joseph Gillis, Richard Walsh, Fred Jardine, Joe D. McNeil, Evan Prothers, Robert E. Walton, George Morris, John T. Foster, William Slade, Allan McIsaac, Henry Testall, Malcolm M. McNeil, Duncan H. McLeod, Pat J. Lynch, Con. Ahern, Walter Donovan.

The Board of Examiners consists of Isaac Greenwell, Sydney, Chairman; John Higson, Stellarton, Vice-Chairman; R. D. Anderson, Halifax, Secretary; John Gray, Inverness; Henry McCarthur, Minudie, Cumberland Co.; Thos. Hale, Westville; A. B. McGillivary, Glace Bay.

Halifax, July 12.—Bonds of the North Atlantic Collieries Company, with a face value of $110,000, were sold here this morning at auction to T. F. Tobin, barrister, for $29,200, or one-quarter of their par value. The bonds were offered for sale on account of the recent failure of the company to pay interest on them.

ONTARIO.

Ottawa, July 13.—The report of the majority of the Board of Conciliation and Investigation which ineffectually endeavoured to settle the differences between the miners and operators of British Columbia and Alberta mines has been given out by the Minister of Labour. The board consisted of Rev. C. W. Gordon, D.D., Winnipeg, chairman; Mr. Colin MacLeod, of MacLeod, Alberta, representing the companies, and Mr. A. J. Carter, of Fernie, B.C., named by the employees. The mines affected are located in Eastern British Columbia and Southern Alberta, the number of men affected being about 6,000.

The board intimates that much of the trouble would have en avoided if tyrannical pit bosses, on the one hand, and ddlesome secretaries of some of the local unions on the ner, were dismissed. There is said to be a lack of sincerity the part of both employers and unions in dealing with the estion of "open shop," and the recognition of the union. e board found an abnormally low scale for day wages, and normally high scales for the more difficult and dangerous ployment known as "pillar" work, the discrepancy ranging 74 and $8.88 for an average daily wage on the same mine. another mine, where the average net daily earnings of con-ct men for the year are $6, individual earnings vary from to even $20 a day. The board found that out of 18 com-anies concerned, only four have paid any dividends, and these y intermittently, while in the past two years two-thirds of mines have been operated at a loss. The board recommends t the rate for "pillar" cost be reduced, and the lower rate wages increased, according to a schedule submitted. This hedule would increase the total day wages by about $280,000, l reduce the "pillar" scale by about $46,000, leaving a net rease in companies' pay rolls of $234,000 a year.

The schedule of wages recommended by the board is:

1) That the day wage scale be increased as follows: 10 per t. advance up to $3 a day; 8 per cent. advance for $3 to 50; 5 per cent. advance over $3.50.

2) Differential of 5 cents to 7 cents per ton in all pillars sently without a differential, the application to be by mu-l consent.

3) Adjustment of the contract rate at the Lille mine so as make the rate proportionate to the size of the seam.

4) An advance of 3 per cent. on contract rates at Leth-dge.

5) All other contract rates to remain unchanged.

After referring to the neglect of sanitation and of pre-tions against disease and overcrowding, the report says: he board cannot but express its profound regret that no-ere could it discern indications of a sincere and earnest empt on the part either of a company or of a local union to mote the social, moral, and intellectual well-being of the rkers in the mines. Earnest and intelligent co-operation here uld surely be productive of the best results."

ttawa, July 24.—In consequence of communications re-ved by the Minister of Labour from Hon. C. N. Mitchell, ting Premier of Alberta, and Hon. Mr. Calder, ing Premier of Saskatchewan, representing the probable ve effects upon their Provinces of a shortage of coal should dispute in the western mines be prolonged, the Government is considering the duties on all coal imported into the west-e Provinces, pending the resumption of work in the mines.

oronto, July 13. — The much-discussed flotation of the th-Armstrong properties in Porcupine is now in process of ng underwritten, and will be placed on the market in the rse of a fortnight under the name of the Plenarium Gold nes, Limited.

he company is capitalized at $2,500,000, of which $500,000 l be held as treasury stock. The shares, which will have a value of $5 each, probably will be listed at $2.50.

he directors of the new mine include: Mr. R. B. Watson, the Nipissing and La Rose; Mr. W. S. Edwards, Mr. David ken, and Mr. E. P. Earl.

ALBERTA.

MacLeod, July 24.—Delegates to settle the coal strike, ch has utterly destroyed business over a large area for six ths, are in MacLeod to-day. Both sides to the dispute are present and the Presidents of the Boards of Trade of British Columbia and Alberta represent the people. The fuel situation could not be much worse on the prairies, where there is no wood to burn. President Barclay, Vice-President Pollock Secretary Moffat and other delegates are attending the meeting. All the delegates are anxious to see a settlement. The Crow's Nest towns are suffering from lack of business and the closing down of the enormous payroll has completely demoralized business. The prairie towns fear the prospects of a coal shortage.

BRITISH COLUMBIA.

Nelson, July 20.—The stamp mill at the Marvel mine, on Siwash Creek, in the Steamboat region, is doing excellent work. Dr. A. W. Mosely, of Vancouver, who is heavily interested in this property, recently visited the mine and mill and reports that the gold-saving apparatus recently added to the mill is working successfully and since the first of the month a saving of 80 per cent. of the gold values has been made.

Six stamps are in operation, working 18 hours per day, treating 24 tons of ore. Everything goes through the mill, the ore being obtained from the surface of the lead in a series of open cuts extending from wall to wall, a distance across the lead of 14 feet. The total product assays about $7 per ton. A Pelton wheel is used for the water power which runs the mill.

Vancouver, July 13.—Capitalized at $10,000,000, the British Columbia Steel Corporation, Limited, has announced that immediately at Port Mann construction will be undertaken of the first unit of the great steel plant, it is the ambition of the concern to build and operate. Plans have been decided upon for unit No. 1, which will cost $700,000.

A. P. Gillies, the moving spirit of the Corporation, has announced from Toronto, where the head offices are situated, that directors who have been chosen include the following local men: R. P. McLennan, president of the Bank of Vancouver; Robert Kelly, Clarence Marpole, Douglas Dominic Burns, John Stewart, of Foley, Welch & Stewart, and F. J. McDougall, barrister.

Material for use at the new plant has been thoroughly prospected and mined ready for use in the furnaces. The Canadian Northern has agreed to purchase from the new concern from 80,000 to 100,000 tons of rails for their system.

Vancouver. — Granby Consolidated has made payment of $250,000 on the bond for the purchase of an 80 per cent. interest in the Hidden Creek group of copper-gold mines on Goose Bay, Observatory Inlet, Portland Canal.

Development work, including diamond drilling has been in progress since the Granby was given a bond over a year ago. The property is now on a shipping basis, equipped with a compressor plant, ore bunkers and wharves and has several rich ore veins, but may be designated as a low grade proposition with enormous tonnage possibilities, one of the outcrops being over 40 feet wide.

The Hidden Creek group was purchased less than four years ago by J. T. Hillis, of Vancouver, from a syndicate, residents of Port Simpson, the price being $50,000. Two years ago Hillis, after doing certain development work, sold out in turn for $135,000 cash to M. K. Rodgers, of Seattle, and Tom Hodgins, of Butte. It is understood the Granby Company will ship Hidden Creek ore to the Ladysmith smelter until it erects its own reduction works at Goose Bay.

COMPANY NOTES

LA ROSE CASH.

La Rose, on July 1st, showed cash in bank and ore in transit and smelters $1,184,242, with ore sacked at mine ready for shipment at $162,311.

MOND NICKEL.

The report of the Mond Nickel Company, Limited, to 30th April last, to be submitted to the meeting on the 6th proximo, shows a balance to credit of profit and loss of £161,544. The directors propose to pay a dividend on the ordinary capital at the rate of 16¼ per cent. per annum (less income tax), and dividend on the deferred capital (less income tax) to the extent of £26,131, transferring to reserve £25,000 and to reserve suspense account £10,000, leaving to be carried forward £,139. In order to meet the increased demand, the directors decided to erect new and enlarged smelting works at Conis, near Romford Junction, Ontario, Canada, where an excel site of 3,700 acres of freehold land has been acquired for purpose. Further capital will be required for the comple of these works and for other purposes, and the directors pose to make an issue of debenture stock, of which a prospe will shortly be issued.

NIPISSING FINANCES.

Nipissing Mines' statement as of July 1 shows: Cash bank, $803,205; ore in transit and at smelters, $364,118; sacked at mine ready for shipment, $251,957.

STATISTICS AND RETURNS

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending July 14, and those from Jan 1, 1911, to date:

	July 14. Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger	.....	55,200
Bailey	.....	40,000
Barber	.....	6,000
Beaver	66,000	845,208
Buffalo	50,324	1,456,184
Chambers-Ferland	.....	703,000
City of Cobalt	.....	557,980
Cobalt Lake	53,930	2,447,736
Cobalt Townsite	97,300	578,000
Colonial	.....	88,000
Coniagas	.....	2,171,734
Crown Reserve	133,419	1,408,839
Hargraves	.....	161,100
Hudson Bay	62,830	648,790
Kerr Lake	.....	1,382,090
King Edward	.....	40,000
La Rose	147,051	3,301,924
McKinley-Dar.-Sav.	128,129	3,291,734
Nipissing	61,600	3,580,328
O'Brien	64,118	737,158
O'Brien, M. J.	47,000	47,000
Peterson Lake (Little Nip)	.....	58,430
Provincial	.....	40,510
Right of Way	66,047	708,995
Silver Cliff	.....	106,680
Standard	.....	102,813
Temiskaming	85,900	946,752
Thethewey	.....	672,380
Wettlaufer	.....	117,232

The shipments for the week were 1,063,648 pounds, or 531 tons.

The shipments from Jan. 1 to July 14 were 26,542,151 pou or 13,271 tons.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for he week ending July 21, and those from Jan. 1, 1911, to date:

	July 14. Ore in lbs.	Since Jar Ore in ll
Badger	.....	55,200
Bailey	.....	40,000
Barber	.....	6,000
Beaver	.....	845,208
Buffalo	58,300	1,514,484
Chambers-Ferland	64,000	767,000
City of Cobalt	.....	557,980
Cobalt Lake	.....	2,447,736
Cobalt Townsite	.....	578,000
Colonial	.....	88,000
Coniagas	63,680	2,235,414
Crown Reserve	62,000	1,470,839
Hargraves	.....	161,100
Hudson Bay	.....	625,790
Kerr Lake	60,270	1,502,700
King Edward	.....	40,000
La Rose	247,510	3,749,438
McKinley-Dar.-Sav.	125,620	3,417,354
Nipissing	65,870	364,208
O'Brien	64,210	801,363
O'Brien, M. J.	.....	47,000
Peterson Lake (Little Nip)	.....	58,430
Provincial	61,160	101,670
Right of Way	.....	708,995
Silver Cliff	.....	106,680
Standard	.....	102,813
Temiskaming	.....	946,752
Trethewey	66,440	738,820

Wettlaufer		117,232

The shipments for the week were 939,060 pounds, or 469 tons.

The shipments from Jan. 1 to July 21 were 27,481,211 pounds, 13,740 tons.

B. C. ORE SHIPMENTS.

Week Ended July 8th.

B. C. Copper Co.'s Receipts.

Greenwood, B.C.

Mother Lode	5,182	170,741
Jackpot	440	16,890
Rawhide	4,980	104,140
Athelston	225	3,344
Napoleon	252	3,429
Unnamed	244	754
Other mines		33,252
Total	11,323	322,550

Granby Smelter Receipts.

Grand Forks, B.C.

Granby	15,805	612,460

Consolidated Co.'s Receipts.

Trail, B. C.

Centre Star	3,069	104,524
Sullivan	396	17,762
Le Roi No. 2	545	14,461
St. Eugene	127	3,527
Richmond-Eureka	32	1,377
Van-Roi	63	423
Le Roi	501	7,030
Ferguson	34	293
Rambler-Cariboo	31	954
Knob Hill	373	2,311
Emerald	27	938
Hope	29	327
Other mines		35,160
Total	3,237	209,087

Rossland Shipments.

Centre Star	3,069	104,524
Le Roi No. 2	545	14,461
Le Roi	501	7,030
Le Roi No. 2, milled	300	8,100
Other mines		428
Total	4,415	134,543

Boundary Shipments.

Granby	15,805	612,460
Mother Lode	5,182	170,741
Jackpot	440	16,890
Rawhide	4,980	104,140
Athelston	225	3,344
Napoleon	252	3,429
Unnamed	244	754
Other mines		33,252
Total	27,128	845,010

Slocan-Kootenay Shipments.

Sullivan	396	17,762
St. Eugene, milled	420	15,996
Richmond-Eureka	32	1,377
Van Roi, milled	800	12,249
Ferguson	34	293
Rambler-Cariboo	31	954
Knob Hill	373	2,311
Emerald	27	938
Hope	29	327
Queen, milled	420	11,130
Granite-Poorman, milled	250	6,750
Nugget, milled	110	2,970
Other mines		5,166
Total	2,922	78,223

TORONTO MARKETS.

July 25.—(Quotations from Canada Metal Co., Toronto.)

Spelter, 5.85 cents per pound.

Lead, 3.75 cents per pound.

Antimony, 8 to 9 cents per pound.

Tin, 45 cents per pound.

Copper, casting, 12.85 cents per pound.

Electrolytic, 12¾ cents per pound.

Ingot brass, 8 to 12 cents per pound.

GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75.

Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.

July 21.—Connellsville Coke (f.o.b. ovens):

Furnace Coke, prompt, $1.40 to $1.45 per ton.

Foundry Coke, prompt, $1.90 to $2. per ton.

July 21. Tin, Straits, 42.20 cents.

Copper, Prime Lake, 12.78 cents.

Electrolytic copper, 12.62½ cents.

Copper wire, 13.75 cents.

Lead, 4.57½ cents.

Spelter, 5.77½ cents.

Sheet zinc (f.o.b. smelter), 7.50 cents.

Antimony, Cookson's, 8.50 cents.

Aluminium, 19.75 to 20.25 cents.

Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $42.50 per ounce.
Platinum, hard, $44.50 per ounce.
Bismuth, $1.80 to $2.00 per lb.
Quicksilver, $5.00 per 75-lb. flask.

Silver Prices.

	New York cents.	London pence.
July 8	52⅞	24⅜
" 10	53	24 7/16
" 11	53	24 7/16
" 12	52⅞	24⅜
" 13	53	24 7/16
" 14	52⅞	24⅜
" 15	52⅞	24⅜
" 17	52⅞	24⅜
" 18	52⅞	24⅜
" 19	52⅞	24⅜
" 20	52¾	24 5/16
" 21	52¾	24 5/16

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Porcupine Stocks.

Stock	Capital	Par	July 17.	
Apex	$1,000,000	$1.00	21½	22
Coronation	1,000,000	1.00	32	37
Foley-O'Brien	3,000,000	5.00	130	135
Det. New Ont.	1,000,000	1.00	50	51
Hollinger	3,000,000	5.00	1300	1375
Moneta	2,000,000	1.00	20	25
Pearl Lake	2,500,000	1.00	58	64
Preston East Dome.	3,000,000	1.00	35	36½
Pore. Tisdale	2,000,000	1.00	8	10
Pore. Imperial	2,000,000	1.00	13	15
Pore. Central	1,000,000	1.00	80	83
Pore. Canada	1,000,000	1.00	112	118
Pore. Northern	1,000,000	1.00	..	66
United Pore.	1,000,000	1.00	..	7
Pore. Gold	2,000,000	1.00	56	58½
West Dome	3,000,000	5.00	165	210
Rea	1,000,000	5.00	540	575
Swastika	1,000,000	1.00	56	58
Dome Extension	2,000,000	1.00	85	90
Dobie	1,500,000	5.00	..	275
Standard	1,500,000	1.00	5¾	6
Am. Gold Fields	2,000,000	1.00	150	160
Eldorado	500,000	.25	12	16
Gold Reef	1,000,000	1.00	23	27

Cobalt Stocks.

Bailey	5,000,000	1.00	4¼	4
[1]Beaver	2,000,000	1.00	44	47
[2]Buffalo	1,000,000	1.00	160	200
Chambers-Ferland	2,500,000	1.00	12½	13
City of Cobalt	1,500,000	1.00	10	15
Cobalt Central	5,000,000	1.00	1	3
Cobalt Lake	5,000,000	1.00	20½	21
Coniagas	4,000,000	5.00	700	730
[3]Crown Reserve	2,000,000	1.00	320	335
Foster	1,000,000	1.00	3	6
Gifford	1,500,000	1.00	1½	3
Great Northern	1,500,000	1.00	14	17
Green Meehan	3,000,000	1.00	2	2½
Hargraves	2,500,000	1.00	7	12
[4]Hudson Bay	25,000	1.00	80	100
[5]Kerr Lake	3,000,000	5.00	490	512½
[6]La Rose	7,500,000	5.00	400	430
Little Nipissing	1,500,000	1.00	2½	2⅝
[7]McKinley-Darragh	2,500,000	1.00	170	171
Nancy Helen	500,000	1.00	1¼	3
[8]Nipissing	6,000,000	5.00	900	1000
Nova Scotia	2,500,000	1.00	10	12
Ophir	395,000	1.00	10	13
Otisse	2,000,000	1.00	1	1⅜
Peterson Lake	3,000,000	1.00	8	10
Rochester	2,000,000	1.00	3¼	4
Right of Way	2,500,000	1.00	8¼	10
Silver Leaf	5,000,000	1.00	3	3⅜
Silver Queen	1,500,000	1.00	4	8
[9]Temiskaming	2,500,000	1.00	42	44
[10]Trethewey	2,000,000	1.00	65 bid	..
[11]Wettlaufer	1,500,000	1.00	110	120
Braden Copper	10,500,000	5.00	4 1/16	5
[12]Brit. Col. Copper	3,000,000	5.00	4⅞	5
[13]Butte Coalition	15,000,000	15.00	18	18⅛
Ely Central	16,000,000	10.00	01	03
Ely Consolidated	10,000,000	10.00	7/16	½
First Nat. Copper	3,000,000	5.00	1¼	1⅜
Giroux	7,500,000	5.00	6¼	6½
Greene-Can.	60,000,000	10.00	6⅞	7
Inspiration	10,000,000	10.00	8½	8¾
Nevada Hills	5,000,000	5.00	3½	3⅝
Nev. Baltic	2,500,000	25.00	..	..
Ohio Copper	15,000,000	10.00	1½	1⅝
Ray Central	6,000,000	5.00	1⅝	1 11/16
Union Mines	2,500,000	5.00	5/16	⅜
[14]Yukon Gold	25,000,000	5.00	3 1/16	4
[15]Goldfields Con.	50,000,000	10.00	5⅝	5¾
[16]Nevada Con.	10,000,000	5.00	19	19⅛
Miami	3,500,000	5.00	21½	21⅝
[17]Granby	15,000,000	100.00	39½	39⅝
Con. Min. & Smelt.	7,500,000	100.00	48	52
Davis-Daly	6,700,000	10.00	¾	1
Con. Arizona	9,200,000	5.00	1 3/16	1 5/16
Rawhide Coalition	3,000,000	1.00	04	06
Ray Con.	10,000,000	10.00	17	17⅛
Chino	3,500,000	5.00	23½	23⅝

[1]3 per cent. [2]3 per cent. extra. [3]6 plus 3. [4]300 per cent. [5]5 plus 5 quarterly. [6]2 per cent. quarterly. [7]3 plus 7 quarterly. [8]5 and 2½ per cent. quarterly. [9]3 per cent. [10]10 per cent. [11]2½ plus 2½ per cent. quarterly. [12]2½ per cent. quarterly. [13]25 cents quarterly. [14]2 per cent. quarterly. [15]30 plus 20 cents. [16]37½ cents. [17]1 per cent.

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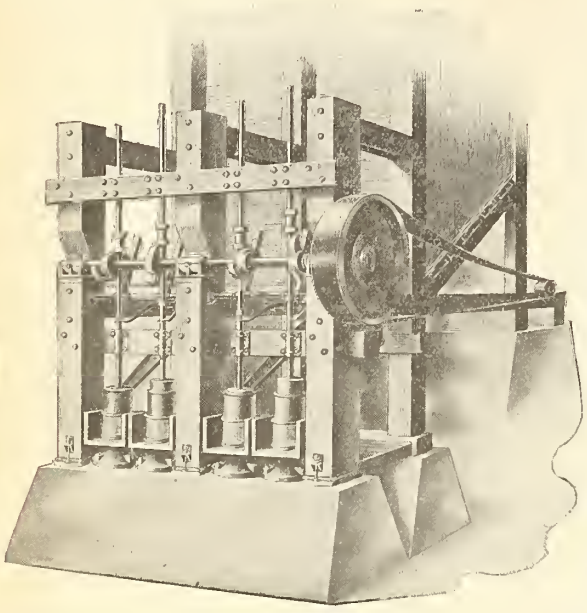

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The Nissen Stamp Mill

STAMP. The Nissen Stamp drops with great crushing effect upon a feed comparatively free of the fines caused by preceding impacts. This causes an actual splash which radiates from the centre of the die carrying the pulp to a circular screen, every aperture in which presents a full opening for the pulp which has already reached size to pass through. As the stamp ascends preparatory for the succeeding blow, a partial vacuum is formed under stamp shoe, which greatly assists the rapid return of the oversize to the die. The condition, the circular form of mortar, and the ascending stamp; lead to a suction effect which hastens the return of oversize to the die, a feature distinctive to the Nissen Stamp. Thus, a greater number of effective drops per minute is possible, resulting in greater capacity.

FEEDER. Each Nissen Stamp is provided with a tappet driven, automatic ore feeder of the Challenge type. This feeder is easily adjusted for different rates of feed, and is very sensitive in responding to the action of the stamp.

MORTAR. The Nissen Mortar is circular in plan and made to accommodate but one stamp, thus confining the crushing zone to a field of activity which forbids pulp coming to rest or becoming sluggish in that circulatory movement essential to efficiency.

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Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map of Canada, by G. A. Young and R. W. Brock.
1170. Summary Report of the Geological Survey for 1910.

NEW BRUNSWICK and NOVA SCOTIA

1107. Joint Report on the Bituminous or Oil Shales of New Brunswick and Nova Scotia. Also on the Oil Shale Industry of Scotland. Part I, Economics, Part II, Geology by R. W. Ells.

QUEBEC

1110. Memoir No. 4. Geological reconnaissance along the line of the National Transcontinental Railway in Western Quebec, by W. J. Wilson, accompanied by a map.
1064. Geology of an area adjoining the east side of Lake Timiskaming, by Morley E. Wilson.

ONTARIO

1091. Memoir No. 1, Geology of the Nipigon Basin, Ontario, by A. W. G. Wilson.
1137. Memoir No. 10 An instrumental survey of the shore-lines of the extinct lakes Algonquin and Nipissing in South-western Ontario, by J. W. Goldthwaite.

NORTH WEST PROVINCES

1035. Coal Fields of Manitoba, Saskatchewan, Alberta and Eastern British Columbia accompanied by a map, by D. B. Dowling.
1115. Memoir No. 8. The Edmonton Coal Field, Alberta, with maps, by D. B. Dowling.

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1139. Memoir 11-T Triangulation and Spirit Levelling of Vancouver Island, 1909, by R. H. Chapman.

YUKON and NORTH WEST TERRITORIES

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1080. Report on a part of the North West Territories drained by the Winisk and Attawapiskat Rivers, by Wm. McInnes.
1006. Report on a traverse through the southern part of the North West Territories from Lac Seul to Cat Lake in 1907, by A. W. G. Wilson.
1130. Memoir No. 9. Bighorn Coal Basin, Alberta, by G. S. Malloch, accompanied by a map.

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1133. Map 13 A. Kingsport sheet, Nova Scotia, No. 84. Scale 1 mile to 1 inch.
1134. Map 14 A. Hall Harbour Sheet. Scale 1 mile to 1 inch.

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1156. Map 25 A. Nipissiguit Iron Deposit, Gloucester County, N. B. Geology and topography, scale 400 feet to 1 inch.

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1066. Map 18 A, Lake Timiskaming Mining Region. Scale 1 mile to 1 inch.
1112. Map 12 A. Vicinity of the Transcontinental Railway, Abitibi District, Quebec. Scale 4 miles to 1 inch.
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1091. Map 8 A, Lake Nipigon, Thunder Bay District, Ontario. Scale 4 miles to 1 inch.

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1132. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.

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1068. Geological Map (sketch) of the Sheep Creek Mining Camp, West Kootenay, B.C. Scale 1 mile to 1 inch.
1164. Map 28 A, Sketch map of Portland Canal Mining District.

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1089. Map 9A. Explored Routes on Parts of the Albany, Severn and Winisk Rivers. Scale 8 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 10 cents is made for maps on linen.

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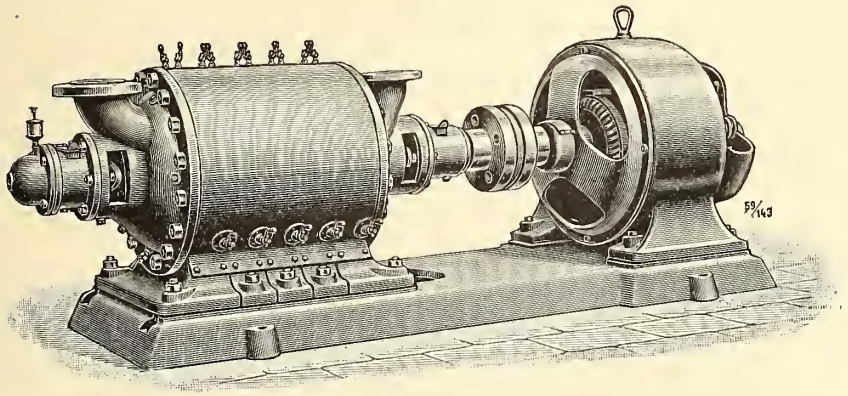

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MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is $10.00 and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his rights must take out a mining license.

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MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of $10 an acre for SUPERIOR METALS when more than 20 miles distant from a railway and $20 an acre when less than 20 miles.

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The mining laws of Ontario are liberal, and the prices of mineral lands low.

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For reports of the Bureau of Mines, maps, mining laws, etc., apply to

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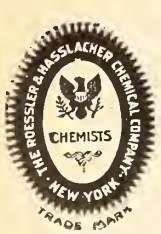

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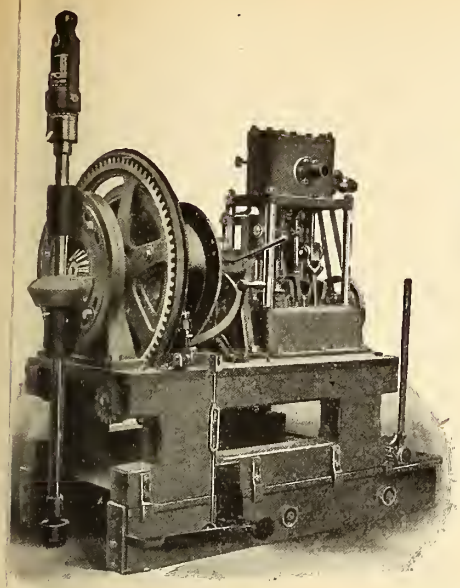

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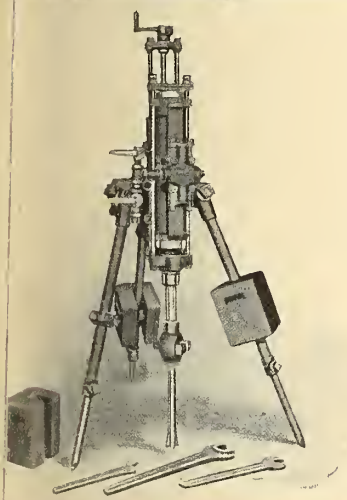

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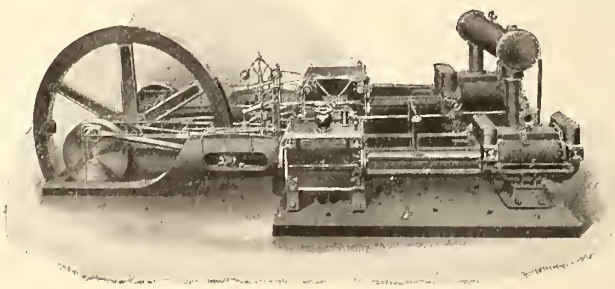

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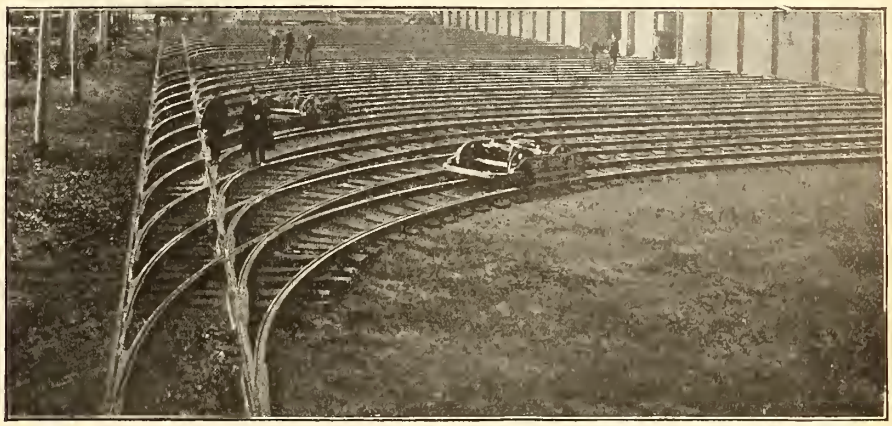

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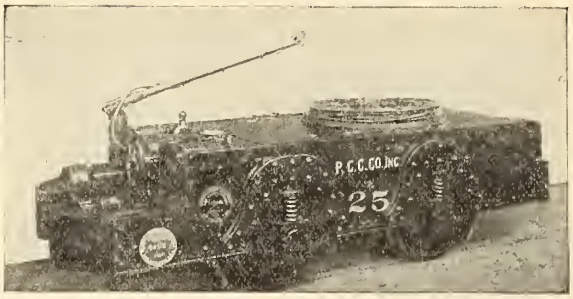

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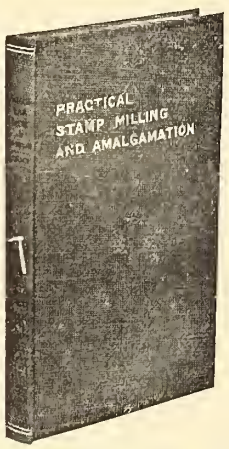

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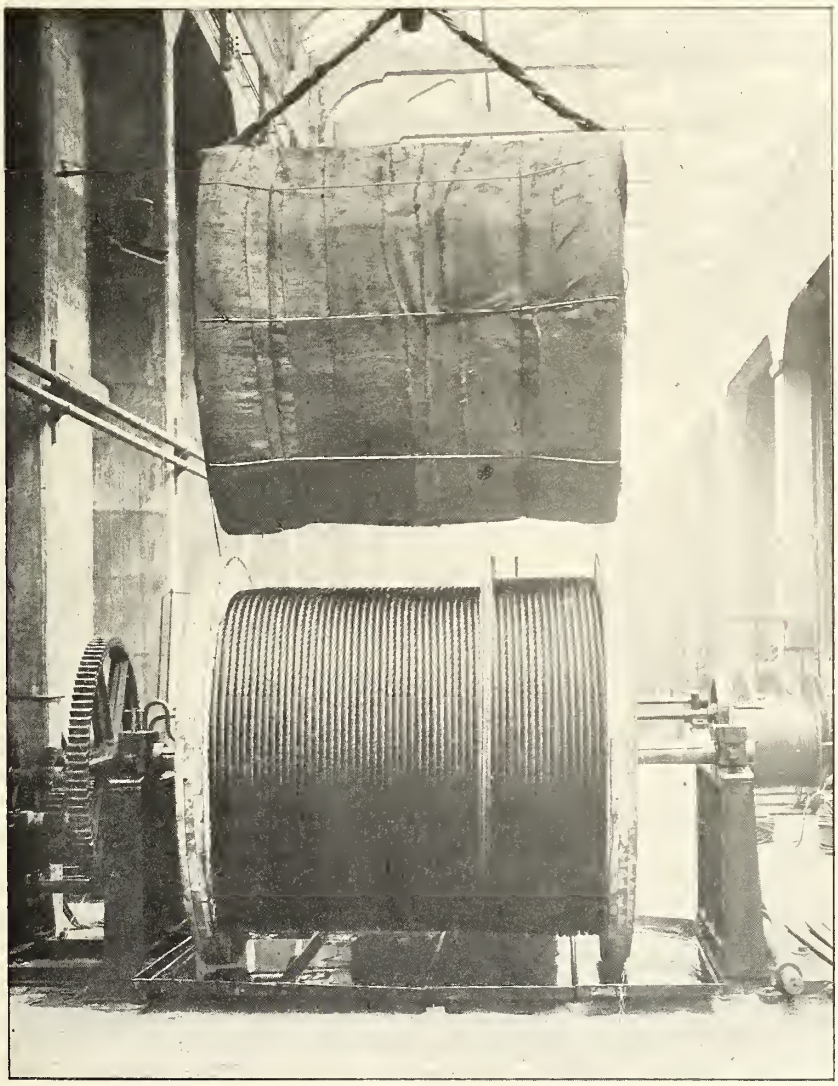

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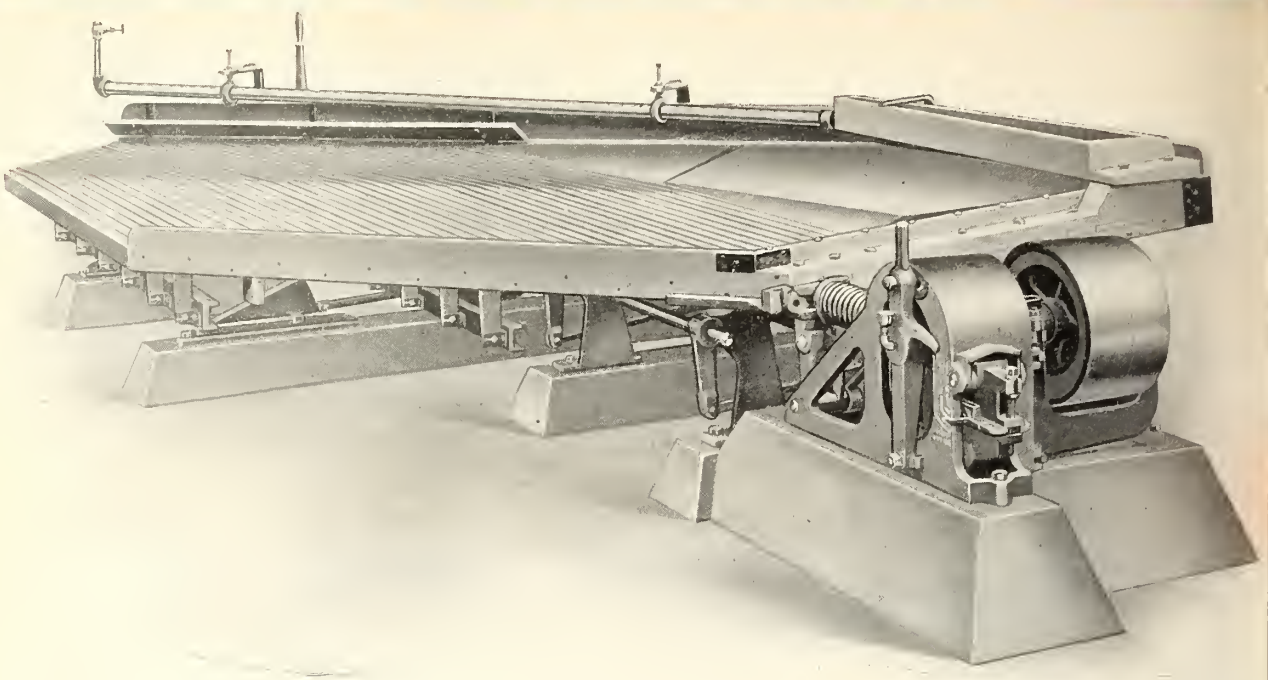

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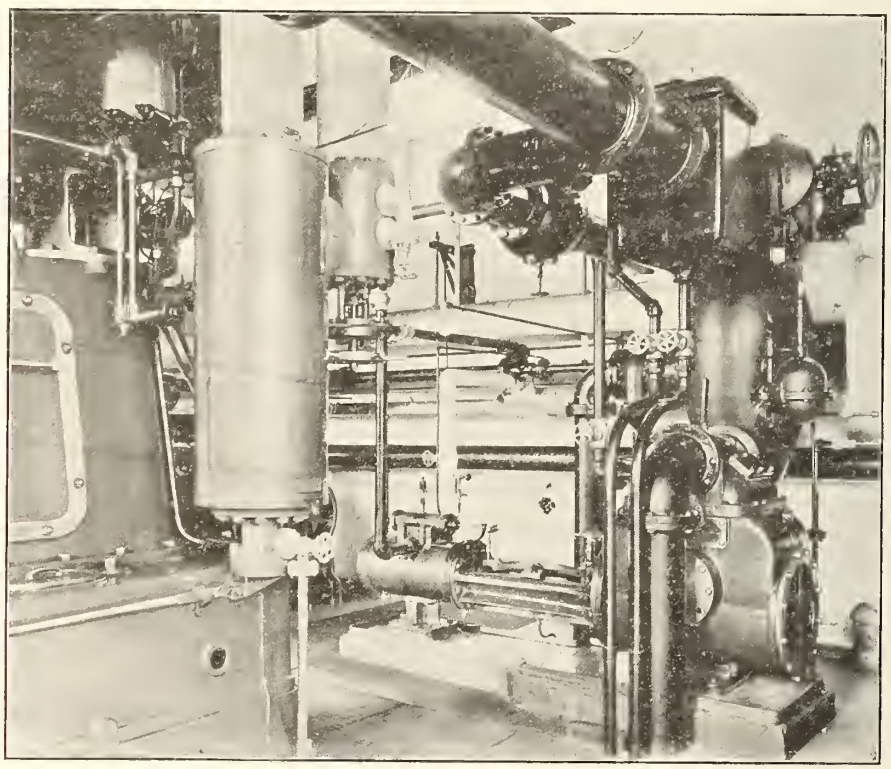

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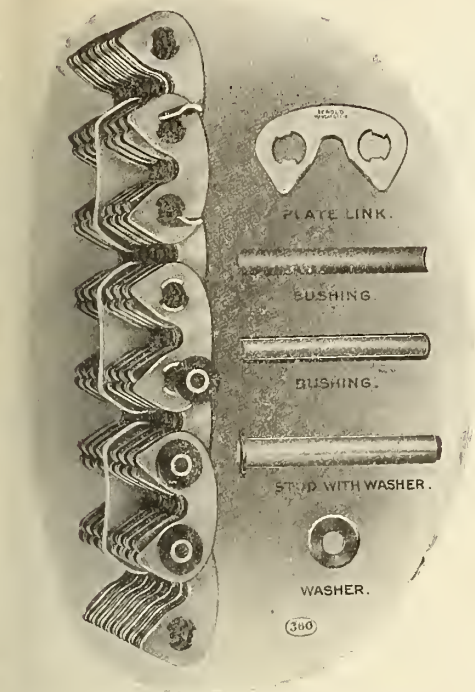

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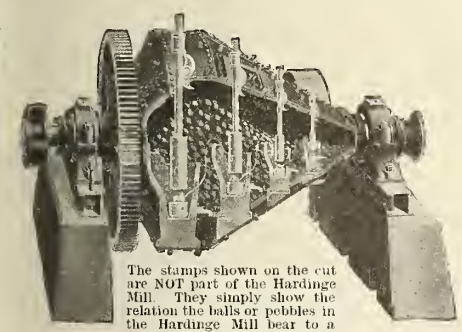

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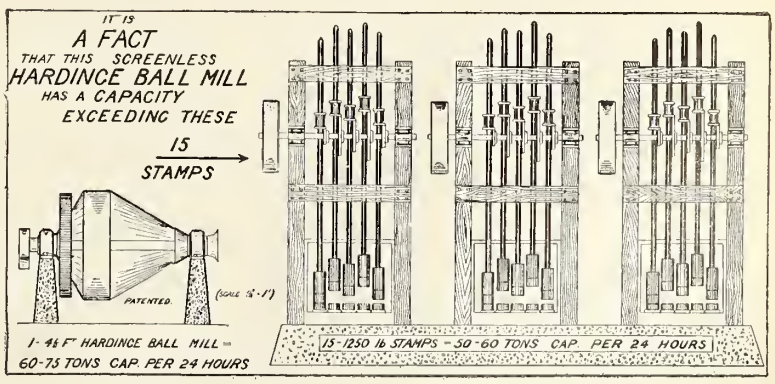

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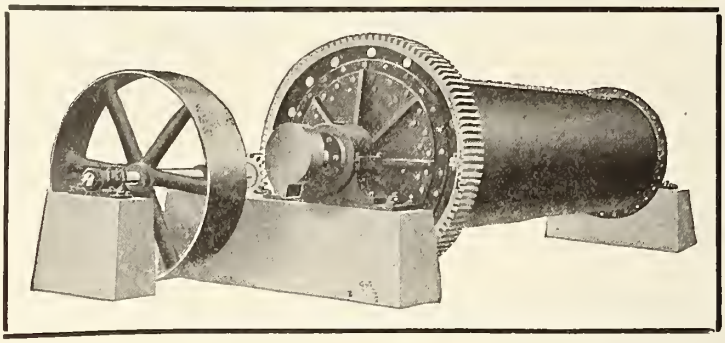

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THE CORE TELLS

The accompanying photograph shows four sections of a diamond drill core secured recently in drilling for limestone near Auburn, California, by the Mountain Quarries Co. The average length of the cores is nine feet four inches, and their diameter, $\frac{15}{16}$ of an inch. They were removed with a Sullivan "Class H" Diamond Drill, using a ten foot core barrel. The cores, it will be noted, form a perfect record of the rock formation from which they were cut.—"MINE & QUARRY,"

THE Core tells where your ore or coal is, what it is worth, and how best to reach it. It tells these things with an accuracy that cannot be doubted, and more quickly and cheaply than you can obtain this knowledge in any other way.

Catalogue 655. Prices on contract drilling on application.

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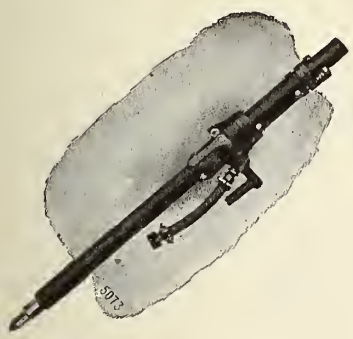

In the mind of the mine manager there can be no doubt of the superiority of the "BC--11" Telescope Feed Hammer Drill over the piston drill, for up holes. Its principle is right; the entire power consumption is concentrated upon operating the hammer.

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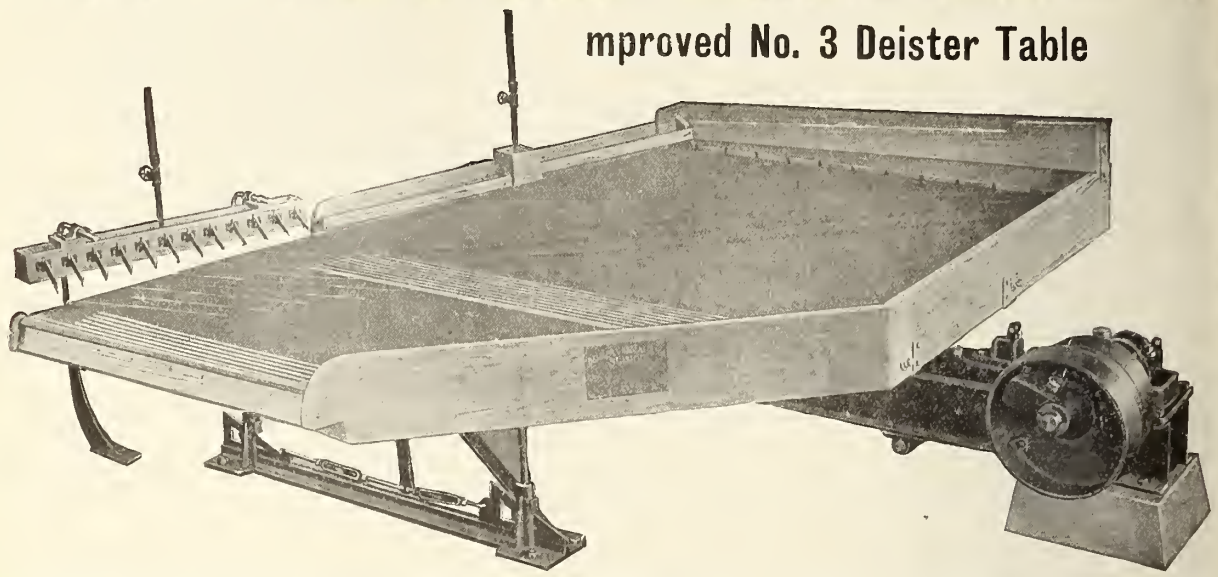

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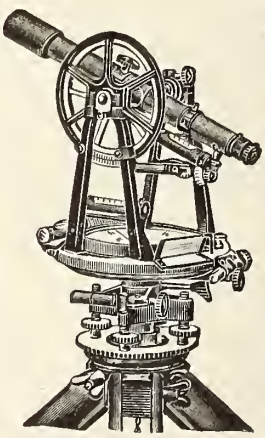

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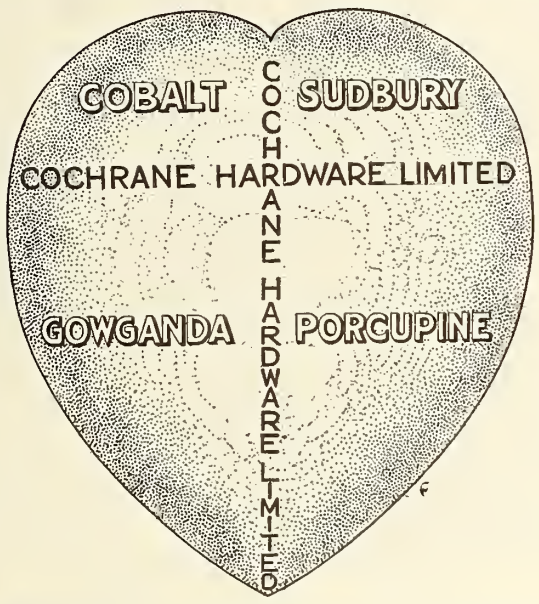

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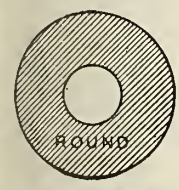

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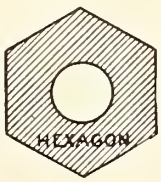

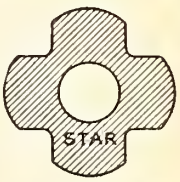

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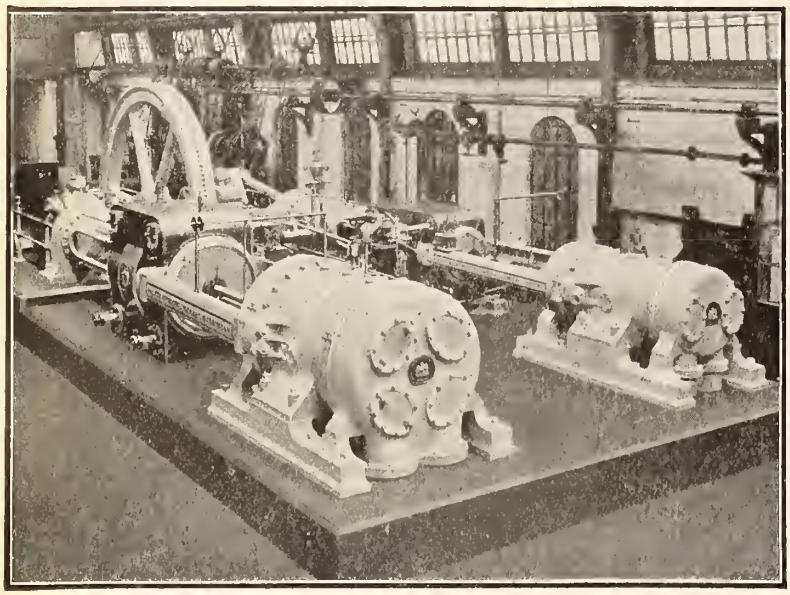

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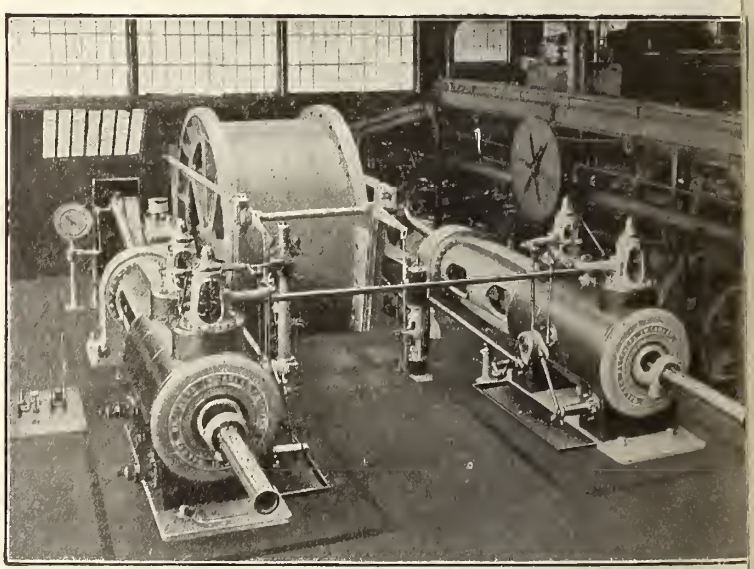

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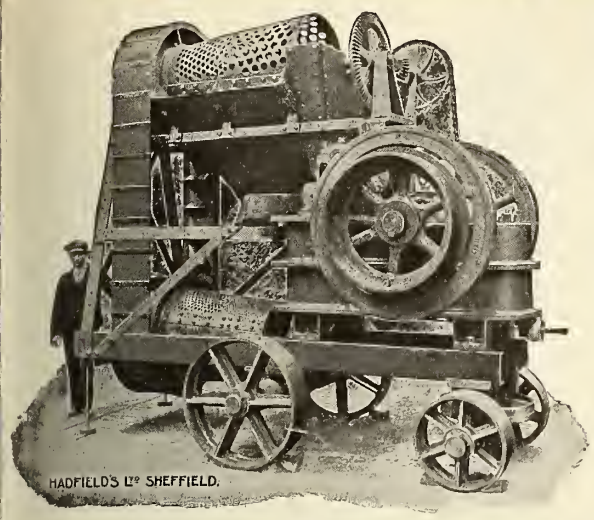

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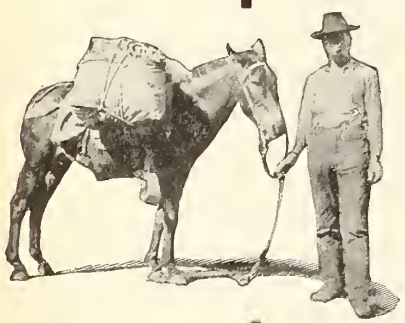

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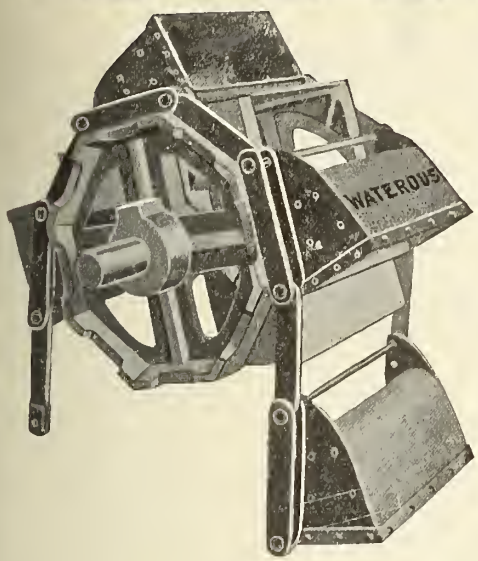

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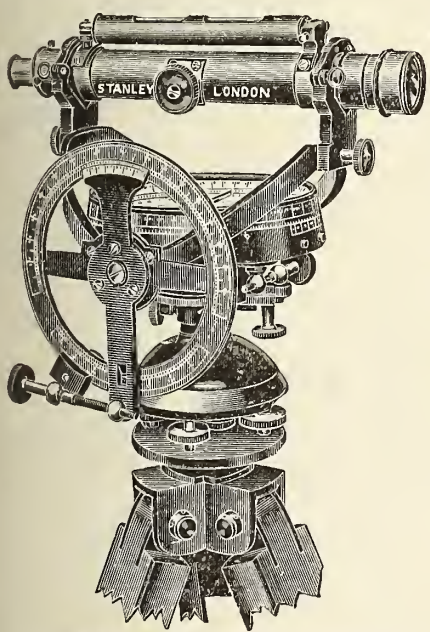

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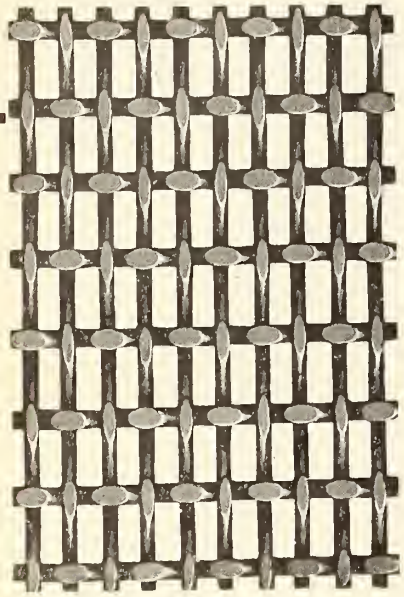

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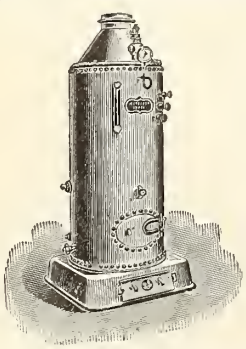

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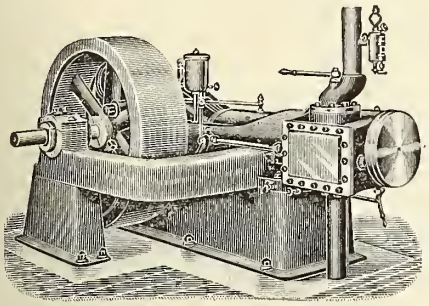

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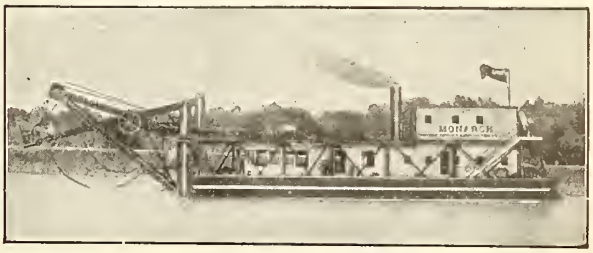

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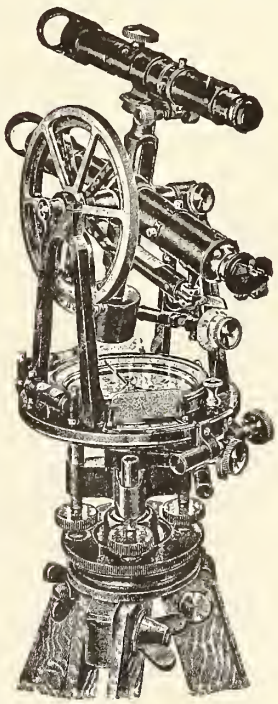

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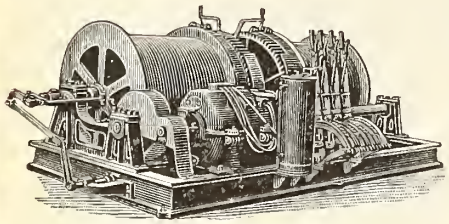

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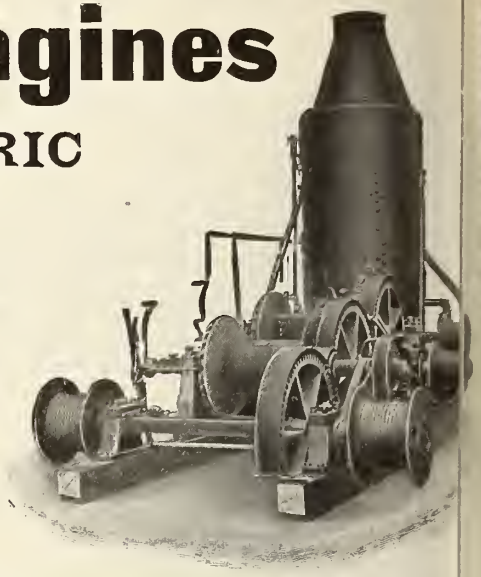

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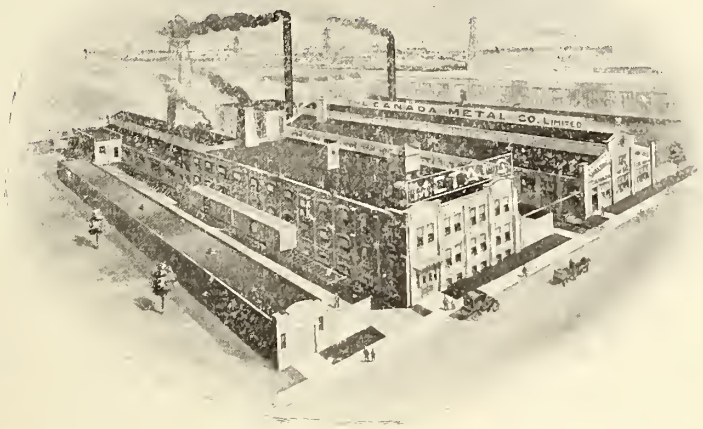

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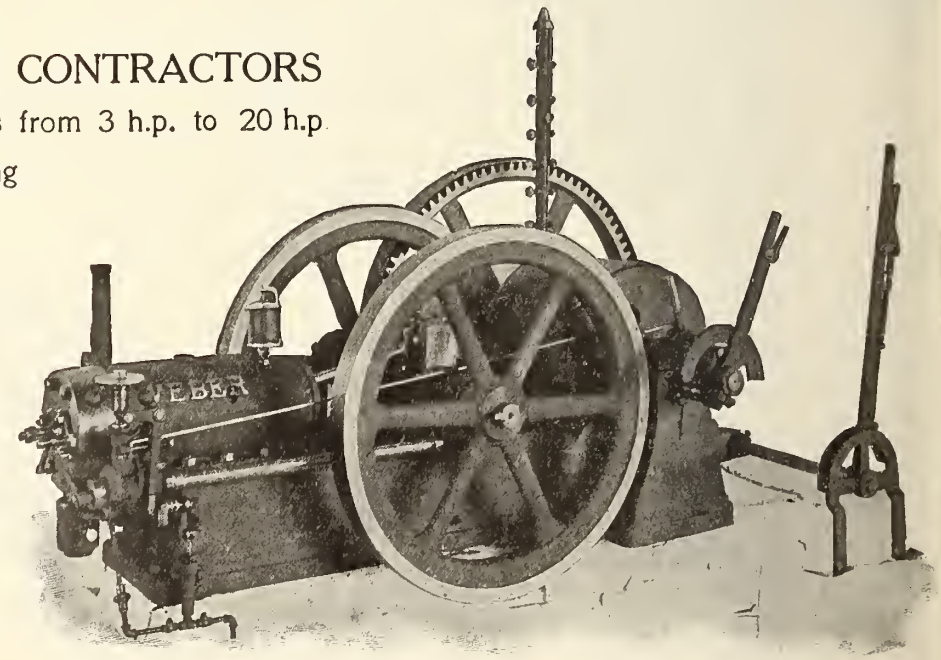

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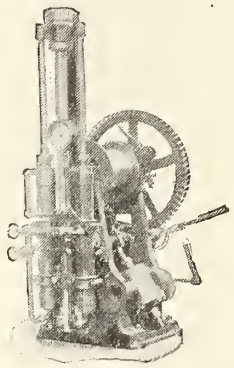

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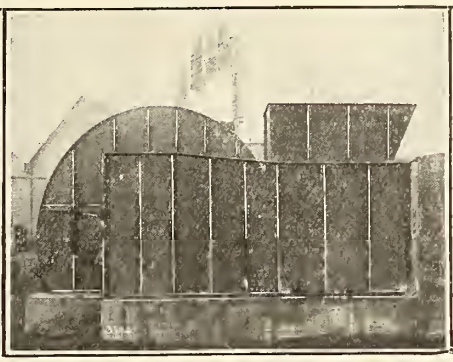

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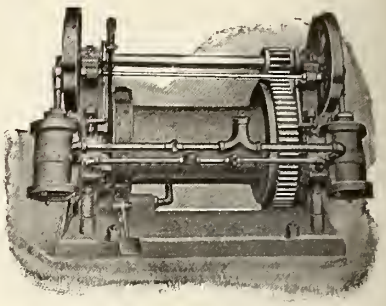

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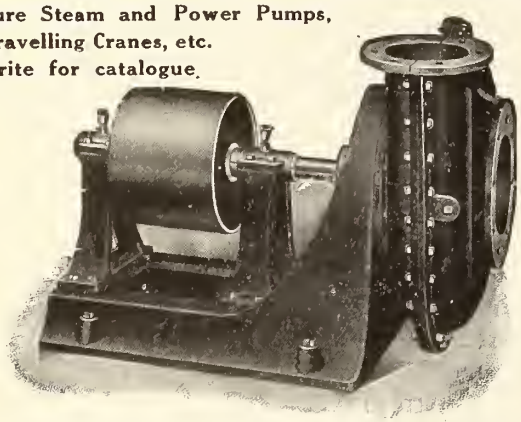

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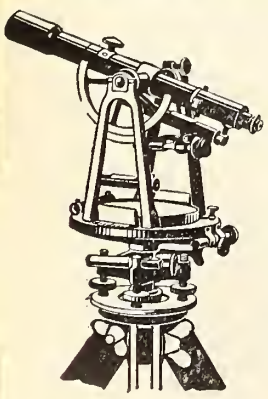

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THE CANADIAN MINING JOURNAL

VOL. XXXII. TORONTO, Aug. 15, 1911 No. 16

The Canadian Mining Journal

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PORCUPINE TO-DAY.

The astonishing recovery of Porcupine from the effects of the fire is stirring proof of the vigour and elasticity of our mining population. It is hard to conceive of any other class of people going so resolutely about the task of rehabilitation.

The public response to the request for assistance was prompt, and, in effect, adequate. There may have been incidental misunderstandings in the administration of relief, but there has certainly been no ground for grave criticism. The various committees gave their services voluntarily and without stint.

Particularly to be commended was the attitude of the Temiskaming and Northern Ontario Railway Commission. Disregarding everything but the relief of suffering and the immediate needs of the homeless, the commission worked valiantly. The value of its efforts may be best estimated when one attempts to picture what might have happened had there been no rail connection between Kelso and Porcupine Lake. It is not too much to say that the commission has brought credit to itself and to the nation. Whatever criticisms it may receive in the future, and no public corporation can hope to escape criticism, the historic incidents of the days that followed the fire will always stand out. Although much of the commission's property and supplies was destroyed, yet no thought was taken of this. The duty of the hour was faced.

As an example of what organization and well-applied wealth may do, we may cite the case of the Dome Mining Company, the chief loser in the disaster. Within an incredibly short time after the fire, a private car was hurried to the scene. Then, under the direction of Mr. Ambrose Monell, the whole situation was canvassed. After the first necessary steps towards ameliorating local hardships, the plan of campaign was outlined and actually begun. The decision was reached to erect a fire-proof group of buildings for residences, in a carefully chosen plot of ground. It was decided further to make all the plant buildings fire-proof throughout. Not a fortnight had elapsed when the company had 250 men again at work, with an ample commisariat organized. Feeding, sheltering, and directing this number of men is no mean accomplishment. The result, it is hoped, will be that a new mill will stand complete before winter has set in.

* * * * * * *

It were impossible to recite a tithe of the genuine acts of bravery that have been brought to our own notice. And it may be noted here that the real heroes are going quietly about their business, whilst several advertised individuals will scarcely receive a warm wel-

come in camp. Above all petty incidents, however, emerges the fact that the race has not degenerated. Men are still men.

* * * * * * *

Soon all physical traces of fire, save sundry square miles of scorched timber, will have been obliterated. Golden City, Pottsville, and South Porcupine will resume their normal aspects. Town lots are selling rapidly in the first and last named places, and the newly selected Timmins townsite is the scene of a real estate boom.

We believe that the new townsite will be laid out with due regard to sanitation. Unless, however, something is done very rapidly there will be a catastrophic outbreak of typhoid at Golden City and at South Porcupine. The state of affairs at the former settlement is exceedingly bad. There appears to be only indifference on the part of those officially responsible. Whereas the fire cost four-score lives, an epidemic of typhoid would take its toll of hundreds. Concerted effort on the part of the citizens themselves is now essential. With the aid of the Government, it is not too late to meet the situation. It will be shameful if the lesson learned in Cobalt be forgotten.

* * * * * * *

Rail connection has wrought vast change in Porcupine. Construction of plants is, of course, immeasurably facilitated. Living is made easier. The best of provender is obtainable. In fact, Porcupine is a full-bloom mining camp, with its hotels, restaurants, amusement halls, and most of the other perquisites that appertain to life under such conditions.

* * * * * * *

Not to be overlooked in any survey of Porcupine is the high standard of the men that are in charge of the mines. This is a direct inheritance from Cobalt. The "four-flusher," an unmitigated evil, became unpopular through Cobalt experience. He is not much in evidence in Porcupine. Cobalt has seen to that.

In the main, the sound engineers are successful in restraining their employers from early extravagance. It is gratifying to observe that the passion for mill-buildings and plant is being curbed. A wise balancing of mine and equipment will be thus attained.

* * * * * * *

Two favourite themes of discussion in Porcupine itself are the sins of the T. & N. O. Railway Commission and the vagaries of the Bewick-Moreing people.

As to the former, it is only necessary to state that the commission is fallible. It has, nevertheless, lived up to its promise. Its lines are fearfully and wonderfully congested with freight that cannot be handled by the consignees. Possibly 500 cars await unloading. We may add that but few strictures come from responsible sources. The incidental discomfort of sitting all night on a station platform is exasperating. But one can survive even that.

For the Bewick-Moreing concern we have little to say that is good. Their market manipulations have been cheap and undignified. Their mining methods and their mining men are of a high order of excellence. Why the firm cares to descend to the level of a broker's office is hard to understand. They have sown the wind; of a surety they will reap the whirlwind.

At least 150 people arrive in Golden City daily. The influx is growing larger. Difficulties are arising in accommodating the newcomers. With a settlement and mine population that may now amount to six or seven thousand, and that is growing every hour, the railway and the hotels are being taxed heavily. It is to be hoped that both will be able to cope with the situation.

* * * * * * *

Considerable attention is being diverted to the Swastika region. The traffic at that getting-off place is large. Yet there is no station building at Swastika. This omission, for which there is no valid excuse, must be remedied at once.

* * * * * * *

To refer to the mines themselves, there is no particularly noticeable change. Three spectacular surface discoveries have been made. Actual mining progress is slow, and will be slow, until such time as the principal plants have been rebuilt. Considered generally, the number of *bona fide* mines will probably be larger than was thought a year ago, although substantial production of gold has been deferred.

In forecasting the future of Porcupine it must not be forgotten that the district as a whole must write off a large debt of expenditure. The railway from Ke is a debit item, as are all outlays on prospecting, on fees, on roadbuilding, on mining, and on travelling expenses. If this chastening thought be kept in mind, it will temper the soulful enthusiasm of those who compare Porcupine with the Rand.

* * * * * * *

In a forthcoming special issue, to be published within a few weeks, the *Canadian Mining Journal* will report in detail the leading physical facts of the camp. The purpose of this editorial is entirely general.

GETTING DOWN TO CASES.

On another page will be found a letter from W. W. Cory, Deputy Minister of the Interior. In this letter reference is made to an editorial entitled "A Modern Instance," that appeared in our issue of June 15, 1911. Mr. Cory, we fear, has mistaken our point, and certainly has not attempted to meet our criticism.

To set forth the whole matter clearly, let us quote first from the editorial in question. Our own words were as follows:—

"Two men made application for a coal mining location in the west, covering 5,160 acres. All the requirements of the regulations were fulfilled as regards staking, making proper application, and making

e necessary deposits of $5 each. The stakers had en thirty days from the date of staking wherein to t in their application. After that application had en considered favourably by the Department at ttawa, *a process covering two months,* they were ven another thirty days in which to make payment the annual rental of $1 per acre, a total of $5,160."

o these remarks, Mr. Cory takes exception thus:—

enclose herewith for your information a copy of e Coal Mining Regulations, which have been in force nce the 25th day of May, 1910, from section 16, of hich you will see that payment of the rental must made to the Agent of Dominion Lands within thirty ys from the date of the receipt of his application the office of such agent."

ection 16 reads as follows:—

If the application is granted, the locator shall be otified in writing, and he shall be given a period thirty days from the date of the receipt of his pplication within which to pay to the Agent of ominion Lands the full amount of the rental for the rst year of the term of the lease, at the rate of one ollar ($1) per acre, and upon the receipt of such ntal the lease shall be issued and shall bear date om the day upon which the application was granted. the rental is not paid within the time specified, the pplication shall absolutely lapse, and the rights ap- lied for shall become available for other disposition."

he first clause of section 16 is the keynote of the ter. But before making further comment let us e the authentic history of the instance on which our ner editorial was based.

ear Brule Lake, in the vicinity of the Yellowhead s, two coal claims were staked last spring. The kers were Messrs. Scovil and Bartholomew. The ual rental for their leases was payable on May 3rd. yment was not made. Information to this effect ched the ears of an investor who was anxious to re the territory. The investor's representative ed upon the Dominion Land Agent at Edmonton, l from that official obtained confirmation of the fact t the rental had not been paid. He therefore hurried the ground, with the intention of staking. Arriving re on May 4 he found, in addition to the original stak- s, stakings dated in April in the name of a third per- , and more recent stakings dated May 4, one day after date on which payment of rentals was obligatory. e latter stakings were in the names of Messrs. Scovil l Bartholomew, and, of course, were valid, despite fact that they may have been made at any date be- e the old lease ran out.

We repeat, therefore, that this process of restaking ght easily go on indefinitely. According to the ulations the applicant is allowed 30 days in which to his application after staking. After the application iled, it is often a matter of months before the depart- nt decides to grant the lease. The applicant then s another 30 days in which to make payment of the rental of $1 per acre. If he is not able to pay, he can immediately restake.

We believe that this is a fair and full statement of the case. We shall leave it to our readers to judge how far Mr. Cory's strictures are justified.

THE UNDEVELOPED IRON RESOURCES OF CANADA.

Despite political vagaries, it may be believed that Canada's iron and steel industries have passed through the dangers and diseases of infancy. Amongst the world's producers of pig iron Canada ranks eighth, exceeding Sweden by a relatively large amount. Whilst, however, the production of pig iron is about 700,000 tons, it is not pleasant to note that the domestic output of iron ore hardly exceeds 250,000 tons, or roughly, about one-sixth of the quantity required to account for the pig iron produced. This measure of dependence upon foreign sources of supply is humiliating. Assuredly, we are lacking in enterprise or in acumen, or in both, when our attempts to exploit our mineral possibilities are so feeble.

As pointed out by Mr. A. B. Willmott, in a paper read before the Canadian Mining Institute, no official estimate of available iron ore in Canada has ever been made. No doubt the making of such an estimate would be extremely difficult. Yet it should be done without delay. One estimate, made by a member of the United States Conservation Commission, places the figure at less than fifty million tons. This is supposed to cover known ore. It can be but a small fraction of ore that can be almost as readily won. At best, it is the roughest kind of guess, and is significant only in so far as it shows the small amount of prospecting and development done.

What Sweden has accomplished, with opportunities not to be compared with Canada's, is alluded to in Mr. Willmott's paper. No country deserves more credit than Sweden for making bricks without straw. In face of most discouraging conditions, that small country has built up an industry that is almost as large, and, presumably, is much healthier than is the industry that we have artificially nourished.

HUNTING FOR MINES.

The much-quoted statement of Mr. S. J. Jennings, vice-president of the United States Smelting Company, to the effect that during the year 1910 that corporation rejected 514 mining properties, calls for comment. The additional facts that preliminary examination alone was made in 124 cases, that further work was done on 46, and that only two properties finally met the requirements of the company, require elucidation.

It can readily be understood that a corporation as large and powerful as is the United States Smelting Company knows definitely what it wants. Many limit-

ing conditions can be set and, as a matter of fact, are set, by such a purchaser. The possible scale on which any given mine, prospects are very rarely touched, is already developed, and the future promise that it holds, are deciding factors. Neither raw outcrops, nor small mines are wanted. The relation of the mine to transportation, to smelters, and to markets is also a vital consideration.

In short, companies like the United States Smelting Company are interested only in large mineral deposits that are developed sufficiently and are so circumstanced as to warrant investment.

Hence, it is beside the point to accept Vice-President Jennings' announcement as meaning anything more than that his company purchased only two mines in more than 500 mines and prospects. Of that large number, doubtless many are saleable. That they were not wanted by the company in question need not imply that they are worthless.

THE REPORT OF THE COMMISSION OF CONSERVATION.

A voluminous report has just been issued by the Canadian Commission of Conservation. The volume contains 519 pages. It is divided into three sections, the respective captions being "Lands," "Fisheries and Game," and "Minerals." In the last-mentioned section is presented a summary of Dominion and Provincial mining laws. This is followed by chapters on conservation and on mine accidents, and by statistical tables.

The diagrams and maps that illustrate the chapters on mining are excellent. Statistics are digested much more readily when graphically represented.

Much information is compressed into the pages dealing with conservation. Controversial points, we more or less regret to say, are avoided. The following quotations, referring to the Sudbury district, show the tone of the report:—

"It is not believed that the waste in mining is very "great."

"This loss of sulphur, copper, and nickel seems un- "avoidable at present."

This is certainly an improvement on the statements for which the commission was criticized.

The chapter upon mine accidents evidences careful preparation. It is informing and copious. We would suggest that it would have been well to include in the text a discussion of the methods of collecting statistics in various countries.

The report as a whole is most creditable.

THE FARMER FOLLOWS.

The solid basis upon which is builded the growth of Northern Ontario is well seen when the agricultural possibilities of the country are noted. Many thousands of acres have been cleared in the region that lies between Cobalt and Englehart. The quiet migration of farmers to this section has passed almost unnoticed in the large stream of mining population. But the farmer is there and is there to stay.

From our own observation, and from the reports of those more competent to judge in matters agricultural, it is certain that the soil is remarkably rich. With the question, the farmer of the north will wax fat and prosper. Doubtless he will have several large mining communities to supply with the necessaries of life. He must not fail, in the hour of his prosperity, to aeknowledge the debt he owes to his mining brother.

Nor is it inappropriate to remind the public and the powers that be of the fact that prospecting and mining open the way for the best and strongest settlement of the soil.

WOLFRAMITE IN NEW BRUNSWICK.

In the last number of Economic Geology there is a brief note by Dr. T. L. Walker, describing a recent discovery of wolframite in the centre of the province of New Brunswick.

For long it has been known that certain quartz veins near the confluence of the Miramichi River and Burnt Hill Brook contain molybdenite. Last year Dr. Walker examined the veins, and found that in almost every one wolframite occurs. More detailed examination has convinced Dr. Walker that these deposits may prove of commercial value.

CORRESPONDENCE

INVIDIOUS COMPARISONS.

Editor Canadian Mining Journal.

Sir,—The importance of the Porcupine district, like that of past gold discoveries in Ontario, is in danger of being too grossly exaggerated. While it has been stated by men who are qualified to judge that there are a number of properties in Porcupine likely to make producing mines, and while we know that several properties may already be called mines, yet it must not be overlooked that prospecting work in other sections of the field has failed to reveal discoveries of importance, and, consequently, interest in some cases has been transferred to other places.

One effect of over-advertising has been to alienate the English press. In addition to this, the market manipulations of the Bewick-Moreing people have done much harm. The 44,000 of the Hollinger shares that were acquired by the Northern Ontario Exploration Company, also 30,000 shares of the same concern that were held by a brokerage house in London, have been sold

w York and Toronto buyers. The fact that these s were not purchased by English investors is suf- t cause for alarm.

is true that the company made a profit of some- like $350,000 out of the Hollinger transaction. may be considered good business. But it is to be tted that the profits came out of the pockets of unfortunate stock gamblers, and not out of the Hollinger

is believed by many that at the present stage of opment the Hollinger mine does not warrant the paid for these shares, namely, $10 to $15. This out the opinions expressed by mining men dur- he Hollinger boom, to the effect that the shares ed a high point, not because the mine warranted it because of clever manipulation, supported by g organization.

Porcupine is to hold the interest of English and mental investors, there will have to be more sys- tic and vigorous development work, with less daily twaddle.

e attention attracted by Porcupine has certainly ded that roused by Cobalt, even in the latter's liest days. But it must be realized that gold has cination that no other mineral or metal possesses. st not be overlooked that Cobalt stands in a totally ent position than Porcupine. To be guilty of a guesses, I would say that there is to be written off st the future production of Poreupine $1,000,000 t in the construction of the railroad; $2,000,000 in ht and machinery; $50,000 in engineers' fees; 0,000 in the recording and performanee of two s' assessment work on claims staked in the Porcu- mining division; $175,000 in the incorporation of panies, etc.; roughly, about $5,000,000, not including sums of money spent in advertising the camp. le these guesses may be wide of the mark, the total obably less than the truth. It is scarcely reasonable pect that Porcupine will prove an exception to all r mining fields of the world. It is inevitable that ust go through the stage of paying for experience. ill have to pay heavily to work out the proper ods for its development, and for the treatment of res. Those who are acquainted with the history of of the important mines in America, Australia, and h Africa, can form some idea of the large amount oney lost through the adoption of wrong methods. must be expected in opening up any new mining . Not until a camp has gone through several stages evelopment can these mistakes be rectified.

ecently there have appeared in the daily papers ements to the effeet that Porcupine as a mining camp usurped the position held by Cobalt; also that it will e equal or even better than the Rand. Let us mine the matter. The position of Cobalt to-day is ue in mining experience. During the year 1910 it luced nearly 11 per cent. of the world's supply of r, valued at $15,375,000, and there is every indica- that during the present year the output will exceed by fully 20 per cent.

hen Porcupine is producing an annual yield of gold valent in value to the silver produced by Cobalt year, there will be some justice in the comparison.

or the benefit of the readers of this journal who are familiar with the Rand, I will attempt here briefly convey some idea of its vastness.

ohannesburg is situated 1,014 miles north of Cape n, and has an altitude of about 5,500 feet above the which assures a cool, pleasant, and healthy climate. Extensive artificial afforestation has made Johannesburg and its surroundings a place of beauty.

In July, 1886, a man named Struben first discovered gold in an outcropping of quartz, which is now known as the main reef leader. A quantity of the ore was sent to Kimberley to be assayed. When the results were known Kimberley mining men, such as Wernher, Beit & Co., Cecil Rhodes, and others, became interested. There was not the usual blare of trumpets. The daily papers did not display half-page advertisements telling the public of the richness of the field. It was done in that quiet manner characteristic of the true mining man.

The Rand series was found to consist chiefly of conglomerate shales and quartzites, resting on granite, and extending east and west. What may be described as one of the Rand's unique features is the fact that gold associated with pyrite is found in paying quantities in a series of conglomerate beds, extending over a great length and to an unknown depth. The trend of the producing zone on the Rand is almost due east and west, extending in a basin-like form for a distance of 62 miles. Over this distance the producing mines are spread. At a place called Klerksdorp, a little over 100 miles in an easterly direction from Johannesburg, the same deposit was found by boring. The deposit is carrying high values in gold, extending for 20 miles, and will be the means of creating another Johannesburg.

There are 72 producing mines on the Rand, with 9,836 stamps dropping, crushing on an average 2,000,000 tons of ore each month, producing nearly $13,000,000 worth of gold.

During the year 1910 the value of the gold output of the Witwatersrand amounted to $147,378,777.60.

One mine on the Witwatersrand has produced 4,801,075 tons of ore, which yielded $72,016,125, or an average of $15 to the ton, and has given its shareholders a handsome profit of about $33,000,000. A mine with a record behind it such as this is one of the glories of the mining industry. Fifteen mines on the Rand have individually contributed roughly $250,000,000 worth of gold to the world's supply.

Dividends declared for the half-year ending June 30, 1911, by companies operating on the Rand amounted to $20,424,085.

These figures are for the Witwatersrand only and do not include mines operating in outside districts in the Transvaal.

It is not my intention for a moment to belittle Porcupine. What I wish to show is that it is exceedingly foolish to institute comparisons between Porcupine and the Rand. Porcupine is more promising than any gold camp that Canada has ever developed. But I fail to see what earthly good can come of making insane comparisons where there is no room for comparison at all.

Temperate talk will do more for Porcupine than will all the shouting in the world.

Yours etc.,
GEORGE R. ROGERS.

Toronto, August 9, 1911.

A REMONSTRANCE.

Ottawa, 8th August, 1911.

Editor Canadian Mining Journal.

Sir,—My attention has been called to your editorial in the issue of "The Canadian Mining Journal" dated the 15th of June last, entitled "A Modern Instance," in which you point out that an applicant for a coal mining lease was given a period of three months from the date upon which his application was filed with-

in which to pay the rental for the first year; that being unable to raise the money he restaked the tract immediately after the expiry of the period given; and that he thus succeeded in postponing payment of the rental for another three months.

I enclose herewith for your information a copy of the Coal Mining Regulations, which have been in force since the 25th day of May, 1910, from section 16 of which you will see that payment of the rental must be made to the Agent of Dominion Lands within thirty days from the date of the receipt of his application in the office of such agent.

It seems manifestly unfair to criticize in so harsh a manner the regulations of this department without having some knowledge of their provisions.

Yours truly,

W. W. CORY,
Deputy Minister of the Interior.

Personal and General

Mr. W. K. McNeill, manager of the Canadian Laboratories, Ltd., has been placed in charge of the Ontario mineral exhibit at the Canadian National Exhibition. Mr. McNeill has just returned from Cobalt, Swastika, and Porcupine, in which places he made arrangements with the principal mines for suitable samples. The mineral exhibit promises this year to be much larger than ever. The directors of the Canadian National Exhibition recognize the importance of giving the mining industry the prominence that it deserves. Considerably larger space has, therefore, been assigned to the Bureau of Mines.

Dr. W. Harvey Weed is in Porcupine.

Mr. Dwight E. Woodbridge was in Toronto on August 5.

Mr. W. F. Ferrier, Lumsden Building, Toronto, has returned to town.

Mr. R. B. Lamb has been retained as consulting engineer for the Pearl Lake Gold Mines Company.

Dr. James M. Bell, M.A., Ph.D., Harvard (formerly on the staff of the Canadian Geological Survey, and lately director of the Geological Survey of New Zealand), and Mr. Colin Fraser, B.Sc. (lately mining geologist on the staff of the Geological Survey of New Zealand), have opened an office as mining geologists at 621 Salisbury House, London-wall, E.C.

Dr. Malcolm Maclaren is making a geological examination of properties on the Porcupine Goldfield, Ontario.

Dr. James Douglas and Messrs. W. R. Ingalls, J. Parke Channing, J. R. Finlay, and John Hays Hammond have been appointed consulting engineers in the United States Bureau of Mines, and will be constituted a committee within the bureau to continue the development of rules and regulations for the promotion of safety in metal mining, upon which they have been engaged heretofore as a committee appointed by the American Mining Congress.

Mr. G. G. S. Lindsey gave a luncheon on Saturday, August 5, at the National Club, Toronto, in honour of Mr. Hugh Marriott and Mr. Louis Reyersbach. Amongst those present were Dr. W. G. Miller, Mr. Dwight Woodbridge, Mr. A. B. Willmott, Mr. W. E. H. Carter, Mr. R. B. Lamb, Mr. W. Stanley Leckie, Mr. Eugene Coste, and Mr. J. C. Murray.

Mr. A. J. McNab, of Trail, B.C., superintendent of the smelting works of the Consolidated Mining and Smelting Company of Canada, Ltd., was in Nova at the end of July.

Mr. Andrew Laidlaw, of Spokane, Washington is largely interested in coal properties in Alberta British Columbia, recently went to Duluth, Minnesota, in connection with the prospective sale of valuable coal lands situated in the former province.

Mr. Thomas W. Lawson, of Boston, Mass., was a visitor to Portland, Seattle, Vancouver, and other fic coast cities. He returned east by the Canadian fic Railway, stopping en route at some of the favorite holiday resorts in the Rocky Mountains.

Mr. Donald G. Forbes, who some years ago was eral manager of several companies working mines the Lardeau district of British Columbia, recently turned to that province after an absence of about a in England. He purposes shortly proceeding to tralia.

Dr. Alfred W. G. Wilson, of the Mines Branch the Canadian Department of Mines, is in British Columbia obtaining information relative to the copper mining industry of that province, from which comes more two-thirds of the copper production of the Dominion.

Mr. D. C. Livingston, son of the late Mr. Cle Livingston (who organized, and until the time of death was general manager of, the Tyee Copper Ltd., operating mines and a copper smeltery in British Columbia), has been appointed associate professor the mining engineering department of the University of Idaho, Moscow, Idaho. Professor Livingston took his B.Sc. degree at McGill University in 1906, in which year he has been engaged in mining in Mexico latterly with the Moctezuma Copper Co.

Mr. Alexander Grant has voluntarily retired from the management of the Marble Bay gold-copper mine, Van Anda, Texada Island, B.C., after having been in charge there for between 11 and 12 years. During several recent months Mr. Grant had been under a surgeon's care, but, notwithstanding that he has been restored to good health, he has decided to relinquish the responsible duties inseparable from the active management of an operating mine. The Marble Bay mine was formerly owned by Mr. J. J. Palmer, of Toronto, is now the property of the Tacoma Steel Co., of Tacoma Puget Sound, Washington.

Circular from the U. S. Bureau of Mines

Compiled By John L. Cochrane.

Washington, D.C.—With the rapid development of mine rescue work in the United States in the last two years and the increasing use of the mine-breathing apparatus, there has come to the Federal Bureau of Mines a demand for information concerning the apparatus and how it should be properly used. In response the Bureau of Mines has issued Miners' Circular No. 4, on "The Use and Care of Mine-Rescue Breathing Apparatus," by James W. Paul, who has general charge of the rescue work. Mr. Paul makes the statement that the use of such apparatus for rescue work in mines is no longer an experiment, but has become an important factor in lessening loss of life and property from fires and explosions.

The circular describes the various types of apparatus used by the bureau and gives careful instructions for

are this apparatus should receive when not in Then the author passes upon the qualifications of e men at the mines. Mr. Paul says: "Mine men 45 years old, in good physical condition, who are erate in their habits and naturally calm and de- ate, are best suited for mine rescue work. Before n undergoes training in the use of breathing ap- us he should be examined by a physician to ascer- his physical condition, especially the action of his t and lungs, and any defects of the nose or t. Unless a man has a physician's certificate stat- hat his physical condition is good, he should not ermitted to take rescue training nor to attempt e work in a mine.

A rescue party should have not less than five, and r not less than six members. Only such persons ld be allowed to join the party as have already trained in the use of the apparatus and are pped with rescue apparatus in good order, and agreed to follow the directions of the leader, who have full charge. While working in unbreath- gases within a mine the men should keep close to another and not separate under any condition.

To be efficient and successful a party must take y precaution for its own safety. If one person in rty faints or receives an injury, he becomes a bur- instead of a help, for the entire party must at once luct him to the surface or to fresh air. One or stretchers should always be at hand.

A relief station or base of operations should be blished at the end of the good air and a relief with knapsacks should be stationed there ready ut on their apparatus and start at a moment's no- A patrol of all brattice and doors leading up to relief station should be maintained to protect the f crew from harm.

At each large mine there should be at least four vs, two outside and two inside crews, each of six , including a captain and a lieutenant, and these vs should have practice once a week.

While working in dense smoke the members of a y should hold a rope which leads to fresh air.

In case of total failure of an apparatus to supply thable air, the wearer of the apparatus can throw y all parts but the oxygen cylinder, and breathe n the cylinder through his mouth while endeavour- to reach fresh air with the rest of the crew.

Apparatus for giving oxygen to one who has been rcome with gases is an essential part of the equip- t of a rescue party.

A telephone helmet is a convenience for shaft k, and its presence lends much confidence to a res- party. Electric lamps, safety lamps, gas-analysis aratus, thermometers, a pocket compass, and a of the mine are necessary parts of the equipment.

At each training station a record should be kept wing the work done by the men and the difficulties ountered. A record of each apparatus should be t also. If an apparatus fails to give proper ser- it should be subjected to the regular tests unless e injury is seen by inspection.

he United States Bureau of Mines has established egular course of training in the use of mine-rescue athing apparatus. This training is designed to give ers or other persons connected with mining a know- ledge of breathing apparatus in general, and a confi- dent familiarity with those types of apparatus that are most apt to be used in this country.

"The purpose of the Bureau of Mines in establishing this system of training is to facilitate investigative work within mines in which disasters have occurred, and to make mine owners and miners acquainted with the value of breathing apparatus for rescue operations after mine disasters. It is hoped that, as a result of this work by the Federal Government in the near future, men familiar with such apparatus will be scattered throughout the coal-mining centres of the country, and be available on short notice to assist in rescue operations. After a disaster, valuable time is often lost in training men at the mine before rescue parties can be organized. Furthermore, a man can not work efficiently unless he has thorough confidence in the apparatus. To give a man this confidence, the course of training has been planned in such a way that he must do work in poisonous or unbreathable gases for periods of one and two hours at a time."

Porcupine Gold

Mr. Reginald E. Hore, in a paper published by the Canadian Mining Institute, discusses the modes of occurrence of gold in several of the Porcupine quartz bodies. In the Dome mine quartz, Mr. Hore found one grain of quartz, 0.5 by 0.8 mm. in section, completely enclosing three very small isolated grains of gold. One area of pyrite, 0.5 mm. by 1.0 mm., enclosed several irregular patches of gold, most of which were less than 0.1 mm. in diameter. Four of the gold grains were completely within the pyrite; but a much greater number were found to be partly enclosed by the pyrite and partly by quartz. Gold grains were found also in calcite, completely or partly enclosed; and in spaces between grains of coarsely and finely crystalline quartz.

In discussing the origin of these deposits, Mr. Hore favours the view that Porcupine ore bodies owe their origin to the same agencies that produced the gold-bearing quartz of California. Some gold, he believes, was deposited simultaneously with the original quartz of the veins. The pyrite, in part at least, appears to have been deposited from the same hot solution that carried the quartz and gold. Unlike the gold and quartz, the pyrite occurs scattered through the wall rocks. In fact, it is more abundant in the walls than in the veins. The relation of the carbonates to the quartz is not always clear. It is evident, Mr. Hore states, that the ferrodolomite of the wall rocks is older than the quartz.

Geologically, the Californian deposits referred to are the result of the intrusion of a quartz-mica-diorite into metamorphic slate. This metamorphic series consists of highly compressed and folded sediments. Among the igneous intrusives are augite-porphyrite, diabase, and serpentine.

The production of talc and soapstone in the United States reached 150,716 short tons in 1910. This is an increase of 16 per cent. in quantity. Of the eleven producing States, New York led, with 71,710 tons., 69 per cent. of the talc was ground, and 21 per cent. was made into slabs and manufactured. The New York product is nearly all ground.

List of Excursions of The International Geological Congress, to be held in Canada in the Summer of 1913

"A" Excursions.

A 1.—Excursion to Maritime Provinces.

At St. John and neighbourhood to visit Cambrian section, etc., one day and a half. Leaders, Drs. G. F. Matthews and W. Parks. Salisbury to Hillsboro and Hopewell, visiting Albert mines area, gypsum deposits, etc., one day. At Joggins section, examining cliff by walking and boats, one day. Passing the Bras d'Or Lakes, etc., by daylight. A day and a half at Sydney, visiting industrial plant, carboniferous section, etc. (A visit might be made to Louisburg by those desiring to do so.) Stop at Waverley gold mine; balance of day and next at Halifax. Leader, E. R. Faribault. By ferry to fish beds, etc., one day. By steamer to Perce and Grand Greve, etc., on Gaspe coast, visiting the very striking faulted sections of Silurian and Devonian exposed there, and return to Dalhousie, four days. Leader, Dr. Clarke. One day at Quebec seeing the city and the sections exposed in the neighbourhood.

Alternative Branch Excursion for Palaeontologists.

Omitting Sydney and Halifax; one extra day at Joggins section. To Antigonish by regular train and to Arisaig and return by carriage, giving two clear days at Arisaig, or on the return journey to Truro a day might be spent at the Riverdale locality. Leader, J. B. Tyrrell.

A 2.—Excursion to the Haliburton-Bancroft Area.

Leave Montreal. Leave Millbridge, drive to Ormsby Junction (or St. Ola.) This drive affords an excellent section across the Grenville series, one day. Leave Ormsby Junction (or St. Ola), arrive Bancroft. Go to camp at Bancroft and spend the remainder of the day in seeing the Crystalline Limestones, Nepheline-Syenites, Sodalite, and Fundamental Gneiss in this vicinity, one day. Leave Bancroft; drive to Mud Creek, about seven miles; take special train on Irondale, Bancroft & Ottawa Railway, stopping at a number of points of interest, and in the evening reach Gooderham. Camp at Gooderham, one day. At Gooderham visit Maxwell's Crossing and various other points, where the origin of the Amphibolites can be studied, and also visit the Nepheline-Syenite occurrences and the Gabbro, with its differentiation into Iron Ore, one day. Drive to Bancroft and then on to Bronson's Landing; the remainder of the day to be spent in further examination of the Geology in the vicinity of Bancroft, one day. Leave Bronson's Landing by canoe, paddling to Craigmont, making stops at two or three interesting points en route, at which occurrences of certain rare varieties of Nepheline-Syenite are to be seen, one day. At Craigmont study the Nepheline-Syenite and Corundum occurrenees, one day. Leave Craigmont, arrive Barry's Bay, stopping en route to visit some points of interest, one day.

A 3.—Sudbury-Cobalt-Porcupine Excursion.

The first two days at Sudbury will be spent in an examination of the mines and geology of the nickel-copper bearing area. The third day an excursion will be made from Sudbury to Moose Mountain, where the iron mine will be visited. The fourth day will be spent on the general geology of the pre-Cambrian; probably a visit will be made to the classic Huronian of Lake Huron. Leaders, T. L. Walker, Dr. Bar Dr. Coleman.

Three days will be devoted to the geology of Te gami, where good contacts of the Huronian and Keewatin are to be seen, and where there is a cha teristie outcrop of Keewatin jaspylite. At Cobalt, day will be spent in visiting the mines and charac istic outcrops of the pre-Cambrian series, which to be seen in striking exposures.

The members will leave Cobalt in the evening about a day will be spent in the Porcupine gold ca Those wishing to proceed to Montreal to take par short excursions will take the main line of the C adian Pacific Railway at North Bay. Leaders Temagami, Cobalt, and Porcupine, Messrs. Mi Knight, and Burrows.

A 4.—Niagara-Iroquois Beach Excursion.

One and a half days at Niagara Falls and Go Road. One day at Hamilton, Silurian on Moun and at quarries. Iroquois Beach, in city, and Burl ton Heights. Leaders, Messrs. Tyrrell, McNairn, nings, and Willmott.

A 5.—Asbestos Excursion.

Spend day at Thetford and take north bound tr arriving East Broughton. See East Broughton currences and mines, and Black Lake. Spend this on Asbestos and next day on Chrome. Leader, Denis.

A 6.—Morin Anorthosite Excursion.

Examine the Anorthosite in the vicinity of St. M guerite. Leave St. Marguerite, arrive St. Jerome. amine the Anorthosite occurrences at St. Jerome. Le St. Jerome, arrive New Glasgow, visit the occurre of Foliated Anorthosite as well as the Dark Gabl Crystalline Limestone, and the Anorthosite which cur in this locality.

A 7.—Excursion to the Monteregian Hills.

Visit Mount Royal, studying the Nepheline-Syen and Essexite Intrusions, as well as the Dykes and Contact Metamorphism of the Intruded Limesto Visit the Breccias at Outremont. Visit St. Hele Island, one day. Study of Mount Johnson. Arrive Gregoire, drive to Mount Johnson. Study there remarkably interesting Intrusive rock, showing varieties of Essexite passing over into Pulaskite, described by Dr. Adams, one day. Leader, Dr. Ada

A 8.—Apatite and Mica Region Around Ottawa.

Visit crystalline limestone and Potsdam escarpm at Lachute, one day. Visit Eozoon locality at Pa eauville. Visit Graphite deposits at Lake Donalds seven miles from Buckingham, and Apatite depo near Poupore, ten miles from Buckingham, one d Gatineau Valley trip. Visit Nellis mica mines, so of Cantley, and other points of interest in the vicin also Blaekburn mine, one day. Leader, Mr. LeRoy.

A 9.—Kingston Mineralogieal Exeursion.

Leave Kingston, visit Sydenham mica mine, Fr tenac lead mine, Apatite deposits, one day. Le Kingston, visit Verona, McDonald feldspar mine. G

wer iron mine. Richardson feldspar mine, one day. aders, Dr. Miller, Prof. Nicol.

A 10.—Excursion to the Drift Deposits of the District about Ottawa and Montreal (Including a Visit to Rigaud Mountain).

At various points in Montreal, study the terraces nich surround Mt. Royal. Visit the Mile End quarries and the brickyards at Maisonneuve. Here excellent sections may be seen of the Bounder Clay overlain the Leda Clay and the Saxicava Sand, the latter rmations holding an abundance of fossils, one day. rrive Ste. Anne de Bellevue. Visit the occurrences the vicinity, and arrive Rigaud Mt. Visit the Devil's arden and study the drift phenomenon in this vicuity, one day. Arrive Green's Creek, collect concreons in the clay. Drive to marine terraces and sands the Quebec side of Ottawa River.

A 11.—The Ordovician of the District about Ottawa and Montreal.

Visit morning at Cap St. Martin and Mile End, and fternoon at Grenville. Night at Hawkesbury, Chazy ossils, one day. Exposures of Chazy to the west. Drive to Caledonia Springs, one day. Ottawa, Queen's ark, Aylmer, Calciferous, Hull, Trenton, Rockcliffe, hazy, one day. Leaders, Messrs. Sowter, Billings nd Narroway.

A 12.—Palaeontological Excursion (Western Ontario.)

Brantford to fossil localities on the Onondaga and riskany, south of Waterford. Evening at Thedford, ne day. Fossils near Thedford and possibly Kettle oint. Evening to Guelph, one day. Fossils at Guelph, alt, Hespeler, etc., one day. Leader, Mr. Stauffer.

"B" Excursions.

B 1.—Niagara Falls. Dr. Coleman.

B 2.—Glacial and Interglacial, Don Valley, Glacial nd Interglacial, and Iroquois Beach, East Toronto nd Scarboro' Heights. Leaders, Dr. Coleman, Walker, and other local geologists.

B 3.—Hamilton excursion.

B 4.—Forks of Credit. Leader, Dr. Parks.

B 5.—Moraine north of Toronto. Leaders, Dr. Coleman, Taylor.

B 6.—Muskoka excursion.

B 7.—Oil Fields excursion. Leader, Dr. Parks.

B 8.—Palaeontological excursion to Streetsville. Leader, Dr. Parks

B 9.—Clay works around Toronto, Don, Milton, etc.

NOTE.—These excursions are left to the Local Committee to complete, they being empowered to arrange further excursions, to be reported to the Executive Committee.

"C" Excursions.

C 1.—C. P. R. Main Line to Vancouver.

Toronto to Sudbury. Nickel copper mines, geological excursion. Sudbury to Port Arthur. Stop en route at Loon Lake. Port Arthur to Kenora. (a) Lake of the Woods excursion. (b) Rainy Lake excursion. (c) Port Arthur excursion, No. 2. Port Arthur to Medicine Hat. Gas wells, coal mines 7 to 10 miles west of Medicine Hat, and Medicine Hat to Banff, coal mines, Bankhead, Anthracite, Canmore. Geological excursion. Banff to Laggan. Excursion to Lake Louise and Victoria Glacier. Laggan to Field. Yoho Valley and Mt. Stephen excursions. Field to Glacier excursions. Glacier to Siccamous, or Kamloops, or Nicola. Arrive Vancouver. Fifteen days.

C 2.—Toronto to Vancouver (via Crow's Nest).

Toronto to Medicine Hat. Visit gas wells, coal mines. Medicine Hat to Lethbridge. Coal mines, Geological excursion. Lethbridge to Coleman, coal mines. Geological excursion. Coleman to Fernie, coal mines. Fernie to Hosmer. Geological excursion. Fernie to Nelson, Moyie mines, geology. Trip on Kootenay Lake, Sheep Creek camp. Geological excursion (alternative with Rossland). Nelson to Rossland, mines, smelter. Geological excursion. Trail to Grand Forks, smelter. Geological excursion. Grand Forks to Eholt mines, at Phoenix and Deadwood. Geological excursion. Grand Forks to Hedley. Nickel Plate mine. Geological excursion. Hedley to Princeton and Tulameen, coal mine. Geological excursion. Diamond fields. Tulameen to Nicola, coal mines. Geological excursion. Nicola to Vancouver. Sixteen days. Leaders, Messrs. Brock, Camsell, Dowling, and LeRoy.

Alternative Route.

Tulameen to Keremeos. Keremeos to Penticton. Penticton to Okanagan Landing. Okanagan Landing to Vancouver; or Tulameen-Vancouver.

C 3.—Toronto to Vancouver, via C. P. R., C. N. R., G. T. R. and C. P. R.

Toronto to Edmonton. Excursions en route, Lake Agassiz, Lake Winnipegosis. Edmonton to Yellowhead Pass. Edmonton to Banff excursions. Banff to Glacier excursion. Glacier to Vancouver, fifteen days. Leaders, Messrs. McEvoy, Tyrrell, Dowling, and Coleman.

C 4.—Toronto to Edmonton (via Great Lakes.)

Stopping at fossil localities in Manitoba, Red Deer, Kicking Horse, with sub-excursions from Edmonton to Lake Athabasca.

C 5.—Excursion Lakes Erie and Huron.

It is proposed to conduct this excursion by means of a chartered steamer. Toronto to St. Catharines, to proceed to Port Colborne. Niagara Falls, one day. Morning at Falls, to Port Colborne, fossils near Port Colborne, or alternative, afternoon on glacial work, one day. Leave Port Colborne to make Pelee Island some time the next night. Physiographic features of Lake Erie shore during the day. Rondeau Park. Night on boat at Pelee Island, one day. Glacial striae and quarries, Pelee Island. Proceed to Amherstburg, quarries and Livingstone cut. Wampole Island, one day. Indians at Wampole Island. Sarnia. Port Frank light. Thedford, Hamilton fossils and Kettle Point, one day. Goderich, salt, one day. Manitowaning. Fossil Hill. Niagara and Clinton fossils, one day. Fossils near Manitowaning. Little Current. Trenton fossils and palaeozoic contacts, one day. Little Current to Parry Sound, via islands, one day. Parry Sound, Grenville, one day. Parry Sound to Collingwood, one day. Utica fossils at Collingwood, one day. Fourteen days.

C 6.—Cobalt-Sudbury Excursion as Before (to be repeated.)

C 7.—Alaska-Yukon Excursion.

This excursion would leave Vancouver after the three parties sent across the continent by different routes had all reached the coast.

The route would be from Vancouver to Skagway by steamer, Skagway to Whitehorse by rail, and Whitehorse to Dawson by river steamer. A short visit to the copper and iron deposits on Texada Island, and a trip up Portland Canal to Stewart. This canal or fiord cuts completely through the Coast Range and an opportunity would be afforded for studying the still unsettled question of fiord origin. The mineral de-

posits and glaciers of the Portland Canal District are also worth visiting.

From Skagway part of the Lewis River Valley is followed down to Whitehorse. The glacial features of the valley are very interesting.

The river trip from Whitehorse to Dawson down the great Yukon River offers many problems for discussion, among them those of peneplanation (the river passes through a typical one), the cause of the absence of glaciation north of the Rink Rapid, and the origin of the huge trough in which the river flows, often sunk for thousands of feet below the bordering uplands. Twenty-three days.

C 8.—Vancouver Island Excursion.

This excursion will occupy two or three days, and will include a visit to Victoria and an examination of the coal fields of Nanaimo.

Excursion to Fort McMurray or Athabasca Lake and Peace River.

The route of travel would be from Edmonton to Athabasca Landing. From Athabasca Landing down Athabasca River to Grand Rapids. From Grand Rapids to Fort McMurray. From Fort McMurray the excursionists, if deemed advisable, could be taken by steamer down the Athabasca River to Athabasca Lake, and up Peace River to Vermilion Falls, also along Athabasca Lake and down Slave River to Slave River Rapids. (Thirteen days.) Economic interest in this trip centres largely in the area of Tar Sands along the Athabasca River. Sections of Cretaceous rocks, often continuous for miles, are exposed along the upper parts of both rivers, and flat-lying Devonian limestone in the lower parts.

OUR EUROPEAN LETTER

Spasmodic revival in Siberians — Rand settling down to an investment level — Giesecke mill — Life of the Rand — Report of Inspector of Scottish Mines —Overwinding appliances — Shaft-sinking by freezing.

(Exclusive correspondence to the Canadian Mining Journal.)

London, July 30, 1911.

A spasmodic revival in Siberians emanating from Paris has been a feature of the half-year, but this movement has since subsided. Favourable developments have given a stimulus to the Barriers, otherwise base-metal stocks have been more or less neglected. Interest in Australians, too, has been practically dormant, apart from the Waihi collapse, and the same may be said of Mexican mining shares, though in the latter direction Paris has been a ready supporter.

Oil, as your correspondent has said, is equally idle, the public continuing apathetic and inside support being weak.

The gradual settling down of the Transvaal to a steady investment level is perhaps fully in accordance with the tremendous development that is taking place there. Reference has been made in these columns to the Giesecke mill which is doing such good work at the Geldenhuis Estate section of the Geldenhuis Deep. Experiments with the Bubola patent are also proceeding on the Stanhope area. This plant consists of a large tank, at the bottom of which the cyanide solution is let in by a pipe which is charged with positive electricity. A slight way up the tank is a grating, the use of which is to conduct the electricity over or through the entire mass of sands. At the top of the tank are two stirrers charged with negative electricity, and these work with a planetary motion. At the first test the boiler broke down before the experiment was completed, and work is delayed until the boiler is again passed for service by the Government Boiler Inspector. Triple tests were taken of the charge which averaged 3.5 dwts. (pennyweights) gold, and after a short period the residues were brought down to 0.6 dwt. Acceleration in recovery is one of the principal advantages claimed. The patent rights are owned by a small syndicate, and there have been dealings in the shares, which have a nominal value of $5, at $100 each. Some influential people have been purchasing shares between $50 and $75. The results of the more extended experiments are being awaited with considerable interest. This is, of course, not the first time that electricity has been used in connection with cyanide, and on the Rand there have been applications of the principle several years ago.

Going back to the Giesecke mill it is stated by the manufacturers that the capital cost with a capacity equal to 50 to 60 stamps plus tube mills is about $30,000. To this would have to be added cost of erection, motive power, etc. Roughly speaking, then, for $50,000 a company would have a crushing plant, and to this would have to be added cost of cyanide equipment. C. O. Schmitt, in his paper on "Future Economies in Rand Reduction Plants," estimates the cost of additional reduction plants at $1,000 per ton milled per day, including cyanide equipment. A plant capable of crushing and cyaniding 500 tons per day on the present style would therefore cost $500,000. Rough figures like these—of course, cyanide plant cost must be added—give some indication of the value of the Giesecke mill and its possibilities, providing it is capable of doing what is claimed for it.

Dr. F. H. Hatch, speaking to the Institution of Civil Engineers in London on June 28th, detailed some calculations he had made to estimate the production of gold to be expected from the main reef series of the Rand, if worked down to a vertical depth of six thousand feet. He estimated that at the present time there remained $5,230,000,000 of gold, which, on the basis of an average output of $150,000,000 per annum, was equivalent to a life of 35 years — namely, down to a vertical depth of 6,000 feet. But if, at still greater depths, the banket should contain sufficient gold to yield a profit, after deducting the cost of working, they may rest assured that it would be worked. What, then, were the limiting factors? They were generally considered to be (1) the mechanical difficulty of raising the ore to the surface from such great depths, and (2) the effect of the temperature gradient.

With regard to the mechanical question, the electrical transmission of power applied to stage-winding had so modified the mining engineer's conception of the depth from which deep hoisting was practicable that it was now generally assumed that there were no mechanical difficulties that could not be overcome if

paid to do so. For all practical purposes, the whole uestion turned solely on the gold eontent, and what hat might be at a vertical depth of 7,000 or 8,000 et no one eould tell. This much, however, might be id: the geological strueture of the country clearly dieated the continuance of the conglomerate or ban- et beds to still greater depths than even 7,000 or ,000 feet before the bottom of the great synelinal asin of the Witwatersrand was reaehed; and beyond hat point, the beds must still eontinue until they rose o form the southern lip of the basin known to exist eyond the Vaal River.

For some time past rumours have been reported ere to be in circulation in Rand mining and engineer- ng eireles relative to defeets which have developed n the battery of the City Deep. In this mill the ferro- oncrete system was adopted, but the results cannot e claimed to be satisfaetory, and the absence of elas- icity is a great drawback. The ordinary type of mill, with wooden King posts, absorbs the impact of the eavy stamps upon the rock. The steel concrete King osts at the City Deep are reported to be giving eon- iderable trouble. The whole plant has been reported pon by Mr. Templer, engineer of the Ferreira, and t is stated in eireles usually well informed, that a con- iderable expenditure will have to be ineurred in order o make the plant thoroughly servieeable. An amount f $850,000 is spoken of, but, inasmueh as a 200- tamp mill — that is, the battery itself, and exclusive f tube mills and eyanide plant — could be erected or about $425,000, it is presumed that this figure in- ludes expenditure in providing additional stoping faces so that the 200 stamps can be properly supplied with ore.

Returning to home topies more particularly, there have been a great many diseussions of the report for 1910 of the Inspector of Seottish Mines — more espe- ially in conneetion with the winding accidents report- ed there. The number of shaft accidents seems to be on the inerease, and the new Mines Bill takes cog- nizance of this fact by providing that a device shall be attached to eaeh winding engine whieh shall pre- vent overwinding or overspeeding. Too often aeci- dents, more or less serious, whieh may or may not have a fatal termination, are caused by a lapse on the part of the engineman. He may be seized with illness, he may forget to stop the engine at the proper moment, or he may start it running in the wrong direetion with equally undesirable results.

Experienee has elearly demonstrated the fact that some deviee must be provided, whieh will operate quickly and effieiently in an emergeney. It must also be quite independent of the human faetor, simple in construetion, and meehanieally perfeet. Such an ap- paratus must, at the moment of need, shut off the steam and apply the brake without an undue strain on the engine. It must act promptly, and be free from eomplicated or delicate parts, whieh might fail when a strain is put upon them.

A eontrolling deviee which claims to fulfil these requirements has been placed upon the market by a Wigan iron company. It takes up a floor space of about 6 feet by 1 foot 6 inches, whieh permits of its being plaeed in any convenient location near the en- gine. Its employment renders unneeessary the use of detaching hooks, whieh have been found by mine managers to be unsatisfaetory in the practieal working of colliery winding gear. It will perform three dis- tinet operations: (1) Prevent overspeeding of the en- gine, (2) prevent overwinding, and (3) stop the en- gine if it is started working in the wrong direction. It can be adjusted to accomplish the two latter within about 2 feet of the regular working limit.

The principal part of the device eonsists of a sub- stantial leading screw driven by a chain and sprockets from the main shaft of the winding engine. On this travels — one way or the other, according to the di- rection of the engine's rotation — a square bloek. Im- mediately above it is a notched bar eontrolled by a governor. It is kept raised above the bloek when the speed is normal, but lowered when the speed becomes excessive. When lowered the notched bar is earried along with the block and puts into action a trip at- tachment which turns off the steam at the main valve and applies the brake forthwith. At either end are notches cut successively lower, so that if the end of the wind be reached, even without the speed having exceeded the normal limit, the bar and trip action operate at once and prevent over-winding. In the same way a wrong start in either direction will be im- mediately checked and the cage stopped before dam- age is done. After the controller has acted it ean be reset with a spanner. These eontrollers have been in use at important collieries in England and Wales for nearly two years.

The freezing proeess of shaft-sinking is eomparatively new so far as this country is eoneerned, although a good deal of work has been done with it in Ger- many, that home of the scientific treatment of indus- trial methods. The objeet, of course, is to freeze wet ground so as to prevent or restriet the influx of water, to harden the ground so that mueh timbering becomes unnecessary, and to facilitate the erection of the lin- ing. Some doubt has been expressed as to the depth to which freezing can be earried, beeause, as is well known, the melting point of ice falls as the pressure inereases. J. Riemen has stated that at about 650 feet depth the ice beeomes too plastie to withstand the pressure, but in a paper read before the North of Eng- land Institution of Mining and Mechanical Engineers, W. B. Wilson pointed out that at Easington in this eountry a depth of 615 feet had been attained without the iee showing any signs of plastieity, whilst at the Deutseher Kaiser Colliery in Germany a depth of no less than 1,366 had been frozen, and the ice was hard and brittle. The explanation whieh suggests itself is that a good deal depends upon the distance to which freezing is earried from the side of the shaft. The outer layers of ice will be exposed to the full earth pressure and may be plastic, but they will partly pro- tect the inner iee at the shaft faee, so that with a deeply frozen ground the face should be relieved of mueh of the pressure. In this conneetion it should be remembered that water expands on freezing, so that eaeh outer layer of ice as it forms tends to hold the ground off from the inner frozen ground.

A NEW PROVINCIAL GOVERNMENT CHEMICAL LABORATORY IN MONTREAL.

With the object of encouraging and helping the development of the mineral resourees of the Province of Quebec, the Honourable Mr. C. R. Devlin, Minister of Colonization, Mines and Fisheries, has eoneluded an arrangement with the corporation of the Polyteelnic School of Laval University, whereby in future the ehemical work of the Government will be done in the laboratories of this institution.

Prospectors and miners wishing to ascertain the value of ores and minerals can get assays, analyses and determinations of samples and specimens made at greatly redueed rates, and the well-equipped laboratories, as well as the staff of trained chemists, ensure prompt and reliable results.

Assays — for gold and silver — for copper — for iron, in specimens from the Province of Quebec, will be made for $1 each. The tariff of analyses of other substances is equally low.

If the interested finder of a mineral wishes only for the determination of a specimen, a report, giving name of mineral. its composition and possible commercial value will be sent upon the receipt of a nominal fee of 25 cents.

Copies of the tariff of the analyses of the various substances, with instructions how to sample a mineral deposit in the field so as to obtain the most reliable results in the laboratory, can be obtained by applying to the Provincial Laboratory, Polytechnic School, 228 St. Denis Street, Montreal, or to the Superintendent of Mines, Parliament Buildings, Quebec.

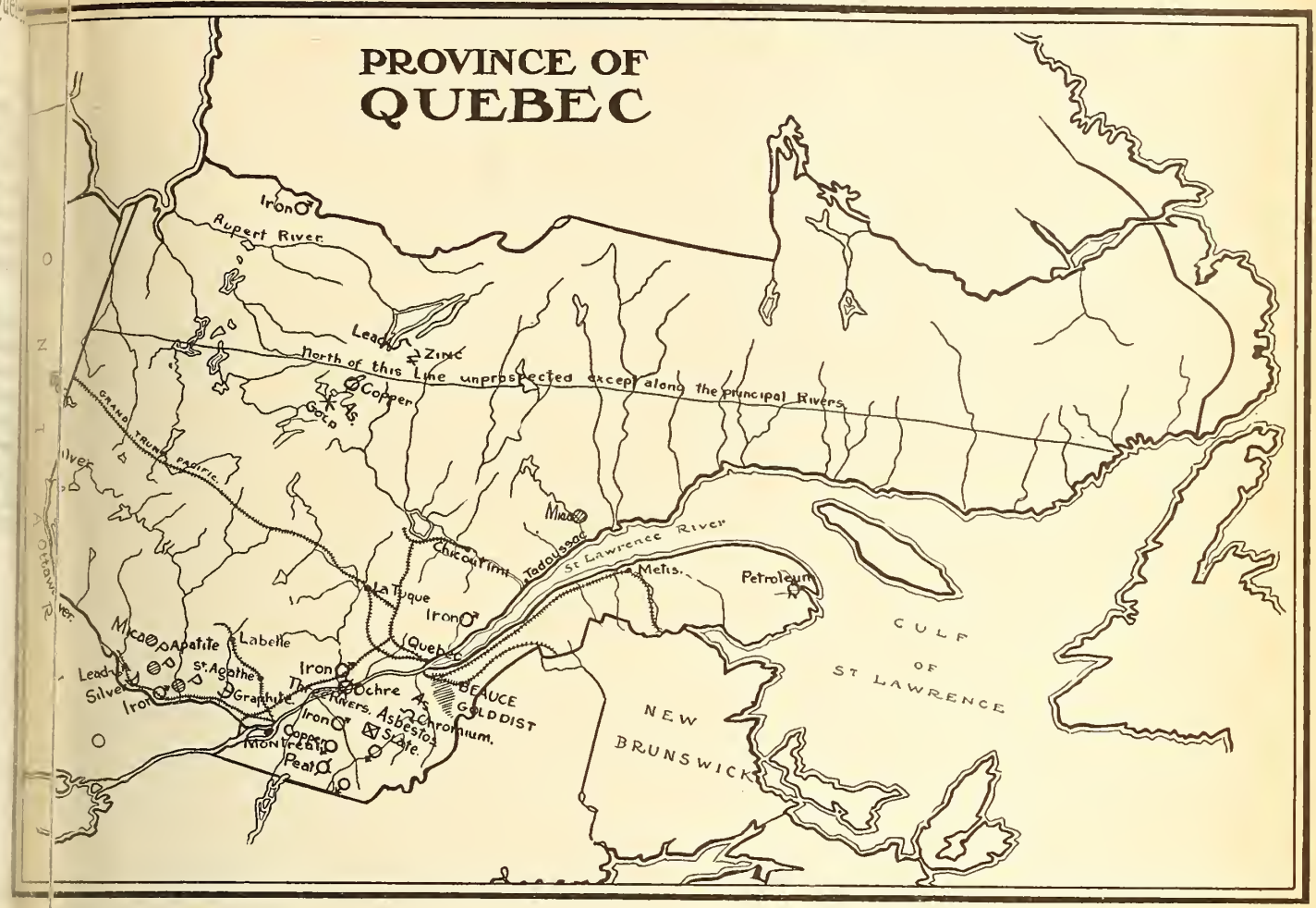
Mining News from Quebec.

(Special Correspondence.)

In the Eastern Townships of Quebec an unprec dented activity in mining is now reported. On th historic Seigniory of Rigaud - Vaudreuil the Dominio Gold Fields, Ltd., has taken over mining rights. Th photograph that accompanies this article shows tha company's elevator and stacker, the first of its kin in Canada. The complete plant is now in operatio Mr. J. R. Duckett, Beauceville, is the managing direc tor.

At Weedon, about 30 miles north of Sherbrooke, o the Quebec Central Railway, the East Canada Smel ing Company is working the MacDonald mine. Thi new field is similar to the well known Eustis deposit which have been worked for a long time by the Genera Chemical Company. The deposits of iron pyrites, wit which is associated copper pyrites, are in a belt tha extends through Weedon and Stratford township Mr. Leland D. Adam is superintendent of the Mac Donald mine.

Elevator and Stacker, Dominion Gold Fields, Ltd.



Mr. B. J. Bennett has been appointed manager of the new asbestos company that has recently acquired the old Ward-Ross mine at Thetford. The price paid was $710,000. A mill is under construction and the mine is being equipped.

* * * * *

The Quebec Mines Branch, of which Mr. Theo. Denis is superintendent, has been most active this year. Dr. J. A. Bancroft, a shining light in the younger firmament of geologists, is striving with the geological problems of the Kewagama and Keekeek Lake regions. Professor Dulieux is investigating the deposits of titaniferous iron ores in the lower St. Lawrence region of the province. He has already finished the examination of the St. Urbain deposits, which were worked 40 years ago. At present Professor Dulieux is working over Seven Islands, 300 miles below Quebec, where exist large bodies of titanium-bearing iron ores.

* * * * *

The Quebec Provincial Laboratory has been transferred to the Polytechnic School, Montreal.

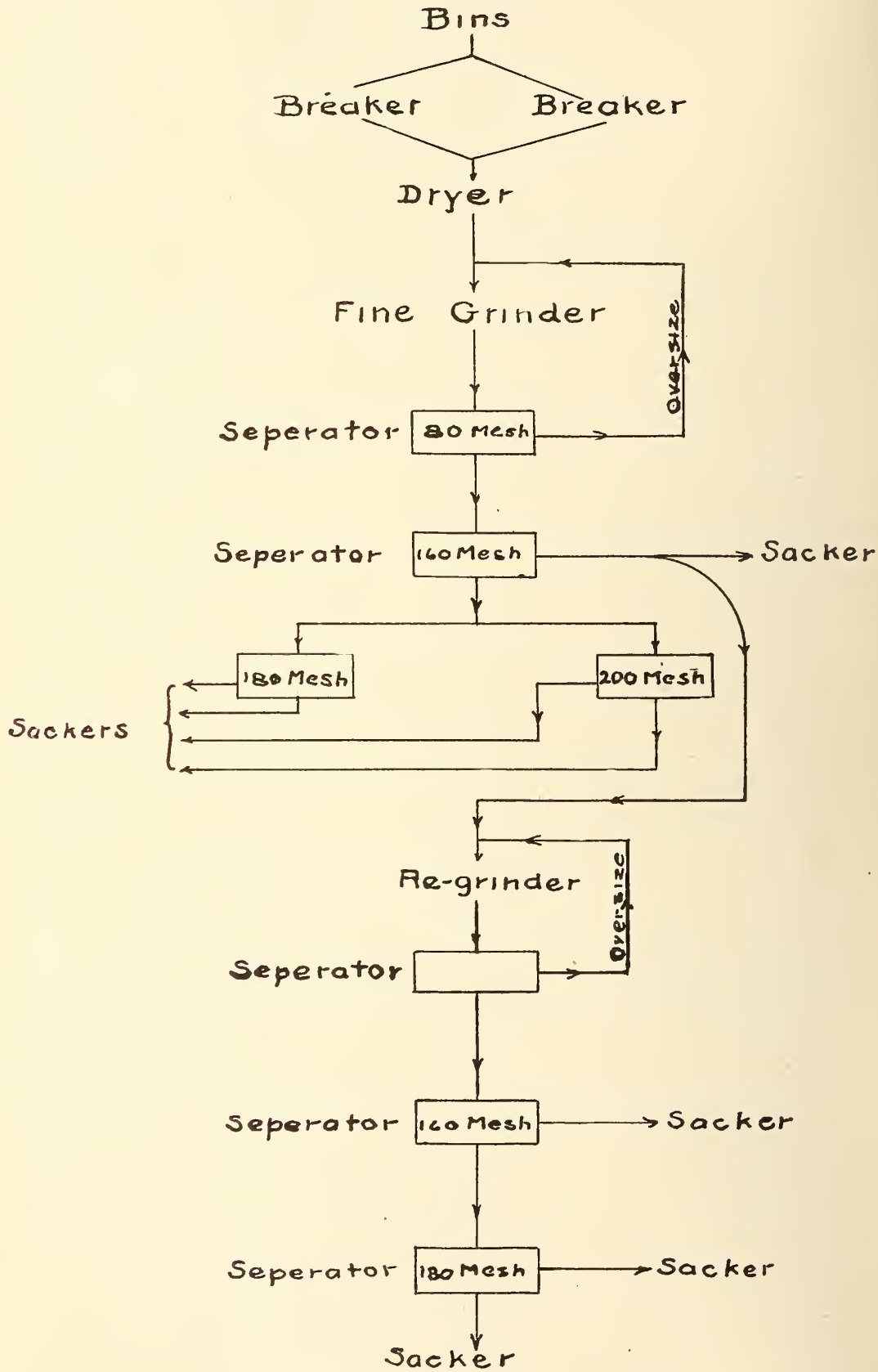
A CANADIAN TALC MILL

(Written for the Canadian Mining Journal.)

Three years ago there was no such thing as a talc-grinding mill in Canada. Shipments of crude talc were made from Madoc, Ontario, to the extent of between 1,000 and 1,500 tons annually. The grinding and marketing were done in the State of New York. As the profits on mining were low, the greater profit accrued to the New York mill owners.

Early in the year 1908, Mr. G. H. Gillespie, a Scotch mining engineer, took in hand the enterprise of equipping a suitable mill for grinding the Madoc talc. It took many months of trial and disappointment to hit upon the proper machinery. The question of grading for the market also gave trouble from the first. Both machinery and grading problems were solved, or, rather, are in constant process of solution. The main drawbacks were overcome early in the game.

The original building selected for the mill was an old, extremely substantial, warehouse, situated a few feet from the Grand Trunk Railway, and almost opposite the station. Alterations were effected and grinding machinery installed. Needless to say, the market had already been as closely investigated as circumstances would permit, and it was known that a foothold could be secured.


Bins
Breaker
Breaker
Dryer
Fine Grinder
Over-size
Seperator
80 Mesh
Seperator
160 Mesh
Sacker
180 Mesh
200 Mesh
Sackers
Re-grinder
Over-size
Seperator
Seperator
160 Mesh
Sacker
Seperator
180 Mesh
Sacker
Sacker

In the two photographs that accompany this article, it l be noticed that the mill consists of one large main tion, on lower ground, facing the track. The loading ite can be seen plainly. This building is the original rehouse. The large addition behind and all the aller accretions represent the growth in three years. e mill has grown with the business.

At first the total capacity of the plant was about five s of ground talc per day. The capacity now reaches tons per diem. Even this will have to be enlarged.

In grading, the finished products cover a very wide ge, all the way from material that soothes the irate ant to stuff that goes into the coarsest roofing. And s is the secret of commercial success—a system of ading that eliminates waste.

The amount of hard missionary work that was neces- y to break into the market was a very painful sur- ise to those interested. Once, however, the Madoc talc ame known, the obstacles of competition were not nd to be insuperable. At present Canada sends talc various grades to Great Britain, Europe, United ates, and even farther afield. In three years the larg- talc-grinding industry in the world has grown up nost unsuspected.

A rough flow-sheet, suggestive rather than exact, is en herewith. The massive talc is brought through

cessive stages of comminution until the finest possible sh is reached. Observe, when next the barber decor- es your face with talcum powder, the fineness of the bdivided material. The chance is fair that the com- rting stuff was once handled as ore at Madoc.

Virtue is its own reward. The conscientious reader of the *Canadian Mining Journal* will find in that invaluable paper, in the November 1st, 1907, issue, an article describing the Henderson talc mine—the mine from which comes all the ore supplies for Mr. Gillespie's mill. The mine is under the supervision of Mr. Stephen Wellington, a mining man who has contributed not a little to the development of mining in Eastern Ontario.

Mr. Wellington possesses the mining sense. He knows every outcrop of anything for miles around the country in which he operates.

From the aforementioned back number of the *Journal,* the following descriptive sentences may be quoted:—

"The shaft is 105 feet deep. It bottoms in clean "granular massive talc. Neither hanging nor foot wall "is visible to the deep, where the shaft is 25 feet wide "by 30 feet on the strike. . . . The shaft, or pit, "as it is more properly called, now opens about 40 feet by "35 feet at the mouth, and narrows down irregularly "to the bottom measurements mentioned before. . . . "The maximum width of the vein is about 36 feet. "This measurement is obtainable near the surface, "where, in the pit, the walls are visible. The strike is "north, 40 degrees west. The talc vein cuts across a "tilted deposit of dolomitic limestone. The dip is 80 "degrees south."

The above paragraph was written before the milling enterprise had been attempted. Since then a new, excellently-timbered, shaft has been sunk, and some hundreds of feet of underground work have been done. The amount of talc in sight is enormous. The principal difficulty in estimating it is in keeping within reasonable bounds. Hence the Madoc mill is in the enviable position of having an assured supply for an indefinite period.

A large and cheap supply of ore is not the only advantage that Madoc offers. Cheap hydro-electric power is used at the mill. This implies cleanliness and economy.

HE UNDEVELOPED IRON RESOURCES OF CANADA

By A. B. Willmott, Toronto, Ont.

Abstract of paper read at the Annual Meeting of the Canadian Mining Institute, Quebec, 1911.

We may now fairly assume that the iron and steel dustry is firmly established in this country. Although e steel companies are quite willing that the bounties ould be continued, it is evident from their prosperity at this continuation is not necessary. We may also firm that the system of giving direct grants to en- urage the establishment of basic industries in our country has been fully justified. These bounties have been paid for a term of several years, decreasing in amount each year, and finally terminating on December 31st last. Table 1 shows that the production of pig iron has steadily increased both in tonnage and value.

TABLE 1.

Annual Production of Pig Iron by Provinces, 1887-1909.

Year	Nova Scotia. Tons.	Nova Scotia. Value $	Ontario. Tons	Ontario. Value $	Quebec.		Total.	
1887	19,320	$ 250,000	.....	.....	5,507	116,192	24,827	366,192
1892	40,049	583,556	.....	.....	2,394	53,865	42,443	673,421
1897	22,500	230,000	26,115	$ 291,466	9,392	217,235	58,007	738,701
1902	237,244	2,477,767	112,688	1,584,273	7,970	181,501	357,902	4,243,541
1907	366,456	4,211,913	275,459	4,581,309	10,047	232,004	651,962	9,125,226
1908	352,642	3,554,540	271,484	4,385,271	6,709	171,383	630,835	8,111,194
1909	345,380	3,453,800	407,012	6,002,441	4,770	125,623	757,162	9,581,864

From Table 2 it further appears that there has been an equally encouraging increase in the production of steel.

TABLE 2.

Annual Production of Steel Ingots and Castings 1897-1909.

Calendar Year	Short Tons.
1897	20,608
1902	203,881
1907	706,982
1908	588,763
1909	754,719

It must further be noted that we have made some small exports of both pig iron and steel.

To those who have not considered the subject it will perhaps be a matter of some surprise to note that Canada now ranks eighth among the nations of the world in her production of iron and steel. We have still a long distance to go, however, before overtaking the seventh country on the list, namely Belgium, as shown in Table 3 below.

TABLE 3.

Production of Pig Iron in the Principal Countries of the World.

	1908	1909
United States	16,191,907	26,209,677
Germany	11,805,321	12,625,575
United Kingdom	9,202,280	9,819,469
France	3,400,771	3,544,638
Russia	2,800,653	2,871,332
Austria-Hungary	1,518,549	.....
Belgium	1,270,050	1,632,350
Canada	572,290	686,893
Swedeu	567,821	443,000
Spain	403,554	.....
Italy	112,924	207,800
China	66,409	74,000
Japan	45,396	.....
Australasia	30,393	.....

Notwithstanding this gratifying increase in our production of iron and steel we are still very far from meeting our own requirements. Our imports of manufactured iron and steel goods are still enormous, as shown in Table 4.

TABLE 4.

	1908	190
Imports of iron and steel subject to duty	$51,485,456	$33,08
Imports of iron and steel free of duty	10,334,242	7,31
Total imports	$61,819,698	$40,39

Many of these articles are highly manufactured we can hardly expect that their production should undertaken in Canada. The weight of these iron steel manufactures is largely unknown. Included, h ever, in the figures presented in Table 4 are a la number of partially manufactured products wh could be well made in Canada and of which the t nage is known. These are given in detail in Table

TABLE 5.

Imports of Some Iron and Steel Products of Wh the Quantities are Available.

Material	12 months ending Mch, 1908 Short tons	12 mo endi Mch, Short
Pig iron	212,290	58
Ferro-products and chrome steel	17,661	13
Ingots, blooms, billets, puddled bars, &c.	21,222	8
Scrap and scrap steel	69,213	26
Plates and sheets	126,172	101
Bars, rods, hoops, bands, &c.	98,631	69
Structural iron and steel	373,871	162
Rails and connections	52,706	32
Pipes and fittiugs	25,090	18
Nails and spikes	2,741	1
Wire	57,046	39
Forgings, castings, and manufactures	22,357	13
Total	1,079,000	545

Although a study of Tables 1, 2, and 3 shows t the production of iron and steel is firmly establish it must be admitted that there are some discourag features in the situation. Of the total quantity of required for Canadian furnaces in 1909, only 17 p cent. was of Canadian origin. All the furnaees in O tario and Quebec are dependent on imported coal coke, and two of them are using imported limesto As Ontario and Quebec are devoid of coal, the imp tation of fuel must be continued until such time as further development of the electric process of sm ing will enable us to substitute water power for a p tion of this fuel. These facts are unpleasant; but th should be faced and a serious attempt made to deve our own resources.

A study of the last available statisties shows t iron ore was produced in 1909 in only two of our p vinces, as shown in Table 6.

TABLE 6.

Production of Iron Ore by Provinces, 1908-9.

Provinces	1908 tons	1908 value	1909 tons	1909 val
Nova Scotia	11,802	$ 17,620	.....	.....
Quebec	10,103	22,094	4,150	5,
Ontario	216,177	528,475	263,893	653,
	238,082	568,189	268,043	659,

In 1910 conditions were somewhat improved by small production in both New Brunswick and No Scotia. Our steel industries in Nova Scotia utili nearly altogether iron ore from Newfoundland.

ast a considerable tonnage of ore has been raised Nova Scotian properties; but the cheapness of Newfoundland ores has virtually excluded the Scotian ore from the market.

Ontario and Quebec our furnaces have been sup- in part from Ontario ore and to a small extent Quebec ores; but much more largely by American om the Lake Superior region. This has been part to the cheapness with which American ores be secured, since they are not subject to an im- ax. It should further be noted that American oducers are willing to take contracts for the re- nents of the furnaces and to deliver ores of the ard agreed on. So far there have been practi- no producers of Canadian ore and those who offering to deliver ores were undertaking the ss in a most half-hearted way. Few of them were o accept any considerable contract and from the ness of their operations furnace men were afraid trust them with contracts. Moreover, the ore ced was apt to vary very much in grade and was ently not of an attractive character.

he of the iron and steel companies have been active in looking for Canadian ores and have large sums in the search. It must be confessed o far the results have been rather disappointing. companies have done little in this respect, prob- for the reason that their capital was required in ction with their iron and steel plants. Practi- no money is being spent in Ontario by independ- e companies, a fact, no doubt, partially attribut- o the smallness of the market. While there was y of 40 cents a ton on Canadian ore entering the ican market a producer of Canadian ore had few furnaces with which he might market the ore. Owing to the different grades required by the ent furnaces, and geographical conditions, it of- appened that only one furnace was available. It t surprising that miners have hesitated to em- in the production of iron ore with such a small et open to them. With the reduction of the ican duty to 15 cents a ton this cause is partially ed.

a number of the provinces there are no smelters, iron ore unless within reasonable distance of a ce is of no value. This observation particularly s to British Columbia, where a number of pro- g deposits are known, but where there is no in- e to development because of the lack of a mar- This is also true, though to a much lesser extent, e prairie provinces.

British Columbia.

roughout the coast region of this province nu- us deposits of magnetite are found which are in iron and low in phosphorus. These deposits at the contact of igneous intrusives with some entary rock, usually limestone. These deposits ery irregular in their outcrops and one cannot ct anything definite as to the size and shape of re bodies. They belong to deposits of the peg- e type and presumably have a greater extension pth than they have in either breadth or length. ully a series of outcrops is found along the line of ct varying from a few square feet in area up to sits one hundred and fifty feet wide and several red feet in length. Little is known as to their h, though several deposits have been opened by ls to a depth of one hundred feet. At the Paxton on Texada Island, the ore is exposed by a tun- nel for a width of seventy-five feet, at a depth of about five hundred feet from its highest outcropping on a hill above.

Most of these deposits carry a little sulphur in the form of pyrite or chalcopyrite. In many cases deposits of this type have sufficient copper value to make them attractive from this standpoint and they are operated as copper properties. With the increase in copper there is usually a decrease in iron contents. There are many deposits throughout the coast region too low in both copper and iron to be worked for either.

A long list of these properties is described in the various reports of the Minister of Mines for British Columbia; particularly in that for 1902. Lindeman describes a number of the more important ones. Among these may be mentioned the deposits on the Gordon River, Texada Island, Campbell, and Nimpkish Lake.

The average of all analyses on one of these groups of claims made by the writer yielded iron 56.135 per cent., sulphur 1.34 per cent., phosphorus .101 per cent. On another property the analyses averaged 60.98 per cent. in iron, 1.8 per cent. in sulphur, and .015 per cent. in phosphorus. The average of all analyses in three other private reports on different properties was as follows: iron 62.82 per cent., sulphur 1.54 per cent., phosphorus, .028 per cent.; iron 68.79 per cent., sulphur .35 per cent., phosphorus .056 per cent.; iron 61.47 per cent., sulphur. 67 per cent., phosphorus 021 per cent. The average of these different properties will probably fairly represent this class of ore. The average is iron 58.04 per cent., sulphur 1.14 per cent., phosphorus .044 per cent.

It is estimated by Hayes that these deposits contain at least thirty million tons of ore of present commercial grade and probably a considerably larger amount of low grade and deep ore not now available. My own opinion is that considering the frequency with which this type of deposit has been found in the small area of the province which has been prospected that the total tonnage ultimately available will be much larger than this estimate. Practically only portions of Vancouver and Texada Islands are included in this estimate. Similar deposits are known in the Queen Charlotte Islands and on the Chilcat River, in the extreme northern part of the province. The main land is also likely to show numerous deposits of this class.

Clay ironstones are known to occur in the Queen Charlotte Islands and on Vancouver Island in connection with the coal deposits; but at present are of no commercial value. Possibly they may be of some use in forming a desirable mixture when the smelting of the magnetite is undertaken. At several points deposits of bog iron ore are known and although very great claims have been made as to the value of these deposits I think they may be considered useless at the present time. Some bodies of hematite are reported on Vancouver Island and on the main land near Bute Inlet, but little is known of them. In southeastern Kootenay, at Kitchener and Bull River, deposits of hematite have been partially explored.

The lack of smelters in British Columbia and the Pacific coast of the United States has been a serious drawback to the development of the British Columbian ores. Without a market the mine owner was not warranted in spending money on the development of his property. Per contra, iron men have hesitated to establish furnaces until a sufficient quantity of iron ore was assured them. The coming summer will probably see an end

of this condition of affairs, as two companies are now proposing to establish iron furnaces in the province.

Prairie Provinces.

Throughout Manitoba, Alberta and Saskatchewan almost no iron ore of commercial value is at present known. Naturally in the prairie parts rocky exposures are few and moreover the conditions for the formation of iron ore deposits are absent. In the Pre-Cambrian area, which touches the north-western corners of Manitoba and Saskatchewan, iron deposits of the Lake Superior type will probably be found.

On the outer edge of the Rockies there are numerous occurrences of reddish shales of Triasic age, which in places carry considerable iron. Possibly some of these may yet prove of value as a source of iron ore.

Alberta, particularly on its west boundary, is very rich in coal of good coking quality. There is a large and ever increasing demand for pig iron in the three provinces for local foundry purposes. Such pig at present commands a very high price, due to the high freight charges on pig iron from the east. There does not, however, seem to be any available source of iron ore within these provinces; but the hematite deposits of south-eastern British Columbia, if properly developed, may yield sufficient ore for a furnace situated in the Crow's Nest Pass.

The iron ores already known, and which may be found, in north-eastern Manitoba and Saskatchewan are too far from a source of coke. With the development of the electro-thermic process for smelting iron ore these may, perhaps, become of value.

The Territories.

In the Yukon Territory occurrences of magnetite similar to those occurring in the coast region of British Columbia are known. Cairnes describes the Mack claim on the Hutshi River as "A small hill of almost solid iron ore about two hundred feet long." The Gilltana Lake claim consists of magnetite, with more or less chalcopyrite, as is so often found with these contact deposits.

On the head waters of the Wind, Bonnet Plume and Snake Rivers, tributaries of the Peel, Camsell describes large quantities of float consisting of banded jasper, with hematite or magnetite. On the Rackla, a tributary of the Yukon, Keele finds similar float in large quantities. Apparently around the head waters of these streams there is a large area carrying banded jaspers similar to the Lake Superior type. The iron ore is of course of no commercial value at present and consequently no exploration has been undertaken.

Several occurrences of magnetite and hematite are reported on the islands of the archipelago in the district of Franklin.

In the district of MacKenzie specular hematite is reported to be found in the vicinity of Great Slave Lake. In the territory of Keewatin, magnetite, apparently of the Lake Superior type, is found near Knee Lake. On Berrens River, a magnetite of similar character is reported by Low. There are probably very numerous occurrences of the Lake Superior type stretching far to the north-west through the province of Keewatin. Close examination has not yet been made of this large area.

On Sutton Mill Lake, an expansion of Trout River, south of Hudson Bay, there is an exposure of the Animikie rocks similar in character to those at the west end of Lake Superior. Dowling reports the occurrence of jaspilite interbanded with hematite and magnetite, as in the region around Port Arthur. The deposit observed by him occurs in narrow beds, the iron running fr[om] 6[5] per cent. down to 28 per cent. It would seem pr[o]bable that careful examination of these areas might lead t[o] discovery of iron ore of commercial value. The d[e]posit is seventy miles from Hudson Bay.

In the territory of Ungava, banded jaspers are k[nown] in considerable quantities, and commercial ore ma[y] be found. Leith, Low, and Mickle, together with o[thers] have visited and described these rocks. The Nast[apoka] group consists of chemical and mechanical sedi[ments] closely related in appearance to the Animikie ro[cks] the Lake Superior basin. Interbedded with the [slates] and sandstones of this group are beds of jaspilite [from] to one hundred feet in thickness. In these bed[s] occasional concentrations somewhat richer in iron[ore]. In the natural exposures few cases are found wher[e] than half of the beds are rock and even of the ba[nds] there is considerable silica mixed with the iron[ore]. There are two types of occurrence, one of siliceous h[ema]tite or magnetite ore, and the other manganiferou[s] bonate ore. In both cases the local enrichment do[es] extend more than a few hundred feet in length or d[ip] dip of the beds. The similarity of geological occur[rence] and of the enclosing rocks on the Nastapoka Island[s] in the Mesabi district of Minnesota is striking. Wh[ether] commercial ore bodies will yet be discovered in t[he] former can only be told by extensive exploration.

One hundred and twenty-five miles south of U[ngava] Bay, in the valley of the Koksoak, there is an occur[rence] of rocks apparently of Animikie age. For seve[ral] miles these rocks are exposed along the river valley [from] Shale Falls to the mouth of Swampy-Bay River. L[ow] describes the ore-bearing portion of these rocks as [alter]nating bands of magnetite and jasper in close prox[imity] to cherty limestone. Analyses of the ore run fr[om] per cent. to 54 per cent. in metallic iron. On the na[tural] exposures from which these samples were taken th[e ore] is hardly of high enough grade to be of comm[ercial] value. Such as it is Low states that "The ore in [sight] must be reckoned by hundreds of millions of tons."

On the Ashuanipi branch of the Hamilton River, [one] hundred miles due north of the Seven Islands, o[n the] north shore of the St. Lawrence, there is an occur[rence] of similar rocks. Through faulting four different [belts] of these rocks are exposed. The ore formation co[nsists] of banded magnetite or hematite, with jasper and c[herty] limestone. Assays of natural outcrops showed [iron] varying from 30 per cent. to 40 per cent. Low [states] that "The deposits are widespread and that the or[e will] be found in practically inexhaustible quantity." T[he] striking similarity of these last occurrences to se[veral] of the iron ranges of the Lake Superior district [must] be noted. Whether natural concentration of these [ores] has taken place can be proved by careful explor[ation]. The large area over which the occurrences are f[ound] renders it probable that in some cases concentration [will] have occurred.

On the Stillwater River, in Ungava, Low repo[rts] large area of iron-bearing ore in gneiss. Beds of in[ferior] iron ore are also reported from the shore of Hu[dson] Strait.

Ontario.

The iron ores of Ontario have been the subje[ct of] numerous papers and for that reason only a brief [sum]mary will be given here. From the standpoint o[f the] present demand for iron ore the deposits of Ontari[o are] the most important in the Dominion and consequ[ently] are not receiving the space in this paper which [their] commercial importance would warrant. A consider[able]

more remote portions of the Dominion has, how- taken so much time that I shall content myself y referring the interested readers to other papers. eleventh volume of the journal of this institute, ished a paper on the iron ores of Ontario, which rized fairly well the known occurrences of iron Ontario. To those seeking more detailed informa- would refer to the index to the reports of the u of Mines of Ontario, 1891-1907.

Iron ores of the magmatic type are represented in On- by deposits at Nemogosenda, on the Canadian Railway; at Bushnell, on the Temiskaming and rn Ontario Railway; at Gooderham, on the Iron- Baneroft and Ottawa Railway, and elsewhere. All se ores are magnetite and most of them are con- ted with more or less titanium and frequently ulphur. That at Nemogosenda has been worked ar, and some others have been worked in the past. yrrhotite of Sudbury, which carries the Ontario belongs to this type.

The Pegmatite type is represented by such properties Belmont, in Central Ontario. This is a magnetite, phosphorus, high in iron and with some sulphur. nber of deposits of a similar type are known h Eastern Ontario.

The Vein type is represented by a number of small nimportant deposits occurring in the quartzites lower Huronian, north of the Georgian Bay. De- of this kind are known in Aberdeen Township, Algoma Mills, and in the vicinity of Killarney.

The Carbonate type is represented by the siderite of ian age occurring on the Opazitika, in Northern o. Deposits of siderite of Keewatin age are found Helen Mine, Josephine Mine, Magpie Mine, in chipicoten district, and at Steep Rock Lake, in the River district. These siderites run around 35 per n iron, are very low in phosphorus, and with some r. They exist in considerable amounts and on g would yield a fairly good ore.

The most important ores of Ontario belong to the Lake or bedded type. They are restricted almost en- to beds of Keewatin age and occur at scores of throughout the province from the Manitoba ary to the Ottawa River. The different ranges been described by Miller, Coleman and Willmott, an, Miller, Leith, Smith, Bell, Silver, Coleman, an and Moore, MacKenzie, Moore, Allen. The for- consists of chert or jasper interbanded with te, magnetite, siderite, or pyrite. These beds are standing vertical and their total length within province must amount to several hundred miles. The ity between these ranges and the Vermilion iron of Minnesota is very close. Natural concentra- re to be looked for in these iron formations, and e, if found, will likely be deep. Comparatively xploration has yet taken place on these Ontario . It is probably safe to assert that there has been xploration on the twenty-three miles of the Ver- iron range than on the several hundred miles in o.

There are four producing mines in Ontario located s class of deposit, namely: the Helen, Magpie, an, and Moose Mountain mines. At least three properties have been drilled, with satisfactory re- but have not yet been opened up.

Limonite type is represented by a number of bog eposits in the older parts of the province, which een slightly exploited in years gone by. Some de- posits of this character in the Metagami Valley are the subject of a paper before the institute this year.

The Metamorphic type is represented by many of the magnetite deposits along the Kingston and Pembroke Railway, which have been described by Ingall. Other deposits of this character have been worked along the lines of the Central Ontario Railway and the Iron- dale, Baneroft and Ottawa Railway.

Quebec.

Iron ores of the Magmatic type are of frequent occur- rence throughout the province of Quebec. Deposits at Bay St. Paul, Seven Island, St. Jerome, St. Lin, Lake Kenogami, and on the Chaudière are described by Ellis. Many of these deposits are of large size and some of them are high in iron, all of them carry titanium and many of them in large amounts.

Deposits of the Beach Sand type are also of frequent occurrence in the province. They are particularly abundant along the shores of the St. Lawrence, where they occur in beds from six inches to two feet in thick- ness. Among the more important are those at Moisee, Mingan, Bersimis, Tadousac, which are described by Ellis.

Bog ore deposits are widely scattered throughout the province, and have been mined in small quantities for many years. In the district of Three Rivers small fur- naces have been at work for a long time using the local ore supplies. Bog ores have been mined in Drummond and Vaudreuil Counties.

Ores of the Lake Superior bedded type do not seem to have been recognized to any large extent. Their occur- rence has been noted on Lake Opazitika, on the boundary between Ontario and Quebec, and also near Lake Megan- tic, in the south-eastern corner of the province. As there are numerous areas of the Keewatin rocks through- out Quebec (usually mapped as Huronian in the Geological Survey reports) there is every reason to think that with proper prospecting many occurrences of this type will be found.

Ore of the Pegmatite type is found at a number of places, particularly in the counties of Pontiac and Ot- tawa. The Ironside Mine and the Bristol Mine have both produced a small amount of magnetic ore. Throughout the Eastern Townships a number of magne- tite deposits are known in the townships of Brome, Sut- ton, St. Armand, and near Sherbrooke. These prob- ably belong to the Metamorphic type.

A number of deposits of chromite are known in the Eastern Townships and some production takes place an- nually. They have been described by Cirkel.

New Brunswick.

During 1910, iron mining in New Brunswick has taken on a new lease of life. This is due to the discovery and exploitation of some large deposits of iron ore near Bathurst by the Canadian Iron Corporation. These ores were described by Hardman before the institute two years ago. There are three separate areas, one of them two thousand one hundred and forty feet long proved to a depth of five hundred feet by drilling. Mr. Hardman estimated that half of these beds would aver- age 53 per cent. iron and not over 15 per cent. silica; phosphorus would be high, possibly .75 per cent. The second area after hand sorting was expected to yield a product 58 per cent. in iron, 10 per cent. silica, 0.88 per cent. phosphorus, and 0.055 per cent. sulphur. During the past year the property has been opened and machin- ery installed for the production of one thousand tons

of crushed ore per day. A railway has been built and a dock completed at Newcastle, New Brunswick. Seven thousand tons of ore were shipped before the close of navigation. This ore belongs to the Lake Superior bedded type and seems closely related in origin to the deposits at Moose Mountain and Atikokan, Ontario.

Years ago some iron ore was mined in the county of Carleton and smelted locally. The ore is a hematite, occurring in numerous veins, one to sixteen feet in width. The ore was very low in iron and high in sulphur and phosphorus, and the enterprise failed. Some small deposits of hematite are known in St. John County and some magnetite deposits in St. John and Carleton Counties. These latter deposits have been described by Bailey. Bog ore is of frequent occurrence throughout the province, but is not at present utilized.

Nova Scotia.

Years ago Nova Scotia produced considerable iron ore; but the output diminished until it reached the vanishing point. Last year, however, witnessed a moderate revival of shipments. This decrease has been due to the ease and cheapness with which our eastern steel plants can procure suitable ore from Newfoundland.

The iron ores of Nova Scotia have been the subject of an exhaustive monograph by Woodman, published by the Mines Branch of the Department of Mines at Ottawa. According to Woodman, the Nictaux-Torbrook Basin is the most important and promising field in the province. The ores are Clinton hematites, and bedded magnetites metamorphosed from it. The ores occur in two zones striking north-east. On the north one are two ore bodies, the Leckie and the Shell, of economic value. The ores run 44 per cent. to 49 per cent. iron, 15 per cent. to 17 per cent. insoluble, .7 per cent. to .9 per cent. phosphorus, and sulphur nearly .01 per cent. The ore is used largely at Londonderry for mixing with local limonite and carbonate. The Clementsport district is regarded as a promising field for exploration. In Antigonish County are other Clinton hematites, which may be of value.

Along the Cobequid Hills, in Cumberland and Colchester Counties, there are many isolated localities, in the Devonian, where siderite and ankerite occur. In places these have altered to oxides at the surface, but rapidly changed into the unaltered carbonate in depth. Acadia Mines has been intermittently active for years as a mining and smelting centre. The ore is very low in phosphorus and sulphur and exceedingly low in iron.

Summary.

No estimates of the amount of available iron ore in Canada have been made by any of the various Governmental officials. In a report by Hayes on the Conservation of Natural Resources in the United States, an estimate is made of the iron ores in the countries adjoining the United States. The estimate is there made of available ore as follows: British Columbia, thirty million tons; Ontario, nine million tons; Nova Scotia, four million tons; total, forty-three million tons. This I would consider a sufficiently high figure for ore already known. At the same time the possibilities and indeed probabilities are so great that a much larger tonnage must be considered as likely to be found. The Lake Superior type of bedded deposit is known to occur in the extreme north-west of our country in the Yukon Territory and in the south-east in New Brunswick, a distance of twenty-eight hundred miles. At numerous points between these extremes, Keewatin rocks of the great Archæan shield are known to occur, and in every case where these have been carefully searched for iron formation has been found. In far from all of these occurrences will the iron formation be productive of commercial ore, but we have every reason to believe that with careful and detailed exploration many of them will. It is true that large areas at present are so far from transportation that they cannot be considered as possible sources of iron ore for years to come.

On either side of the shores of Hudson Bay Archæan rocks are found much as they border the sides of Lake Superior. Already, with a most limited amount of exploration, we know that rocks of Keewatin and Huronian age are found bordering the shores of this inland sea and that these series of rocks carry iron formations just as they do around the basin of Lake Superior. Sixty years ago the production of iron ore on Lake Superior in the quantity in which it is produced to-day would have been looked on as an utter impossibility. It was urged that the district was so remote from supplies of coal that the ore even if found could not be profitably smelted. With the tremendous cheapening of transportation this has proved to be a false prophecy, and it is quite possible that water carriage from Hudson Bay may yet solve the transportation problem for that great region. It should further be remembered that Hudson Bay itself is navigable for quite as long a period each year as Lake Superior.

In considering the possibilities of our great northern areas it would be well, also, to bear in mind what has been accomplished in Sweden during the last few years. Some of the largest deposits of iron ore in the world are now being mined in that country within the Arctic Circle. Geologically these ores occur in the Pre-Cambrian rocks found to such a large extent in our own country. The exact equivalent in type of ore deposit is at present not known here; but it is quite within the bounds of possibility that such may yet be found.

The Clinton ore deposits, which yield such a large portion of iron ores of the United States, occur but to a limited extent in Canada, and cannot be looked upon as probable large producers. In Newfoundland, however, two of our eastern steel companies have very large iron ore reserves in beds of this type.

Editor's Note:—In the original paper reference numbers are affixed to each author mentioned. These are omitted in the above abstract.

MINING RIGHTS IN QUEBEC SEIGNIORIES

The last title to a Quebec seigniory was issued in 1762, under the French regime. All mining rights, all except a few seigniories were reserved to the Crown. After the British occupation in 1763, the townships were granted or sold with reservation of mineral rights. Thus, on concessions of lands made before 1763 the Crown still possesses the mining rights; whilst on lands patented between 1763 and 1880 the mining rights belong to the surface owners, except for gold and silver, which were always specifically reserved.

The provision as to seigniories affects 11½ million acres, and hence is of some importance.

SOME COAL MINING DATA

Excerpts from the Provincial Mineralogist's B.C. review of "Coal Mining in the Province."

The following table shows, for the past four years, the output and the *per capita* production of the various districts:—

Year and District.	Gross tons of coal mined.	Total No. of employees at colliery.	Tons of coal mined per employed	No. of men underg'd.	Tons of coal mined per underg'd employee.
1907—					
East Kootenay District	876,731	2,290	383	1,527	574
Coast District	1,342,877	3,769	356	2,862	469
Whole Province	2,219,608	6,059	366	4,389	506
1908—					
East Kootenay District	883,205	2,524	350	1,746	506
Coast District	1,226,182	3,549	345	2,686	456
Whole Province	2,109,387	6,073	347	4,432	476
1909—					
East Kootenay District	923,865	2,427	380	1,737	532
Coast District	1,476,735	3,991	370	2,976	496
Whole Province	2,400,600	6,418	374	4,713	509
1910—					
East Kootenay District	1,365,119	3,111	439	2,374	575
Coast District	1,774,116	4,647	382	3,529	502
Whole Province	3,139,235	7,758	404	5,903	532

It will be seen from the above that the production employee' has materially increased, particularly in last year. This increased effectiveness of the labour loyed is largely due to better methods, better equipt, and greater volume of output.

During the year 1910 there were 404 tons (2,240 of coal mined per employee, or 532 tons for each erground employee. According to the 'Report of the pector of Coal Mines for the State of Washington,' ppears that in the mines in that State there was ed in 1909 3,205,900 long tons (2,240 lbs.) of coal 90,639 tons of 2,000 lbs.), with a *per capita* proion of employee equal to 560 long tons per annum; e in 1910 each employee represented 590 long tons luction, or an output of 3,553,200 tons (2,240 lbs.). m this it appears that the effectiveness of the emee is greater in Washington than in British Colum--whether due to the nature and occurrence of the seams, equipment, or other causes is not known.

It is, however, to be noted that this increased *per ta* production has been obtained at a greater list ccidents than in British Columbia mines, as in hington there was 92,548 tons (2,000 lbs.), or 82,632 of 2,240 lbs., while in British Columbia there was ed some 112,116 tons (2,240 lbs.) for each life lost."

he next table gives analyses of accidents in British mbia coal mines in 1910:—

"The gross output of coal for the year was 3,139,235 tons (2,240 lbs.), which represents an increase over that of the year 1908 of about 48.8 per cent., and over that of 1909—formerly the 'banner year'—of about 30.7 per cent.

"Of this gross tonnage of coal mined, 2,800,046 tons was used as coal, while 339,189 tons was utilized in making coke, of which there was produced 218,029 long tons.

The total value of the product of the collieries of the Province for 1910 was $11,108,335, an increase over the highest previous record—that of 1909—of $2,533,451, or nearly 130 per cent.

"As in former years, the greater proportion of this product was made by three larger companies—the Crow's Nest Pass Coal Co., with two collieries in East Kootenay, and the Western Fuel Co., of Nanaimo, and the Canadian Collieries (Dunsmuir), Ltd. (formerly the Wellington Colliery Co.), both operating on Vancouver island.

"In addition to these larger shippers, appreciable shipments were made by the Hosmer Mines, Ltd., and the Corbin Coal and Coke Co., in East Kootenay, by the Nicola Valley Coal and Coke Co., the Diamond Vale Collieries, and the Coal Hill Syndicate, all of Nicola valley; and by the Pacific Coast Coal Mines, Ltd., and the Vancouver and Nanaimo Coal Mining Co., both operating on Vancouver island, near Nanaimo.

	No. of accidents per 1,000 men employed.				Tons of coal mined per accident.			
	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.
East Kootenay District	5.46	15.75	5.78	27.00	80,301	27,860	75,840	16,251
Coast District	2.36	9 89	10.32	22.59	161,283	38,568	36,961	16,896
Total Province	3.61	12.24	8.51	24.36	112,116	33,044	47,564	16,610

"During the year 1910 about 51.3 per cent. of the coal, sold as such, produced by the collieries of the Province, was consumed in British Columbia; about 46.2 per cent. was exported to the United States, including Alaska; and 2.5 per cent. was exported to other countries, chiefly to Mexico. Of the coke sold, about 96 per cent. was consumed in British Columbia, and the remainder was exported to the United States." (Note by Ed.—In 1908, 19 per cent., and in 1909, 19 per cent of the output of coke was exported to the United States.

The distribution of this output of coal and coke is shown in the next table, which is followed by another showing the number of employees at the coal mines and coke ovens.

Coal and Coke Produced, Exported, Etc.

Sales and Output for 1910. (Tons of 2,240 lbs.)	Coal		Coke	
	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	1,238,439	.....	213,274	.....
Sold for export to United States	1,114,809	.....	8,730	.....
Sold for export to other countries	60,290	.....	.....	.....
Total sales	.....	2,413,538	.....	222,004
Used in making coke	339,189	.....	.....	.....
Used under colliery boilers, etc.	206,871	.....	79	.....
Lost in washing	146,277	.....	.....	.....
Total for colliery use	.....	692,337	.....	79
		3,105,875	.....	222,083
Stock on hand first of year	36,290	.....	17,109	.....
Stock on hand last of year	69,650	.....	13,055	.....
Difference added to stock during year	.....	33,360	.....	*4,054
Output of collieries for year	.....	3,139,235	.....	218,029

By-products—Clay—4,535 tons.
*Taken from.

Number of Hands Employed.

Character of Labour.	Underground. No. employed.	Above ground. No. employed.	Totals. No. employed.
Supervision and clerical assistance	133	97	230
Whites—Miners	3,003	..	3,003
Miners' helpers	619	..	619
Labourers	1,085	481	1,566
Mechanics and skilled labour	798	626	1,424
Boys	143	63	206
Japanese	24	25	49
Chinese	95	548	643
Indians	3	15	18
Totals	5,903	1,855	7,758

The Porcupine Gold Area

(Extracts from report by A. G. Burrows, Ontario Bureau of Mines.)

Character of the Gold-Bearing Deposits.

The occurrence of gold at Porcupine is associated with the quartz solutions which circulated through the fissures in the Keewatin and Huronian series. The irregular fissuring has produced a great variety of quartz structures, varying from the tabular, though often irregular or lenticular, vein which may be traced several hundred feet, to mere veinlets, often only a fraction of an inch in width and a few feet in length, which ramify through a rock that has been subjected to small irregular fissuring. This latter variety is well illustrated in the fissuring of ankerite bands, so characteristic of many of the gold deposits of Porcupine. Irregular and lenticular bodies of quartz often occur which may have a width of ten or twenty feet, which die away in a distance of fifty feet. Again there are dome-like masses of quartz which are elliptical or oval in surface outline, but whose underground extension has not been examined closely. In some parts at least these masses can be seen in contact with underlying rocks at a low angle, which would suggest that they are broad lenticular masses which have filled lateral fissures in the country rock. The most conspicuous dome masses are those of the Dome property where the two largest are about 125 feet by 100 feet. A fissure may be vertical and regular at some points. At others it may incline at a lower angle to the ho-

l or take on a more or less lenticular form.

e relationship of the strike of the veins to that of the nclosing rock is often difficult to determine, since generally along the veins there has been shearing of the country rock which may conform to the general direction of the strike of the veins. However, by determining numerous strikes in the schist away from the veins, it is seen that the majority of them are inclined to the direction of strike of the enclosing rocks. In dip the veins vary from vertical to nearly horizontal. In No. 1 shaft of the Hollinger the vein is practically vertical, while a series of narrow quartz veins, 6 to 18 inches wide on the Lindburg claim, have a dip at the surface of only 20 degrees. The prevailing dip of the schist in the Porcupine area is to the north at high angle, and frequently the veins dip distinctly to the south across the cleavage of the schist. While it is apparent that most of the deformation of the country antedates the vein formation, nevertheless there is a decided tendency in many cases for the fissuring to be influenced by the direction of schistosity, which is also a direction of weakness; hence we find veins having a more or less lenticular structure the strike of which closely corresponds to that of the country rock.

Distribution of Veins.

While gold-bearing veins occur over a wide area and are often isolated, it is seen, from a number of those already discovered, that they occur in groups along certain lines. For instance, in Tisdale Township there are at least three distinct areas where the fissuring has been most pronounced. One such area extends from the southeast end of Miller Lake, on lot 11 in the first concession, in a northeasterly direction for three miles, and includes such veins as the Miller-Middleton, Hollinger, McIntyre, and Connell or Rea, and in addition many others with visible gold. The average strike of the veins here is **northeast-southwest.** Another series, including the Davidson, Crown-Chartered, Armstrong-McGibbon, and Bannerman (in Whitney), occurs in the northeast part of the township in the first concession. The general direction of the veins is east and west. Again in the southeast part of the township is a group including the Foster, Dome, and Dome Extension, with general strike somewhat south of west. Similar groupings could be mentioned in other parts of the area.

In these disturbed zones the country rock is generally schistose in character. At the Dome mine the disturbed area has a width of about 600 feet, in which there are numerous narrow quartz veins in addition to large irregular quartz masses.

Well defined, disturbed zones occur in the fifth concession of Tisdale. In this locality the main rock is a light greenish, fine-grained. rather massive greenstone. This greenish rock is itself not much fissured, but here and there through it are bands of rusty-weathering carbonate, which is generally schistose, striking east and west. I think that much of the carbonate associated with this greenstone is of secondary origin. It is possible that the shattering and fissuring of the greenstone in an east and west direction may have caused a deposition of migrating carbonate solutions, partly filling fissures and partly replacing the greenstone. These carbonate bands were later fissured, and gold-bearing quartz solutions deposited in them. The fissuring of the carbonate is generally irregular, and hence we find veins with steep or low dip striking with the schist and across it. This irregular series of veins is seen at the Crown-Chartered and Armstrong-McGibbon properties. Where the veins are small, it becomes necessary to mine both the carbonate and the intersecting quartz veins. Gold often occurs in the carbonate near the contact with the quartz veins, as well as in the quartz.

Distribution of the Gold.

While the quartz is considered to carry the gold, it was noted at many properties that the metal occurs in greatest quantity along certain lines which give a streaky character to the ore. On the surface these streaks are rusty, due to the oxidation of pyrites, while at depth they are dark gray or greenish in colour.

Thin sections of quartz from the main Hollinger vein show grains of quartz with irregular outline, which often contain liquid and gas inclusions. There has also been much secondary pressure, indicated by strain shadows or wavy extinction, and along lines of slip or fracture planes there has been much crushing of the quartz to finer grains. In these crushed areas are secondary minerals like calcite, sericite, etc., while iron pyrites is also present in cubical form and has evidently crystallized, subsequent to the crushing.

Some thin sections from the Rea mine main vein also show much secondary crushing along lines. Calcite and sericite are present in the crushed quartz generally in linear arrangement, and in addition there are several rough crystal outlines of free gold which were formed subsequent to the crushing.

These fine dark streaks may have resulted from a solidification and shrinkage of the quartz forming filmy cracks, which may have become slip or crushing planes along which the richer gold-bearing solutions were deposited at a later period.

These minute dark streaks in the quartz are frequently slickensided, and this character may often be seen in hand specimens, as from the Rea or Vipond mines.

It should be noted that where cracks or fracture planes have been produced in a quartz vein and subsequently filled by minerals from solution, secondary quartz can be distinguished with difficulty, if at all, from the original quartz. Hence it is not always possible to say whether visible gold in such a vein occurs in the original or in secondary quartz.

Carbonates of lime, magnesia, and iron occur with the quartz in practically all the veins in the area. This material may have been absorbed from the wall rock, which is frequently dolomite or rock impregnated with dolomite or calcite. Fragments of country rock are often included in the veins. Veinlets of clear calcite occasionally cut the quartz veins.

The distribution of the gold is generally irregular, occurring along one or both walls, while other portions of the veins may be very low grade. Most spectacular showings occur on many properties, but these are limited to portions of the veins. Considering the irregular character of certain veins and the quantity of country rock which will need to be mined, the ore must be considered low grade

Iron pyrites occurs in massive and crystallized forms, somewhat sparingly in most of the veins. Cubes of pyrites are frequently abundant in the enclosing rocks, especially where sericite or dolomite schist occur. A sample of cube pyrites was separated from the schist, obtained from a shaft of a principal property, and an assay gave a gold content of $10.40 per ton.

Copper pyrites, galena, zincblende, and pyrrhotite are found in some veins in very minor quantity. Sulphide of silver, argentite, occurs in association with the gold on the Powell property in Deloro township.

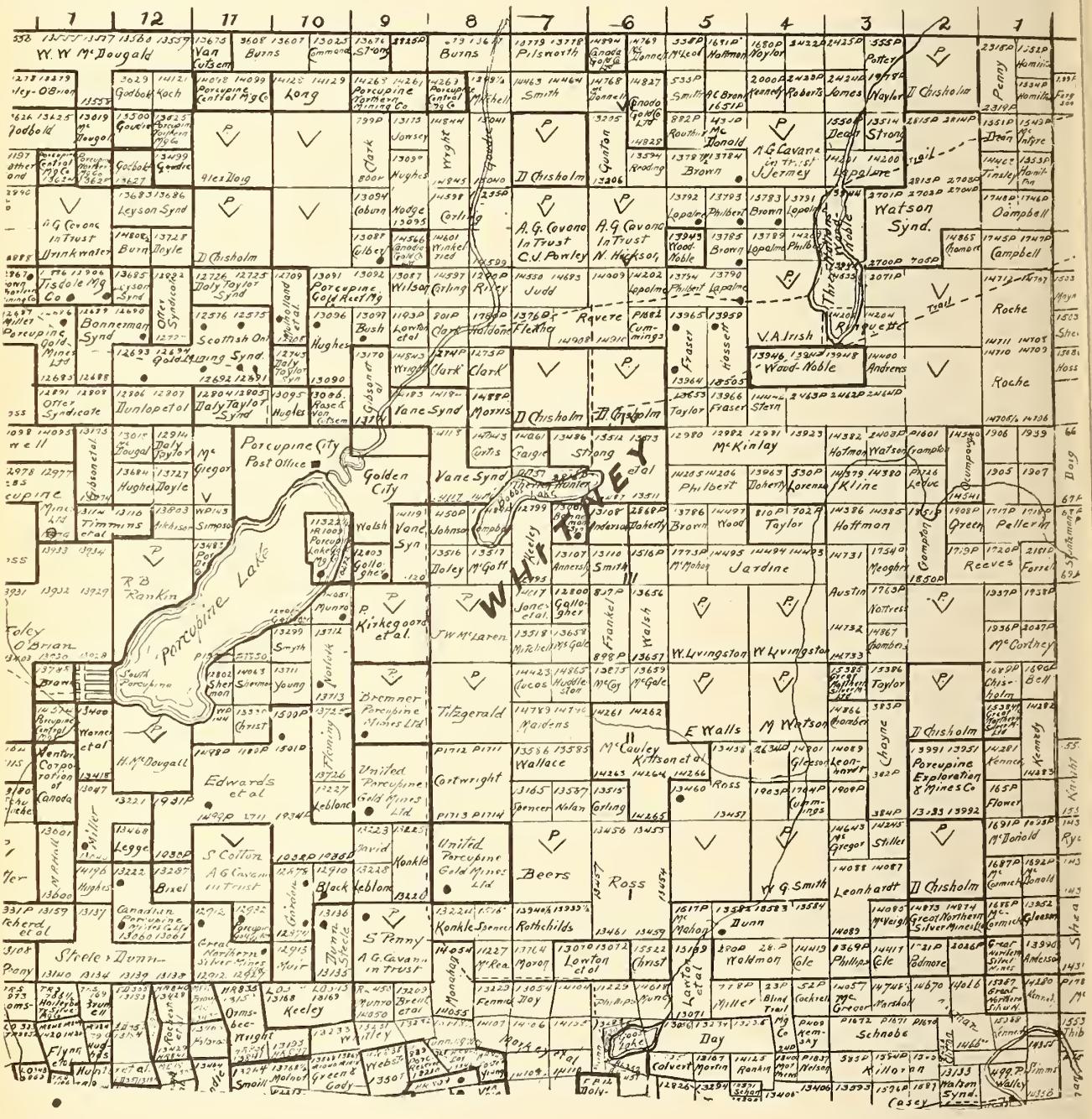
It will be seen from an examination of the ore from most of the properties that it is largely free milling, while the concentrates should be amenable to cyanide treatment.

Little is said in this report as to actual values of properties, since their sampling is the prerogative of their owners. Many samples were taken for assay, rather for the determination of the distribution of the gold, which was found to be irregular and to be associated with the secondary fracturing of the quartz (and schist) in many cases. The determination of the value of properties is a matter requiring considerable development accompanied by extended sampling and mill tests.

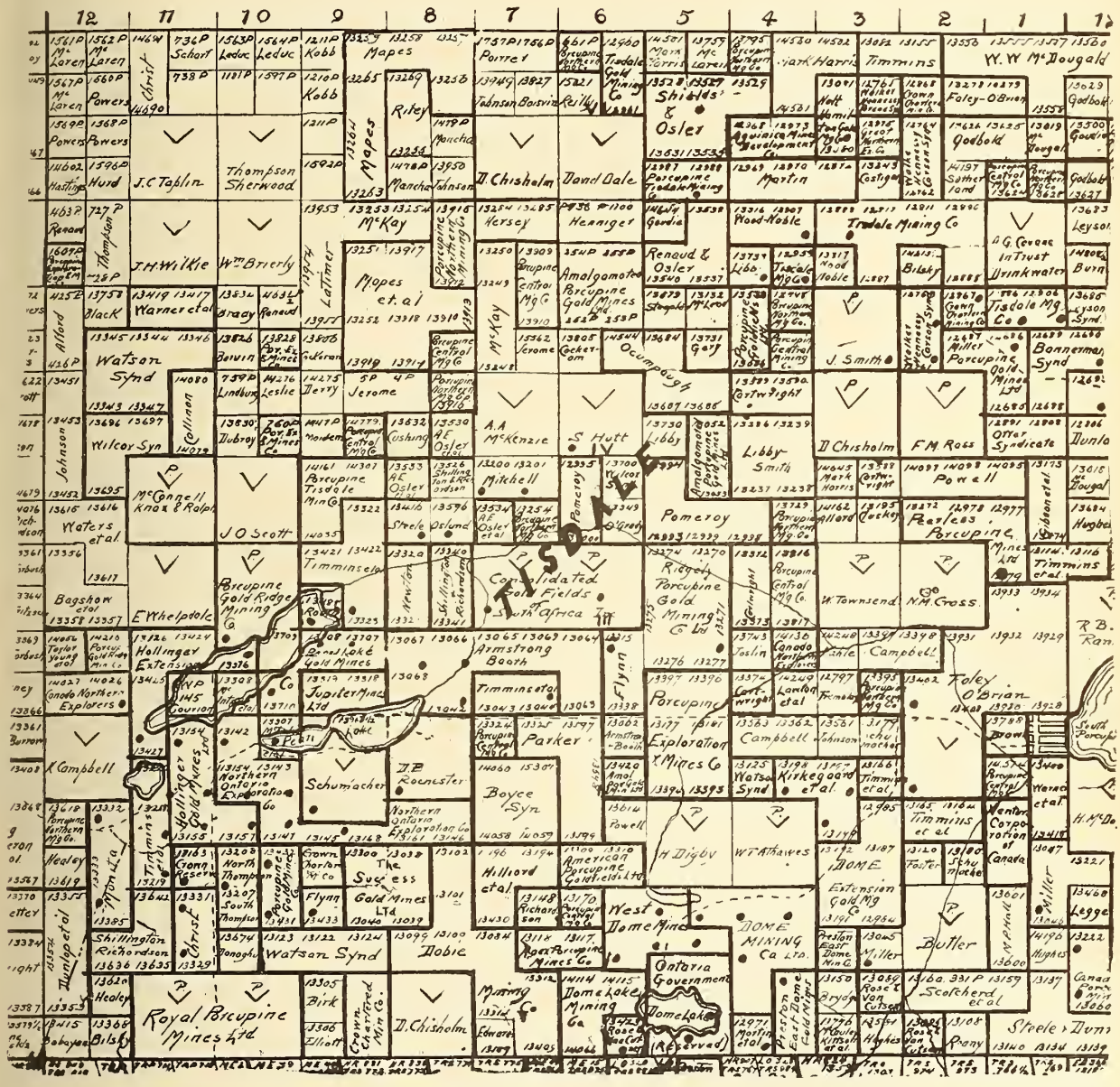
In the following is a brief description of a few of the working properties. Gold has been discovered on many claims, some of which discoveries are of recent date. A part of the coming summer will be devoted to an examination of these properties.

The Dome Mine.

This property, comprising six claims, is situated in the first concession of Tisdale, and includes parts of lots four and five. The main workings are on the northwest forty acres of lot four. In an area, which is roughly 600 feet wide north and south, and 800 long east and west, there are frequent occurrences of quartz in irregular masses and narrow quartz veins, in some of which there is visible gold. Toward the east end of the workings there are large dome-like masses of quartz in contact with Huronian conglomerate and slate-like greywacke, while to the west the quartz occurs chiefly as narrow veinlets associated with Kewatin schist which is impregnated with carbonate. The country rock in the proximity of the veins contains considerable crystallized iron pyrites.


Porcupine Lake
Golden City
Porcupine City
Post Office
WHITNEY
Vane Synd
Tisdale Mg Co
Bonnerman Synd
Scottish Ont
Dunlop et al
Daly Taylor Synd
Porcupine Gold Reef Mg
Wilson
Ravere
Fleming
Hughes
Clark
Holden
Vane Synd
Johnson
Lambe
Walsh
Young
Christ
Sherman
Munro
Kirkegoord et al
Bremner Porcupine Mines Ltd
Fitzgerald
Waldens
Wallace
Cartwright
United Porcupine Gold Mines Ltd
Beers
Ross
Rothschilds
Konkle-Spencer
Lawton et al
Day
Schaabe
Killoran
Watson Synd.
Campbell
Roche
Pellerin
Reeves
Chisholm
Porcupine Exploration & Mines Co
McDonald
Gregor Silver Mines Ltd
Leonhardt
Walls
Watson
Jardine
McKinlay
Hoffman
Taylor
Wood
Brown
Phillips
Dunn
Waldman
Cole
Miller
Colvert
Martin
Rankin
Nelson
Casey
Walsh Synd.
Keeley
Edwards et al
Rankin
Timmins et al
Sutherland et al
Gibson et al
Porcupine Lake Mg Co
Porcupine Central Mg Co
Porcupine Northern Mg Co
Porcupine Crown Mg Co
Porcupine Northern Mining Co
Porcupine Central Mining Co
Porcupine Exploration & Mines Co
Porcupine Lakeview Mg Co
Porcupine Gold Mines Ltd
Porcupine Crown Mines Ltd
Porcupine Northern Silver Mines
Porcupine Central Mg Co
Porcupine Northern Mg Co
Porcupine Crown Mg Co
Porcupine Lakeview Mg Co
Porcupine Gold Mines Ltd
Porcupine Exploration & Mines Co

The surface of this deposit was sampled during the summer of 1910, while a part of it was tested by underground workings, consisting of five shafts, one raise, and about 1,000 feet of drifting and cross-cutting at the 40-foot level. In addition, seven diamond drill holes averaging 400 feet tested the property at various points. During the latter part of the summer a 100-pound Nissen stamp was used for sampling purposes. As the result of this prospecting the company decided to equip the property with a modern 40-


12
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1
TISDALE
Mapes
Rickey
Mapes et al
McKay
Hersey
Henniger
Renaud & Osler
Amalgamated Porcupine Gold Mines
Occupoggis
Pomeroy
Consolidated Goldfields of South Africa Ltd
Rickey Porcupine Gold Mining Co Ltd
Armstrong Booth
Timmins et al
Parker
Boyce Syn
Hillcrest et al
Schumacher
J.P. Rounester
Jupiter Mines Ltd
Hollinger Extension
Hollinger
Dome Mines Co Ltd
West Dome Mines
Ontario Government
Dome Lake
Dome Lake Mining Co
Dobie
Watson Synd
Royal Porcupine Mines Ltd
Porcupine Gold Ridge Mining Co
Timmins
Foley-O'Brien
Godbolt
Tisdale Mg Co
Bonnerman Synd
Dunlop
Hughes
Leggo
Steele-Dunn
Scotchford et al
Butler
Preston East Dome
Dome Extension Gold Mg Co
Kirkegaard et al
Campbell
Watson Synd
Schumacher
Boyce Syn
Parker
Hillcrest et al
Timmins et al

pump. The solution will be pumped to triangular precipitating presses, precipitation taking place entirely during the passage of the solution through the pump, pump-column, and presses. The precipitates will be acid-treated, fluxed and smelted.*

West Dome Mines.

This property, commonly known as the Foster, is directly southwest of the Dome in lots five and six. There are several veins on this property, some of which occur near the Dome boundary. These are narrow, averaging possibly two feet in width, and consist of ankerite and quartz. One shaft has been sunk to a depth of 25 feet on a vein which dips about 75 degrees to the north. The greatest attention, however, has been paid to the deposit known as the "Curts vein," which is situated in the southwest part of the property. This vein has been stripped at various points, over a distance of 1,200 feet, showing a width of about three feet up to twenty-two feet. The deposit has well-defined schist walls, and dips steeply to the north. In proximity to the vein the country rock is rusty weathering, but away from the vein is a greenish Keewatin schist. The main mass of the lode is a lime-magnesia-iron carbonate, the composition of which is given earlier in the report. This mass is variously called ankerite or ferruginous carbonate. In fresh material the carbonate has a gray to light bluish colour, but on the surface is much stained to a rusty brown, which has resulted partially from the oxidation of iron pyrites but chiefly from ferrous carbonate. In parts of this carbonate rock there has been fracturing and filling with quartz and a later carbonate. The quartz veinlets vary from mere threads up to two feet in width, the widest of which are mostly transverse to the strike of the lode and end abruptly at the schist walls. Unequal weathering of carbonate and quartz has resulted in a striking ribbed structure. Native gold occurs in patches in the quartz and also in the carbonate near the quartz, indicating an enrichment of the carbonate from the quartz veins. When the property was visited on February 21st the development consisted of only two shafts, which were down 32 feet and 45 feet respectively, so that little was known at that time as to the actual value of the deposit.

The Hollinger Mines

The property consists of four claims lying to the east of Miller Lake in the southwest part of Tisdale. There are a number of quartz veins which have a general northeast and southwest strike. Development has been largely confined to the southeasterly vein of the series, which is generally known as the main Hollinger vein. This vein has the characteristic lenticular structure, which is frequently seen in this area, widening in places to 15 feet and again narrowing to a few feet. Two vertical shafts No. 1 and No. 3 625 feet apart, have been sunk 100 feet. Of these No. 1 is a 14 x 6½ foot 3-compartment shaft, and has been used as the main working shaft. No. 2 shaft, which is midway between the others, was discontinued at 60 feet. No. 1 and No. 3 have been connected at the 100-foot level by a drift along the vein. On February 19th this drift had been extended 300 feet northeast of No. 1 shaft, and at a point 120 feet from No. 1 shaft a 6 x 9-foot winze had been sunk 114 feet. The vein, as exposed at the surface, at the bottom of No. 1 shaft and at the bottom of the winze, is nearly vertical. A cross-cut had also been run from a point 110 feet south of No. 1 shaft 100 feet to the southwest towards the second vein of the series.

The gold in the ore occurs chiefly along dark seams in the quartz in which there is iron pyrites. These seams are well distributed in much of the quartz in this vein. Copper pyrites, zincblende, and galena occur in minor quantity. Other minerals in the vein are calcite, dolomite, sericite, and chlorite. Fragments of wall rock are frequently included in the vein. The wall rock is a grey sericite schist impregnated with carbonate and iron pyrites.

For the past year a 2-stamp Tremaine mill has been treating about 4 tons of ore per day, which represented only a small portion of the ore raised from the mine during development.

Much of the wall rock, which is impregnated with iron pyrites, is said to carry gold values for some distance from the veins. This can be treated with better results by cyaniding.

A mill will be erected during the coming year.

The Rea Mine.

The Rea property consists of two adjoining 160-acre veteran claims in the north half of lots 6 and 7 in the third concession of Tisdale. Several veins, with visible gold, have been discovered on the property, but most of them, beyond stripping, have not been developed. Attention has been chiefly confined to the vein known as the Connell, which is on the lot line between the claims. This vein strikes north 47 degrees east magnetic, and has been traced, partly by trenching in the low ground to the northeast, a distance of 0 feet. When seen in February this vein was being tested by two shafts 150 feet apart. The more northerly, No. 1, or "Kingsmill," shaft had been sunk vertically to 85 feet, while at 75 feet cross-cuts had just been started. The vein where exposed at a depth of 30 feet has a dip of 85 degrees northwest. The hanging wall, which is well defined, is much slickensided and grooved vertically. The quartz has been subjected to much movement, showing frequently slickensides along dark seams, which occur for the greater part in the direction of the vein and show over a width of about two feet. Numerous stringers of quartz, from a few inches to two feet in width, extend from the main vein into the foot wall. The greater enrichment occurs along the north wall, where gold is frequently seen along the dark seams in association with iron and copper pyrites. A little native copper was found near the surface in No. 2 shaft. This shaft, the "Eakins" was being sunk on the inclination of the vein and had reached a depth of 25 feet.

Preston East Dome Mines.

On the Preston claim, H. R. 826, in Deloro township adjoining Tisdale, the rock associated with the gold veins is a quartz-porphyry, which in part has been fractured and filled with narrow quartz veins, some of which will average from 5 inches to 15 inches in width. These narrow veins cut across the general strike of the formation in a north and south direction. In places the porphyry has been sheared and fractured, showing dark seams along which gold sometimes occurs. When seen in November, 1910, the property had not been developed beyond some stripping and

*Can. Mining Journal, Vol. XXXII., No. 4, p. 126.

shallow pits. During the winter a compressor nt and 2 Nissen stamps were taken in to test the perty.

Armstrong-McGibbon.

n the Armstrong-McGibbon claim, the northwest quarter of the south half of lot 1 in the fifth concession of Tisdale, there is a band of impure carbonate rock with an east and west strike, which towards the west is exposed for a width of 50 feet. This rock has been considerably fractured in an irregular manner, and quartz veins occur at many points. These veins, towards the west part of the band, have a dip to the south at about 35 degrees, whereas the schistose carbonate rock dips to the north. Gold has been found in very coarse and spectacular form at several places in the quartz, and the best values are obtained along the line of quartz and schist, especially where slips occur. On the west part of this band of fractured rock a 7 x 9-foot shaft had been sunk 65 feet, encountering narrow veins of quartz dipping to the south, in all totalling about six feet. Six hundred feet to the east a second shaft had been sunk 30 feet. Here the quartz veins have a decided dip to the north.

The property was equipped with a 30 h.p. boiler and a 6 x 8-foot hoist, and drilling was being done by hand.

Scottish Ontario.

On the Scottish Ontario property in northwest Whitney there are several veins exposed on the surface with approximately east and west strike.

An 8½ x 5-foot shaft had been sunk 100 feet and 90 feet cross-cuts had been started north and south. The north cut had been extended 80 feet, while at 50 feet it cut a mass of quartz on which drifting had just begun. The rock in the cross-cut is Keewatin greenstone, a soft decomposed basalt at the breast and a hard quartz diorite at 30 feet from the shaft. This hard rock was also exposed in the shaft at 40 feet. The cross-cut was to be continued northward to cut two well-defined veins which were exposed on the surface for over 400 feet.

A 24 h.p. boiler is used to run the hoist, and drilling is done by hand.

Powell Claims.

The claims of the Powell group are in the northeast part of Deloro township. A band of rusty weathering carbonate with much serpentine occurs on M. E. 22, M. E. 21, and adjoining claims This band has a strike somewhat south of west, varies in width from 35 feet to 75 feet and dips to the north at about 60 degrees. In parts of this band there are veinlets of quartz and dolomite in which visible gold has been found. The veinlets of quartz have a general strike of northeast and southwest. In one part argentite occurs in association with the gold.

Two 50-foot shafts one-half mile apart have been sunk in the hanging wall of the carbonate band at points where the rock is much intersected by quartz veins.

Vipond.

This property is the principal claim of the Porcupine Gold Mines Company.

There are several narrow quartz-ankerite veins having a general northeast and southwest strike. When visited in February last the main development had been confined to No. 3 vein, which had been traced for several hundred feet on the surface. A 4½ x 9-foot 2-compartment shaft had been sunk to the south of the vein a depth of 100 feet, and a cross-cut of 42 feet made to the vein. Drifting had been started in both directions along the vein, which at this depth showed a width of 18 inches to 2 feet, dipping to the southeast at about 83 degrees. The vein consists largely of quartz, but in addition there is considerable carbonate, some in the form of clear calcite.

On No. 3 vein a shaft had been sunk 50 feet, but at 23 feet the vein dipped out of the shaft and no cross-cut to it had been made.

One Nissen stamp was in operation and a small amount of bullion had been produced.

Foley-O'Brien.

This property is situated half a mile west of the south end of Porcupine Lake, where, on a ridge of Huronian rock which outcrops through the drift, the main workings are located to the north of the main road.

No. 1 shaft has been sunk 70 feet. The surface was not exposed, but it was stated that this shaft had been sunk on a quartz outcropping. As seen underground, the quartz appears to occur as a lens, but more development is necessary before the character of the ore body can be determined.

At the 37-foot level the quartz mass is about 26 x 35 feet in horizontal dimensions, while it shows in the shaft for 20 feet deeper, and from a lower cross-cutting appeared to be dipping to the east.

A second shaft had been started to the south of No. 1 shaft on high ground, since the first shaft was located close to a creek and much water was encountered.

A 4-drill compressor plant had been installed and 3 drills were in operation.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

The inundation of Port Hood Colliery.

Later information does not throw much light on the cause of the flooding of Port Hood Colliery, but it is now clear that the inrush could not have been predicted, and that, under the circumstances, and with the pumping equipment available, it was quite impossible to do any more than was done to save the mine. Some very uncalled for and injudicious attacks have been made on the management, and inuendoes have not been low that the mine was lost through improper working.

The water broke in at a point where the vertical cover measured 941 feet, in a portion of the workings where no faults had ever been encountered and no signs of water had ever been noticed. When first the water made its appearance it was the merest trickle, but it was regarded seriously because hitherto the mine had been quite dry in this section. The inflow is calculated to have been about 300 gallons per minute, and the low level pump could only handle 54 gallons per minute at the best. It was speedily drowned. Two attempts were made to put in dams, but before they could be completed the water overflowed them. Had there been time to have finished the dams it is extremely doubtful if they could have

been made effective, because of the enormous pressure of the rising water and the broken nature of the roof. The inundation was so utterly unexpected that no proper dam material was at hand, but even had material been ready, it is more than doubtful if it would have availed anything.

The depth of water at a point vertically overlying the place where the water broke in is only 17 feet, and the sea-bottom is bare at low-tide. It is, in fact, just at the end of the shipping pier.

The whole affair is inexplicable, but so far as can be learned no blame can be laid upon the management, except it be that they failed to anticipate the unexpected.

The Port Hood incident makes it evident that in submarine mining nothing should be taken for granted. All possible information should be collected as to the depth and the nature of the cover, and the position and size of any faults or crevices in the strata. The depth of the sand should be tested by drills, and the soundings should be accurate and so arranged to show, if possible, the presence of any hollows or pits in the sea-floor.

No rules can be laid down for pillar-drawing, or the system of working to be pursued in submarine territory, because the local conditions must rule, and local experience must guide the operations. It is obvious, however, that pillar-drawing should be undertaken with great judgment, and that every possible means should be adopted to prevent any decided break in the sea-floor. Such precautions will be especially necessary in the case of submarine territories where more than one seam is being extracted, and where barrier pillars may be superimposed. It may be possible to use with advantage the system of packing the waste by "flushing" with sand, which system has been largely used in Germany and is being now used in the United States.

A reasonable precaution in all submarine mining would be to have in readiness suitable material for building dams quickly. In some places it may be advisable to put in permanent dams, so arranged as to swing or slide into position when required. Ample pumping capacity should, of course, be provided.

So far as is now known, the submarine areas around Sydney and Glace Bay are of a very different character to those of Inverness County. In the Sydney coalfield the sea-bottom slopes very slowly from the shore, and the submersion of much of the coast is evidently the result of slow erosion extending over an incalculable period. There are practically no faults or dislocations in this field, and both the measures and the coal seams maintain a surprising regularity and sameness. The conditions for submarine mining are very favourable, and given only reasonable precautions there is absolutely no reason to anticipate any such occurrence in the Sydney coalfield as has unfortunately befallen Port Hood Colliery. That reasonable precautions are being taken is more than assured, and it may be confidently stated that the people in charge of the mining operations in the Sydney coalfield are fully alive to all the possibilities of submarine coal-mining.

Dominion Coal Outputs.

The outputs for July total approximately 369,000 tons, or 600 tons more than the largest monthly output yet obtained from the Dominion Coal Company's mines. The largest previous monthly production was 368,400 tons, in July, 1908. The figures for July this year are, however, really better than would appear, because in July, 1908, the month had 26 working days, and in the same month this year there were only 25. The average daily output in July of this year was 14,710 tons, comparing with 14,170 tons in July, 1908. The steadiness of the outputs has been noteworthy.

No. 9 Colliery (Harbour Seam) put out 39,920 tons, beating its own record of 38,655 tons in October, 1906. All the Lingan collieries exceeded their best previous performances, contributing 52,000 tons, or one-seventh of the entire monthly tonnage.

No. 14 Colliery is now almost up to its full production, and when the permanent hoisting engine is installed, the equipment of this mine will be complete. It is practically settled that the hoist will be an electrically operated one, and if this intention is carried out, No. 14 will be a colliery without boilers, and consequently without smoke.

In very many respects the new collieries at Lingan will be in advance of the older collieries on the Glace Bay side, but in no respect will the improvement be more marked than in the housing accommodation, and the general surroundings of the colliery houses. It is not so generally realized as it might be how great an influence on the steadiness and morale of a mining population is brought about by decent housing and pleasing natural surroundings. The new houses being built for the colliery workers have rear kitchens and front verandahs, and care has been taken in clearing the woods to leave as many of the hardwood trees as possible. It is pleasing to note how many of the residents have cultivated kitchen gardens, and to observe flowers and creepers around the house fronts.

The improvement in the Springhill output continues, and from 1,000 to 1,400 tons a day are now being mined. The July output was about 27,000 tons.

ONTARIO.

Cobalt and Gowganda.

While the tonnage shipments from the Cobalt camp for the first six months of this year are almost 3,000 tons less than for the first six months of 1910 the value of the ore sent out is almost two million dollars higher. The figures for the first quarter of the year are official, those for the second quarter are based on the tonnage shipped, the same ratio of silver ounces per ton being allowed as in the first quarter. As concentration has increased during this period and the shipments of low grade ore decreased, the estimate should be exceeded. The official return for the first quarter of the year was:

First Quarter.	
Ore	$3,358,273
Bullion	350,271
	$3,708,544
Second Quarter.	
Ore	$3,883,460
Bullion	380,329
	$4,263,789
First six months of 1911	$7,972,333
First six months of 1910	6,103,372
Increase for 1911	$1,868,961

The La Rose Consolidated is now for the first time since the property was taken over, working the Violet mine, near Cross Lake. The old shaft, sunk five years ago by the original owners, has been pumped out and work may be resumed from it. Under the old owners this property yielded two cars of ore. It is in the diabase formation, which has not been very profitable digging for mine operators.

Having secured some fresh capital, the Rochester Mining Company has let a contract to the Lumsden Mining Company to open up its property from the 200-foot level of the contractor's shaft. At this depth the Lumsden opened up a vein carrying much smaltite and some native silver, and it is proposed to follow this and other veins over the boundary of the property on to the Rochester, which has been idle for some time. It is interesting to geologists to notice that, like the Temiskaming, the Lumsden has found the diabase under the Kewatin, and, like them too, find that the values do not persist

The probability of this development was discussed by ril Knight in a paper he read before the Cobalt branch Canadian Mining Institute some months ago. He then ed that after about 600 feet of diabase had been pene- the Keewatin would be encountered again, and with it five—Mining journal 8 point .... ce of getting more silver values. It remains to be seen of the South Coleman operators will have the courage ir convictions and expend money in sinking and dia- drilling for the Keewatin underneath.

Ca ain A. A. Hassan has returned to the Cobalt field and s that he has a considerable sum of money to continue pment at the Cobalt Station Grounds. Contracts may be her to the Cobalt Lake Mining Company or the City of to continue their drifts into the Station Grounds pro- and so develop it.

It s again reported, with some colour of probability, that & N. O. Commission is going to build an electric line lk Lake and Gowganda. It is likely that the line, if it t at all, will be constructed on the same terms as the ger extension from South Porcupine, namely, that the for the scheme is to be provided by a private company, vill receive back its money in a percentage of the returns. It is said power is to be developed at Engle-

Elk Lake some bags of ore have been discovered, stolen, aid, from the Lucky Godfrey shipment more than a year Some 25 bags have been discovered, and it is said that nstable who has made the find it hot on the trail of more. well posted mining men it has always been doubted if ss through the highgrading operations was quite as high company imagined, though it has always been conceded ome high grade ore had been taken and rock substituted place.

Crown Reserve has completed its contract with the Prus- overnment. The million ounces were contained in seven f high grade ore, the last of which left Cobalt the end month.

standing of the Temiskaming Mining Company on July cording to its own statement, was:

in banks	$247,902.38
from smelters	42,659.00
hand	35,944.85
nts receivable and stock in hand	25,119.86
ned insurance	3,138.05
	$354,764.14
nt and taxes payable	44,812.41
	$309,951.73

Philadelphia Syndicate which purchased the Cobalt Cen- ine, is now attempting to induce old stockholders in the t Central to put up more money to further develop the rty at Diabase Mountain. The committee representing hiladelphia Syndicate consists of Alfred S. Elliott, Wil- J. Haines, and Spencer W. Wright, with head office at Chestnut Street, Philadelphia.

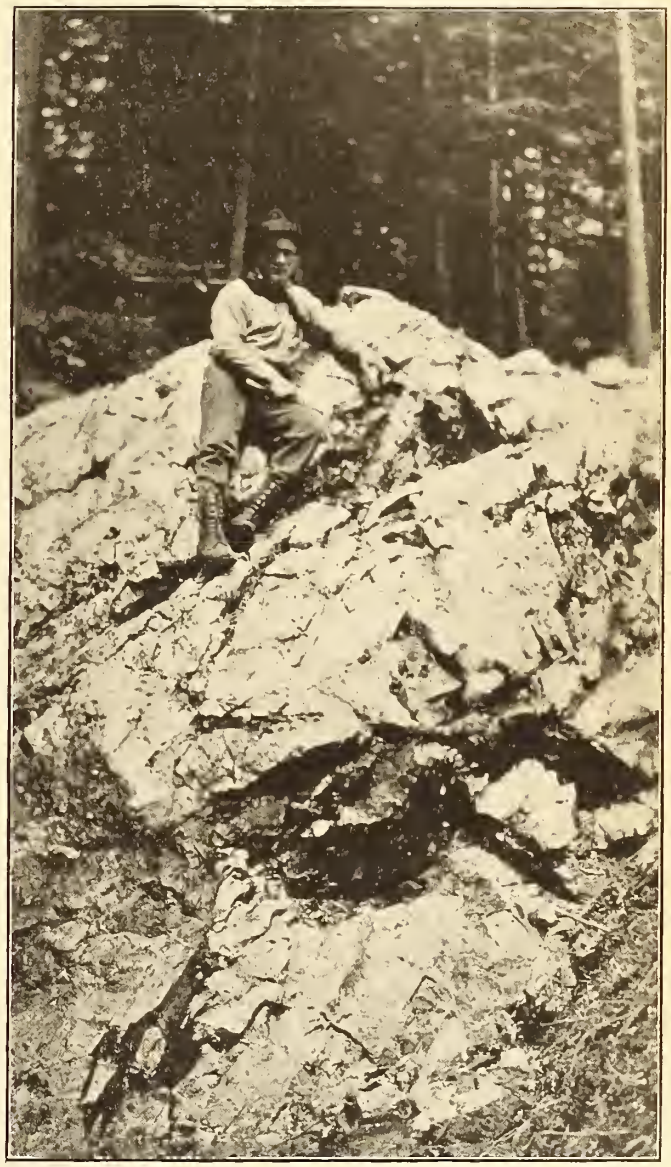
ing the first six months of 1911 the Crown Reserve mined the amount of $795,829, while the mining profits amount- $654,287. The cost of mining was 11.467 cents per , a third of a cent lower than the cost for last year. Dur- he six months $53,644 was paid out in dividends, leaving h surplus of $45,582.

itration is still in progress in relation to the strip of expropriated from the Cobalt Lake Mining Company by '. & N. O. Railway. Two sittings have now been held, he third will be opened shortly in Toronto.

Coniagas paid another 6 per cent. regular and 3 per extra dividend on August 1st, which meant a disburse- of $360,000. The company has to date paid 62 per cent., or $2,480,000. With ore reserves of 16,000,000 ounces almost untouched, the Coniagas holds a very strong position in the Cobalt camp.

Porcupine and Swastika.

The general work of reconstruction after the fire has hardly commenced at the mines affected with the one exception of the Dome. They were not in a sufficiently forward position to have any extensive plant, and since the fire wiped everything out there has been considerable deliberation before ordering fresh plants. Much good work has been accomplished fixing up the mine roads, clearing and preparing for the erection of



Quartz Outcrop on Martin Group.

the plants. The Dome, having plans fully matured, commenced with the utmost speed to replace what it had lost. It employed every man it could find to build a spur out from the main line to the mine, so that the new and very heavy machinery could be unloaded right at the foundations of the plant. It secured a second-hand plant exactly similar to the one burnt, so it will be able to place it on the old foundations. It is very desirous of immediately proceeding with underground work so as to open up other levels.

It is now known exactly where the spur line to the Hollinger will go. By extending the line somewhat it has been possible to avoid a very heavy rock cut, and the line should be running into the Hollinger by the first of October. Now that the T.

& N. O. Commission has definitely picked the spot for the station at the Timmins townsite, the lots should be on the market in a few days. So heavy has been the demand that it has been decided to auction them on the understanding that every lot will be furnished with water and drainage by the vendors.

The Jupiter mine has continued to be the scene of good discoveries. On what may possibly be another vein running parallel to the first at the hundred foot level, another extremely rich lens of ore has been struck about 40 feet from the former. So rich is the ore that after it had been picked over several times it still yielded minute nuggets and fine gold on panning.

There is now a very bad congestion of traffic on all the sidings in Porcupine or on the Porcupine branch. It is estimated that 380 cars are lying between North Bay and Porcupine waiting to go in and the merchants at the gold camp have not been able to unload the freight as fast as they hoped. There was a dearth of teams and the road between the railroad and South Porcupine was long delayed. It is claimed that to-day there are a million and a half feet of lumber required in Porcupine, and only 350,000 feet have so far reached the gold camp. The same conditions prevailed at Cobalt after the fire, and only time can remedy the state of affairs.

The Brydge McAulay claims in Bristol township have been sold to B. E. Cartwright, of Toronto, president of the Temiskaming mine at Cobalt, for half a million dollars. The first payment is small and the installments are spread over two years. The vein is of quartz and ankerite and free gold can be discovered in the quartz all across the vein, and it is fully twenty feet wide on the average. An action for an interest has been started, but it is not expected to form any impediment to the deal.

The British Canadian Power Company has finished its surveys at Waiwaitan Falls on the Matagami River, and 25 men are now employed laying out camps for the 250 men who are to be employed at the work of erecting a dam and putting in machinery for a plant to supply 800 horse power. The water power consists of a series of falls about 18 miles from Porcupine.

Work recommenced on the Hughes property has already brought results. Two new veins running parallel to the first find have been opened up and traced for a distance of 200 feet.

Mr. Walker Ross, who has been put in charge of the Standard Mines, where everything was lost in the fire, will not bring in a fresh plant till he has done a very considerable amount of diamond drilling and prospecting. It is said the Imperial Porcupine will soon start up again after its complete demolition by the flames.

After duly considering the claims of the prospectors for extension of time in which to do assessment work, the Government has decided to grant a general extension of 60 days, with power to Mr. Bruce, the local Recorder, to still further extend the time limit in any cases he thinks particularly hard. It was at first proposed to make a year's extension, but this was opposed as likely to foster the speculative spirit in the camp.

Under Mr. Rickart, the new manager of the Foley-O'Brian, work has been resumed and new camps are being built. The Foley-O'Brian was fortunate enough to save its plant, and the principal loss it sustained was loss of time owing to the impossibility of housing the men. Work has also been resumed on the Vipond and the ten stamp mill which was to have been installed this fall will probably now be brought in as soon as it can be supplied and hauled over the road.

It is now anticipated that the Swastika plant will be set up and in running order by the end of August. The new plant consists of an eight drill compressor, two 125 horse power boilers, and a complete equipment. It will now be possible to continue development on a much larger scale, former operations being very largely curtailed by the small and antiquated plant.

An excellent discovery has been made on the claims of the Pike Lake Mining Company at Swastika. There had previously been discovered a wide vein of quartz and ankerite, and in it a very little fine gold. Recent developments have opened a rich section in this vein. Another good discovery has been made on the Hurd claims on the north side of the track. This property is now known as the Lucky Cross Mines of Swastika.

The Porcupine Canada Gold Mines, Limited, has purchased through Baron von Polenz, the Joslyn, the Canadian North Explorers, and the Kahle claims in Tisdale township. The people interested are mainly Germans and Englishmen.

Captain A. S. T. Stevens, who has resigned from the management of the City of Cobalt mine at Cobalt, was given a handsome present by the men when he left the company. The contract made with the Northern Customs plant to mill ore of Cobalt ore has expired and has not been renewed, the Customs company desiring to turn its attention to Cobalt site ore in preference.

BRITISH COLUMBIA.

At the time of writing (August 1) the outlook for a resumption of work at the coal mines of the Crow's Nest district is not thought to be encouraging, except that information has been received of the intention of the Corbin Coal and Land Company to reopen its mine at once. This company, however, is differently situated to others in the district, in that it has an immense body of coal which can be mined—practically quarried—from the surface, and this will give a large tonnage over a long period. A press despatch from Fernie contains the information that the Crow's Nest Pass Coal Company's employees near there, numbering more than one thousand men, have decided not to support resuming work on the conditions proposed by the Board of Conciliation contained in the majority report made to the Minister of Labour. Meanwhile the exigencies of the situation are being improved by a reduction of railway freight rates on coal from the United States and the announcement that a rebate of the Customs duty will be made on coal shipped from the States to the parts of Western Canada most affected by failure of the ordinary sources of coal supply.

East Kootenay.—The Sullivan mine continues to be one of the chief sources of lead ore supply for the Consolidated M. & S. Company's smeltery at Trail. The output for the seven expired months of this year has totalled between 9,000 and 10,000 tons. The St. Eugene, for many years the largest and most productive lead mine in Canada, has shipped about 8,000 tons of lead-silver concentrate during the same period, being the product of between 20,000 and 25,000 tons of ore mined and put through the concentrating mill. Several other properties in Fort Steele mining division are being worked, but as yet their production is insignificant. Placer mining is being carried on in several parts of the district—on Wild Horse, Perry, and other known gold-bearing creeks.

Slocan.—The Canadian Pacific Railway Company having let a contract for the construction of a spur line, to be about four miles in length, from its Slocan railway at Three Forks to near Bear Lake, chiefly to provide railway transportation for the Rambler-Cariboo and Lucky Jim mines, an aerial tramway is to be erected from the former mine to the site to which its concentrating mill is to be removed. The distance from mine to railway will be approximately two miles. The mill site will probably be near the railway, so as to admit of economic shipment of concentrates from the mill to the smeltery. Financial arrangements have been made for the improvements decided upon. Much ore of good grade has been opened on five levels, namely on the 700, 800, 900, 1050, and 1250 foot levels, and the main adit is being extended on the 1400 foot

el to cut the downward extension of the three oreshoots ened in the higher levels. Several years ago this main adit s driven 4500 feet with the object of draining the old work- s of the mine and doing away with pumping and hoisting. ce then connection has been made with the old shaft at the -foot level and other levels below that have been opened. w there is a comparatively large tonnage of ore available extraction, but since the forest fires of last summer de- oyed the railway for several miles, it has not been prac- able to ship a large quantity of ore. The construction of C. P. R. spur line will do away with this disability. Ship- nts of ore from this mine during an earlier four-year period alled 14,500 tons, having average metal contents as follows: ver, 127 ounces per ton; lead, 37 per cent.; zinc, 14 per t. Average metal contents were rather lower last year, but some shoots of high-grade ore have since been opened, good urns are looked for. Last winter, when snow was on the und and hauling was good, shipments of ore were at the e of about 200 tons per month. Preparations for shipping from the Lucky Jim mine, which in past years has been largest shipper of zinc ore in Canada, are being made, so to be in a position to regularly maintain a fairly large out- t after the railway spur shall be completed to within a short tance of the mine. The Lucky Jim also has large reserves ore, and the mine has been developed to an extent that will mit of its production being an important one.

Nelson.—Lode-gold mining in Sheep Creek camp is on a adually increasing scale. Mill plant and machinery is being talled at the Mother Lode mine; the Nugget is being sely examined by representatives of United States capi- lists who have this property under bond; the Queen is be- g opened to a deeper level; and the Kootenay Belle is also aping well for future production. Several other properties e being developed, some of them with good prospects of be- ming producers. Lead ore has lately been found in the cinity of Sheep Creek camp, and some prospectors are now ving attention to this mineral. The Emerald lead mine, near lmo, in this district, has shipped much lead ore in recent ars, and has heretofore been the only lead mine in the Nel- n mining division. Mining in Erie and Ymir camps is still progress, but without much ore production just now. Near e town of Nelson the chief producer is the Granite-Poorman roperty, on which a 20-stamp mill is kept running.

Boundary.—The smelting works of the Granby and British olumbia Copper Companies have been kept in operation, sup- lies of coke having been obtained from Pennsylvania during ie last three months. There is not much being done in the ay of producing ore in this district other than the operations the two companies just mentioned. The Greenwood-Phoenix ramway Company is persisting in its work of driving a long nnel from Boundary Creek near Greenwood into the moun- in in the direction of Phoenix, but so far no orebody of com- ercial importance has been encountered. Good results are xpected ere long, though.

Portland Canal.—The most important mining operations in rogress in this district are those of the Granby Company in ie vicinity of Goose Bay, Observatory Inlet, the latter being n arm of Portland canal. The company has about 80 miners t work developing the Hidden Creek copper mine, and a num- er of mechanics and other employees making surface im- rovements. The mine is stated to be developing satisfac- orily, giving promise of proving a large copper mine. It is nlikely, though, that much ore will be shipped to smelteries his year, the company's present policy being to further develop large tonnage and to otherwise prepare for putting in its wn smelting works at such a place as shall be found most dvantageous.

In Portland Canal camp proper the Portland Canal Mining Company and the Red Cliff Company are operating energetically. The former company has added more machinery and plant to the equipment of its concentrating mill, which was running to full capacity by the end of July. The mine is in excellent condition for regularly maintaining a sufficient supply of ore to keep the mill fully supplied, and development work is being kept well ahead. The Red Cliff Company has been awaiting the completion of the 12 miles of railway that will provide transportation facilities for shipment of ore to Stewart, where it will be loaded on steamers for conveyance thence to the Tyee Copper Company's smeltery at Ladysmith, Vancouver Island. It is stated to be the intention of the management to ship 100 tons of ore per day. Ore is being opened on three levels in the mine. Water power has been substituted for steam to drive the compressor. A gravity tramway down to the shipping bunkers is about completed, and other preparations for sending ore out are also reported to be well forward.

Skeena.—This district is receiving much attention this year, particularly the part of it with Hazelton as its centre. The development of a number of promising silver-lead properties is being proceeded with, there now being a prospect of trans- information relative to the known mineral deposits of this portation difficulties being much lessened by the progress made with construction of the Grand Trunk Pacific Railway. Much district is contained in the reports of Mr. W. W. Leach, printed in the "Summary Report" of the Geological Survey of Canada for 1909 and 1910, respectively. Mr. Jas. McEvoy is opening coal measures in the northern part of Skeena district for a syndicate in which Toronto capitalists are largely interested. It is expected that this property will be visited late in August by Mr. G. G. S. Lindsey, and Messrs. Louis Reyersbach and Hugh F. Marriott, of the Central Mining and Investment Corporation, London, these gentlemen being scheduled to make a trip to western mining districts shortly.

Other Coast Districts.—Metalliferous mining on Queen Charlotte Islands seems to be quite unimportant at present. Several years ago many glowing statements were published concerning the big ore deposits reported to have been opened on Moresby Island of this group, but little or nothing is heard of them these days. Prospecting for coal is being carried on in parts of Graham Island, but the gross exaggerations of company promoters, as advertised in some of the provincial newspapers have made many people suspicious of the bona fides of the companies spending so much money in flamboyant advertising. One of the worst offenders in this direction is the "trustee" of the British Pacific Coal Company, which is alleged, among other things, to control "practically the only body of anthracite coal land in Western Canada."

Much activity prevails on one or two of the creeks in Atlin camp, where returns from placer mining were larger in 1910 than in either of the two immediately preceding years. Information concerning gold-quartz mining in Atlin district is given in the report of Mr. D. D. Cairnes, printed in the "Summary Report" for 1910 of the Geological Survey of Canada, including the fullest particulars yet published relative to the pockets of rich gold-tellurium ore found at the Engineer mine, Taku arm.

Vancouver and Texada Islands.—Coal mining on Vancouver Island is on a larger scale this year than in any previous year in the history of this industry, so that last year's record output of more than 1,600,000 long tons of coal is likely to be exceeded this year. There is no metal mining of consequence being done, save that it is reported a large deposit of iron ore, in the vicinity of upper Quinsam and Buttle Lakes is being opened, with promise of results of commercial importance. The mining of gold-copper ore in the vicinity of Van Anda, Texada Island, is being continued, though recent production has been largely restricted to the Marble Bay mine.

GENERAL MINING NEWS.

NOVA SCOTIA.

Glace Bay.—A new record for coal production was hung up at the collieries of the Dominion Coal Company last month. The output reached the splendid figures of approximately 369,000 tons. This is the largest output in any one month at these collieries. The best previous month was July, 1908, when 368,324 tons were produced. That month, however, contained 26 working days, while there were only 25 in the month just closed, which, therefore, in addition furnished a record for the best daily average production all around.

Other features of the output figures for the month are that the men at No. 9 made a new record for that time, getting out 39,920 tons—the best previous month's work at No. 9 resulting in an output of 38,600 tons in October, 1906—and the rapid growth in the output figures for the new collieries in the Waterford district. As will be seen by the figures given below, these new collieries produced about one-seventh of the company's total.

The approximate outputs by the collieries in detail were as follows:

No. 1	50,940
No. 2	68,320
No. 3	16,240
No. 4	36,590
No. 5	29,570
No. 6	22,750
No. 7	17,770
No. 8	17,970
No. 9	39,920
No. 10	15,680
No. 12	25,290
No. 14	21,820
No. 15	3,820
No. 16	1,180
No. 20 (Birch Grove)	1,130
Total	368,990

ONTARIO.

Ottawa, July 31.—Hon. Mackenzie King to-night made the following announcement:

"With a view to relieving the situation as it has developed in the Canadian West in consequence of the prolonged cessation of operations at the coal mines in southern British Columbia and Alberta, an order in council was passed by the Government to-day providing that on and after August 7th the duties on coal will be removed on the southern frontier, west of Sault Ste. Marie for consumption in British Columbia east of the 122nd meridian of longitude, and in the Provinces of Alberta, Saskatchewan, and Manitoba."

The action taken by the Government is based on representations which have been made by the Premiers of Alberta and Saskatchewan, by boards of trade and the authorities of the mining localities in provinces concerned to the effect that a serious shortage of coal in eastern British Columbia and in the Provinces of Alberta and Saskatchewan and Manitoba is likely to result from the prolonged cessation of work in the various coal mines, and that such shortage will be liable to be the occasion of widespread privation and possible disaster among the inhabitants of the provinces referred to. In these circumstances and having in mind the situation as it developed in the Canadian West at the time of the threatened fuel famine [illegible] years ago, it has seemed right and conducive to the pu[illegible] good that exceptional steps should be taken to assist in br[illegible]ing about an avoidance of dangers which might arise fro[illegible] a fuel famine.

It is stated in the order in council that the proposed re[illegible]sion of duties shall take effect on and after August 7th n[illegible]t. and shall continue so long as in the opinion of the governo[illegible]n council the mines may, through lack of operation, fail to [illegible]cure sufficient coal to meet present requirements and fo[illegible]a period of two weeks after the passing of an order revoking [illegible]e order which authorizes the remission of duties. From thi[illegible] will be apparent that if the authorities between now and [illegible]e close of the present week affect a settlement and work is [illegible]o be resumed on Monday next, no remission of duties will ta[illegible]e place. On the other hand, if work should not be resumed [illegible]n Monday next, then practically all coal brought into the P[illegible] vinces of Manitoba, Alberta, Saskatchewan, and British C[illegible] umbia will come in free of duty for such time as the work n[illegible] not have been resumed at the mines and for a period of t[illegible] weeks thereafter.

Porcupine, Ont.—Railway sidings are practically comple[illegible]l into the Dome mill site, over which new machinery will [illegible] taken as the beginning of another forty stamp mill and cy[illegible]ide plant.

Railway building is being pushed in Tisdale, and within [illegible] days mines will be able to get sidings for the shipment of p[illegible] visions and building material. The Government waggon ro[illegible] from South Porcupine to Pearl Lake is about completed.

A twelve-drill compressor plant has been ordered for t[illegible] Pearl Lake gold mines.

Cobalt.—The Violet property, adjoining the Colonial, ne[illegible] Cross Lake, owned by the La Rose Consolidated, is again bei[illegible] worked, after a suspension of nearly five years.

BRITISH COLUMBIA.

Fernie.—The executive of District No. 18 of the United Mi[illegible] Workers of America has acted wisely in deciding to subm[illegible] the question of the acceptance of Dr. Gordon's award as chai[illegible] man of the Board of Conciliation, which recently inquired in[illegible] the differences between the miners and mine owners of th[illegible] Crow's Nest Pass and Southern Alberta, to a vote of the me[illegible] By so doing they relieve themselves of any implication of pr[illegible] longing the dispute for personal ends of any kind which migh[illegible] be levelled at them by persons not conversant with the situa[illegible] tion. As a result of the executive's action the decision is le[illegible] with those who are vitally and directly interested. The resu[illegible] of the vote will be awaited with the greatest interest.

YUKON.

Dawson, August 2.—The largest concern ever organized fo[illegible] Yukon, excepting Yukon Gold of Guggenheims, is now the eigh[illegible] millions company reported from London by cable as havin[illegible] been formed by the South African Gold Field Companies' capi[illegible] tal on advance of John Hays Hammond. It is believed here tha[illegible] the concern takes extensive holdings on the Dominion Quart[illegible] and other creeks organized during the last two years by Arthu[illegible] N. Treadgold, in his giant fight against Yukon Gold. It i[illegible] also reported that the company absorbs Northern Light Powe[illegible] & Coal Company, which invested three million dollars som[illegible] years ago installing electric power. Treadgold has already acquired vast holdings of the Canadian Klondike Mining Com[illegible] pany, including the Boyle concession and dredges.

COMPANY NOTES

TARIO PORCUPINE GOLDFIELDS DEVELOPMENT.

Property Unharmed by the Recent Forest Fires.

e statutory meeting of the shareholders of the Ontario Pupine Goldfields Development Company, Limited, was held at e registered office of the company, 20 Copthall Avenue, Lon, E.C., July 24, Mr. Cyril Wanklyn (the chairman of the pany) presiding.

e secretary (Mr. F. C. Heley, F.C.I.S.) having read the e convening the meeting.

e chairman said: Gentlemen, Forest fires, as you know, are requent occurrence in Canada, but they do not generally a much loss of life. Two years ago in Porcupine the loss fe from a forest fire would have been very small indeed—act, it is quite possible that there might have been no loss fe at all. But since the summer of 1909 growing and flour-g townships have sprung up, a railway has been brought o the field, and settlers of every class have crowded in. In e two years the population of the district has probably in-sed more than a hundred fold, and Porcupine, which a short ago was a simple desert, is now the centre of a very ishing and important community. Happily the loss of life no means so great as was at one time feared would be the ; but a sacrifice of life among men who are practically neers in a new region is always sad, and I feel sure that to e who have suffered, or who may be suffering to-day, the pathy of all present here to-day will be cordially extended. In loss of life and in loss of property this company es-d almost as by a miracle. We had news of forest fires in district towards the end of June, but the principal fire h caused all the mischief in this case seems to have start-n 7th July in the southwest. It swept across the east side he Porcupine field, in a line from southwest to northeast, practically wiped out all it met. It descended in its course ur Camp No. 4, on the Dome mines, and on the townships nd Porcupine Lake. Our other camps were in very serious ger at one time, but in the end they, with the Hollinger the Rae mines, escaped unhurt. Above all, not one single nber of the company's staff was hurt. Our principal danger at No. 4 camp, as I said just now, but here everything was ed by the prompt action of our foreman. What occurred is ribed in a letter dated 10th July, from which I will read an extract. The extract is to the following effect: "The swept over our No. 4 camp, and would have resulted in the plete loss of all our camp equipment had it not been for foresight of the foreman in charge, who, realizing the ger, struck all the tents and buried the whole of our outfit trenches. When the fire had passed, it was difficult to see ere the site of the camp had been." The very latest news, r than that letter, is contained in a cablegram dated 18th y, which is as follows: "Railway opened 1st July; not naged fire; official statement, dead under 70, our camps not naged; no loss of life our staff; fire facilitate prospecting y much." Altogether we may congratulate ourselves upon host fortunate escape, and I think that more than a word of nks is due to the staff and management on the spot for the mpt measures which they took at the time to minimize what ght have been a very terrible catastrophe.

With these few words on the recent fire, I pass to the im-diate affairs of the company. The company proceeded to otment on 26th April, and since then the entire purchase sideration, whether in cash or shares, has been paid. More-er, the fifty mining claims in Porcupine, which we were med to explore, have been registered in the company's me. I hope that this distinct statement will put an end to ggestions to the contrary which have been made, and to the ect that there has even been any difficulty about our titles. No difficulty of any sort ever existed, and the claims are now not only our own, but are registered in our own name. In addition to the mining claims, we also took over some machinery, plant and buildings, to the value of £10,000 or thereabouts. The machinery includes boilers and a winding and compressor plant, and is practically new. As regards working capital, the prospectus stated that the issue would provide approximately £89,000. As a matter of fact, after payment of the vendors, we were left with £90,000, and of this sum £80,000 is still available for working capital and for the general purposes of the company. We were formed then to acquire and explore 50 mining claims in Porcupine. The area of these 50 claims is about 2,000 acroes, and they are not in one block, but are dotted about the field. Yet there was nothing whatever haphazard in the selection of these claims; in fact they were pegged out by Messrs. Timmins and their friends in the early days of the field. At that time competition for claims was not so strenuous or severe as it became later on, and it was only natural that these gentlemen, who were not in any way hampered in their selection, should have chosen positions which, as it seemed to them, would repay subsequent investigation. The expression "early days of the field" in the case of Porcupine means about two years ago. Little, in fact, was known of this district till towards the end of 1909; we have, therefore, behind us the advantage of all the knowledge of people who were among those who led the way into this new district. Our 50 claims occupy no fewer than 14 different points on the main portion of the Porcupine field. This fact inereases our chance of finding a successful mine, but it also involves a more extended and perhaps more expensive search than would be the case if our claims were all concentrated at one point. There is a distance of seven miles between our extreme north and our extreme south claims; there is a similar distance between our extreme east and our extreme west claims. We shall in our researches be attacking the field simultaneously at several different points. This advantage, in my opinion, far outweighs anything that might be gained by the concentration of our leases in one spot.

For carrying on the work we have established four mining camps at four principal points. Two of these are important head camps, the other two are small subsidiary camps formed for prospecting purposes only. It was on one of the latter—the No. 4 camp—that the fire descended the other day. Other small prospecting camps will be formed at likely points as time goes on. At these camps we have recently been employing from 100 to 150 men. From them as a centre, exploration of the surrounding plains will be vigorously carried out. To assist towards this end we have offered a stimulus, or what I hope will be a stimulus, to our working miners; we have promised a reward of $250 for the discovery of any quartz vein of sufficient value to be opened up. This, I think, will encourage our men to do their best, and in any event it will be particularly useful on outlying claims where supervision might be rather difficult. In the work that lies before us the first essential is a thorough search for surface indications on all our leases. I do not say that here or there we may not sink trial shafts; I do not say that here or there we may not drive on any vein channel that seems important. We have already, in fact, done both of these things on a small scale; but the first essential is a thorough search for surface indications. On this account the character of the surface covering of all our leases is very important. Now our leases are largely covered with trees and with a growth which is called muskeg. This muskeg is a thiek mass on a sediment of fallen leaves and other forest matter. All this has to be cleared away before the real character of the surface can be ascertained. Moreover, until April

in the present year, another obstacle in our way was snow. In March the trees were actually standing in from 4 feet to 6 feet of snow. You must not on this account suppose that the field is unworkable in the winter months; indeed, judged by parallels of latitude, Porcupine is some 3 degrees nearer the equator than London itself. But certain factors which make for mildness in our insular climate are entirely absent at Porcupine. In England, when snow falls, it seldom lies for any length of time, but Porcupine is part of a large continent, and when snow falls there, there it may stay for many weeks. This matter, of course, only affects the question of surface examination. In all other respects work underground or overground can be carried on without let or hindrance throughout the year. But our surface examination must clearly be prosecuted with thoroughness in the coming months. Some promising places must be opened up which in the subsequent winter months can be developed underground. Wherever outcrop indications are favourable there must be trenching and costeaning, and if there are no outcrop indications costeaning must be done at all likely spots. Later on, small trial shafts may be sunk and the veins themselves explored. But a systematic and thorough surface examination is the first essential. It should be all the more systematic because the field is a virgin field, and it should be all the more thorough because purely surface work is limited to the open months of the year.

To assist us in all this work we are having a geological survey made of all our leases. This survey is being carried out by Dr. Malcolm Maclaren, who has already been engaged upon it for some time. Dr. Maclaren is a leading expert on the question of the geological distribution of gold, and many who are interested in good mining know of Dr. Maclaren's work in other connections and in other countries. All speak of his ability and of the value of his experience in the highest terms. I myself have seen the results of his work elsewhere, and I shall look forward to reading his report on our Porcupine claims with the utmost interest. I feel sure that in this report we shall have a document of the greatest possible value to guide us in the work we have now in hand. The branch line from the railway at Kelso is now working as far as Porcupine. The station is near our No. 4 camp, and the line will be continued four miles further west to the Hollinger mine. We shall then have direct railway communication with our No. 1 camp, and the journey from Montreal, which until recently occupied three or four days, will now be accomplished in about 24 hours. In conclusion, I may mention that both Mr. Moreing and Mr. Loring are now on the spot. Mr. Moreing is the head of the firm that is managing our affairs in Canada, and is well known to you all. Mr. Loring is a partner in that firm, and I think he is also their chief mining engineer, and his advice, I think, is second to none in the profession. His acquaintance with the Porcupine field dates from the autumn of 1909. These two gentlemen left London a fortnight ago, and they will have arrived just after the recent great fire. They are both of them directors of this company, and their visit will be most timely. If anything could be considered as wanting to the management on the spot at such a moment, the presence of Mr. Moreing and Mr. Loring will amply supply that want. We have, gentlemen, entered upon a field of great perhaps of unique—possibilities. Everything that can be done is being done to further the company's interests and to push on with the company's work. It is early days yet to talk of actual and definite specific performance; much work has still to be done—work that will take considerable time. I am therefore only able to speak of mere preliminaries to-day and nothing more. There is, however, one impression which I hope I shall leave behind me, and that is the feeling that we are doing everything in our power to make this undertaking a success. There is no resolution to submit to you, gentlemen, to-day. Our business was simply to place before you the statutory report, but my friend, Mr. Richards, who was absent in Canada on the business of the company for some weeks early in the ar, I think, would like to make a few remarks with referenc to the company and its work. (Applause.)

Mr. David Richards: Gentlemen, I am not anxious to m ke a few remarks, but having only just returned from Ca la after an absence of from four to five months, and being ar ticularly identified with this company from its inceptio is very interesting to me to be present at the first ge a meeting of the company. It may be within the knowledg o many of you that Mr. Moreing and I went to Canad i January last in connection with the negotiations which ev u ally resulted in our acquiring this property. When Mr. Mor a and I completed those negotiations and entered into the n sary contracts, Mr. Moreing abandoned me cruelly — he f me in Canada and came back—(laughter)—as it was r necessary that he should be here in London in connection t the organization of the company. Having acquired a prop t in those rigorous northern latitudes, the first thing to do a to prepare to go on with the work.

Consequently, I remained in Canada, opened our busines Montreal, and immediately ordered the whole of the neces r outfit, machinery, compressor plant, etc., to which Mr. Wan has just referred, and all the necessary stores to supply h wants of from 60 to 90 men on the field. This was most n sary, because it is only during the winter that transport ar be effected in these wilds. As an example of that, I m h mention that during the winter, when the ice is good, we goods to the camp, a distance of 40 or 50 miles, at abou s per cwt. But when the frost breaks the cost of transpo i about 10s. per cwt. for two or three miles, as the whole c n try is one morass or swamp. A good deal of preparation a necessary, therefore, in order that we should start vigo u prospecting as soon as the snow cleared. At the beginnin o April we had 90 people carrying on prospecting work upon h property. You are aware that those 50 claims originally e longed to the Timmins-McMartin group. The property es not consist of one mining proposition, but of practically 5 propositions, distributed over a wide field, and some of t n occupying most promising positions in close contiguity to ell proved mines. The field, as a whole, has not yet been ry widely prospected, apart from the two main belts, or ore c n nels, represented by the Hollinger mine on the west and h Dome system to the east. Mr. Wanklyn referred to our w k ing capital as amounting to about £90,000, and I should lik to mention that this company acquired from the Vendors £10 0 or £12,000 worth of good assets in the shape of plant and st s. The examination of the properties has been taken in hand, u naturally over such a large expanse of country it has ly been so far of a cursory nature. However, a good dea or work has been done at three or four centres, and at the p s ent moment about 150 men are at work, principally upon n Miller and Ferguson groups. The Miller is situated clos to the Hollinger mine, and I consider that the prospects are x ceedingly good. We have at present a considerable amoun or talent on the field—indeed, I very much doubt whether ny field has had the advantage of so many capable and qual d men upon it at the same time. Dr. Maclaren has been on e field for two or three months, and Mr. Moreing has gone ut specially to see things for himself, accompanied by his p t ner, Mr. Loring. You will therefore see that nothing is b ng neglected in the matter of development. I should like to y something with regard to the Hollinger mine, of which ry little is known in mining circles on this side. I saw a go deal of that property while in Canada, and I think that in e course of a year or two the Hollinger will stand as one of e great gold mines of the world. It has an extraordinary p s pect at the present moment. It has opened out a pay shoo or 1,600 or 1,700 feet in length and of great width and much h ness. The figures would surprise a great many people. It as proved its main shoot down to 215 feet, and here it has a w h

feet carrying very high values indeed. The Timmins-Mcin people, who were the original owners of this property, o-day practically the owners of the Hollinger mine, and it be very interesting to the shareholders of this company now that the Timmins-McMartin people own nearly one- of the shares of this company. They are, moreover, quite nt to remain as shareholders and await the developments e property. Mr. Noah and Mr. Henry Timmins, as well as John McMartin, form with us an advisory committee in da, and I think we are very lucky in obtaining the co-operation of such influential and experienced people in this business. The greatest advertisement this field has had has been the fire. The loss of life was a great deal more serious than the loss of property. Most of the mines that suffered in the Dome belt were only in their first stage, so that the buildings were of the most primitive kind, and I do not think that the loss has been so very serious. I think that on the whole there will be more activity consequent upon the fire

The proceeedings then terminated.

STATISTICS AND RETURNS

COBALT ORE SHIPMENTS.

llowing are the shipments from the Cobalt camp for the ending Aug. 4, and those from Jan. 1, 1911, to date:

	Aug 4. Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger	.....	55,200
Bailey	.....	40,000
Barber	.....	6,000
Beaver	122,470	967,678
Buffalo	50,600	1,668,984
Chambers-Ferland	.....	831,000
City of Cobalt	.....	557,980
Cobalt Lake	.....	2,447,736
Cobalt Townsite	.....	578,000
Colonial	.....	88,000
Coniagas	177,540	2,412,954
Crown Reserve	.....	1,539,839
Hargraves	.....	161,100
Hudson Bay	59,700	750,990
Kerr Lake	60,330	1,623,030
King Edward	.....	40,000
La Rose	86,650	3,986,368
McKinley-Darragh-Savage	124,100	3,665,284
Nipissing	126,200	3,902,878
O'Brien	62,950	864,318
O'Brien, M. J.	.....	47,000
Peterson Lake, Little Nip.	.....	58,430
Provincial	.....	101,670
Right of Way	.....	708,995
Silver Cliff	.....	106,680
Standard	.....	102,813
Temiskaming	.....	1,041,372
Trethewey	.....	785,520
Wettlaufer	.....	117,232

e shipments for the week were 930,760 pounds, or 465 tons.
e shipments from Jan. 1 to Aug. 4 were 29,317,271 pounds, 1,658 tons.

B. C. ORE SHIPMENTS.

e smelter receipts for the week ended July 29th were 4 tons, and for the year to date 1,093,580 tons. The ore nents from the Rossland, Boundary and Slocan-Kootenay s were 31,422 tons and 1,151,995 tons, respectively. The es in detail are:

Rossland Shipments.

Centre Star	3,223	115,677
Le Roi No. 2	841	16,210
Le Roi No. 2, milled	300	9,000
Le Roi	224	7,670
I. X. L.	11	61
Other mines	.....	388
Total	4,599	149,006

Boundary Shipments.

Granby	15,530	559,964
Mother Lode	2,162	186,317
Rawhide	4,940	118,411
Athelstan	294	4,201
Napoleon	391	4,560
Unnamed	149	1,328
Other mines	.....	51,294
Total	23,466	926,075

Slocan-Kootenay Shipments.

Molly Gibson	75	566
Van Roi, milled	800	14,649
Sullivan	1,066	9,778
St. Eugene, milled	420	17,256
Richmond-Eureka	25	1,472
Queen, milled	420	12,390
Granite-Poorman, milled	250	7,500
Nugget, milled	110	3,300
Emerald	112	1,050
Hope	59	417
Other mines	.....	8,536
Total	3,357	76,914

Granby Smelter Receipts.
Grand Forks, B.C.

Granby	15,530	559,964

Consolidated Company's Receipts.
Trail, B. C.

Centre Star	3,223	115,677
Sullivan	1,066	9,778
Le Roi No. 2	841	16,210
St. Eugene	122	3,847
Le Roi	224	7,670
Molly Gibson	75	566
Richmond-Eureka	25	1,472
Hope	59	417
Emerald	112	1,050
I. X. L.	11	61
Other mines	.....	40,100
Total	5,758	196,848

B. C. Copper Company's Receipts.
Greenwood, B.C.

Mother Lode	2,162	186,317
Rawhide	4,940	118,411
Athelstan	294	4,201
Napoleon	391	4,560
Unnamed	149	1,328
Other mines	.....	21,951
Total	7,936	336,768

Silver Prices.

	New York cents.	London pence.
July 22	52½	24¼
" 24	52½	24¼
" 25	52⅜	24 3/16
" 26	52⅛	24 1/16
" 27	51⅞	23 15/16
" 28	52	24
" 29	51⅞	23 15/16
" 31	52¼	24⅛
Aug. 1	52⅛	24 1/16
" 2	52⅛	24 1/16
" 3	52¼	24⅛
" 5	52⅜	24 3/16
" 7	52⅜	Holiday

TORONTO MARKETS.

Aug. 9.—(Quotations from Canada Metal Co., Toronto).
Spelter, 6.25 cents per pound.
Lead, 3.85 cents per pound.
Antimony, 8 to 9 cents per pound.
Tin, 45 cents per pound.
Copper, casting, 12.85 cents per pound.
Electrolytic, 12.75 cents per pound
Ingot brass, 8 to 12 cents per pound.

General Markets.

Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼ inch lump.

Coke.

Aug. 7.—Connellsville, coke, (f.o.b. ovens).
Furnace coke, prompt, $1.50 to $1.55 per ton.
Foundry coke, prompt, $1.85 to $2 per ton.
Aug. 7.—Tin, Straits, 42.70 cents.
Copper, prime lake, 12.65 to 12.75 cents.
Electrolytic copper, 12.50 to 12.60 cents.
Copper wire, 13.75 cents.
Lead, 4.60 cents.
Spelter, 6.00 cents.
Sheet zinc (f.o.b. smelter), 7.75 cents.
Antimony, Cookson's, 8.50 cents.
Aluminium, 19.75 to 20.25 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $43 per ounce.
Platinum, hard, $45.50 per ounce.
Bismuth, $1.80 to $2 per pound.
Quicksilver, $48 per 75 pound flask.

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)
Aug. 8, 1911.

Cobalt Stocks.

	Bid.	Ask.
Bailey	.03⅞	.04¾
Beaver Consolidated	.43	.44
Buffalo	1.55	1.85
Chambers-Ferland	.10	.11½
City of Cobalt	.09½	.11
Cobalt Central	.01	.03
Cobalt Lake	.23	.24
Coniagas	6.25	7.50
Crown Reserve	3.15	3.40
Foster	.03	.05
Gifford,	.01¾	.02
Great Northern	.10	.11½
Green Meehan	.02½	.02¾
Hargraves	.09¾	.10
Kerr Lake	4.80	5.10
La Rose	3.95	4.05
Little Nipissing	.03	.03
McKinley	1.55	1.60
Nancy Helen	off	.01
Nipissing	8.25	8.40
Nova Scotia	.10¼	.14
Ophir	off	.10
Otisse	off	.02
Peterson Lake	.08	.09
Right of Way	.06	.08
Rochester	.03⅜	.03
Silver Leaf	.03	.03
Silver Queen	.02	.05
Temiskaming	.41½	.42
Trethewey	.74	.76
Wettlaufer	.85	.98

Porcupines.

Apex	.12	.17
Coronation	.05	.13
Foley	1.10	1.15
Detroit	.50	.51
Hollinger	10.30	10.50
Monita	off	.20
Pearl Lake	.50	.51
Preston	.29½	.30
Tisdale	.04	.06
Imperial	.09¼	.10
Central	.72	.73
Porc. Canada	.85	.95
Porc. Northern	.60	.61
United	.01	.04
Porc. Gold	.46½	.48
West Dome	1.90	2.00
Rea	3.65	3.80
Swastika	.44½	.45
Dome Extension	.61	.62
Dobie	.97	1.10
Standard	off	.05
Eldorado	.14	.16
Gold Reef	.10	.25

New York Curb.

Braden Cop	5	5⅛
Brit. Col. Cop.	4	4⅛
Butte Coal.	16¾	17⅛
Ely Cent.	2	4
Ely Cons.	7/16	½
First Nat. Cop.	1	1⅛
Giroux	5⅝	5¾
Greene-Can.	6¾	7
Inspiration	7¾	7⅞
Nevada Hills	3 11/16	3¾
New Baltic	..	..
Ohio Cop.	1 3/16	1¼
Ray Central	1⅜	1½
Union Mines	..	..
Yukon Gold	3 15/16	4
Nevada Con.	18	18⅛
Miami	20¾	21⅛
Granby	30	60
Con. Min. & Smelt.	45	50
Davis-Daly	¾	1
Con. Ariz	11/16	¾
Rawhide Coal	..	..
Ray Cons.	16	16⅛
Chino	21¼	21⅜
Goldfields Cons.	5¾	5

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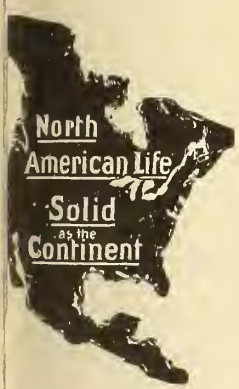

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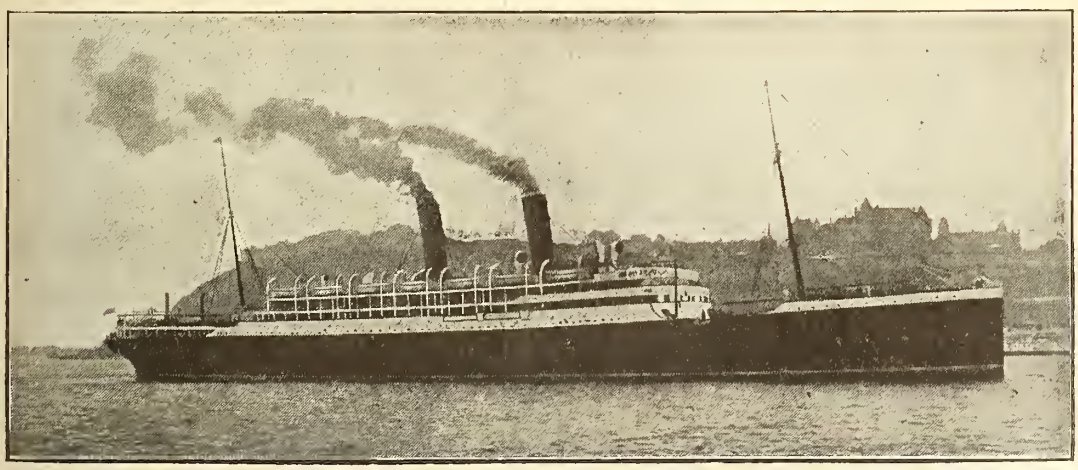

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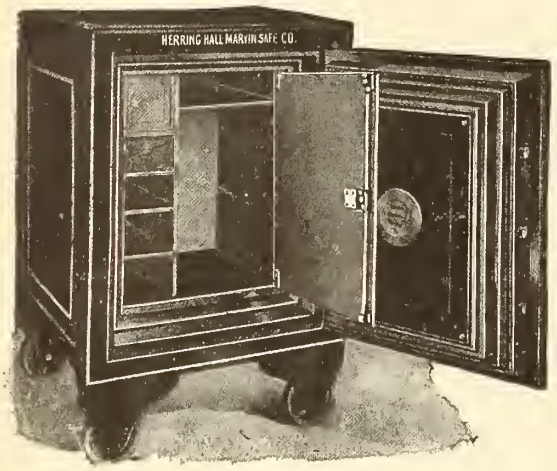

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The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

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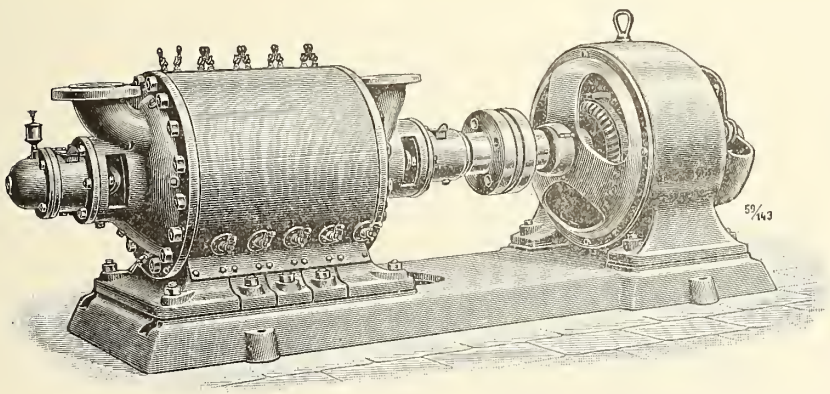

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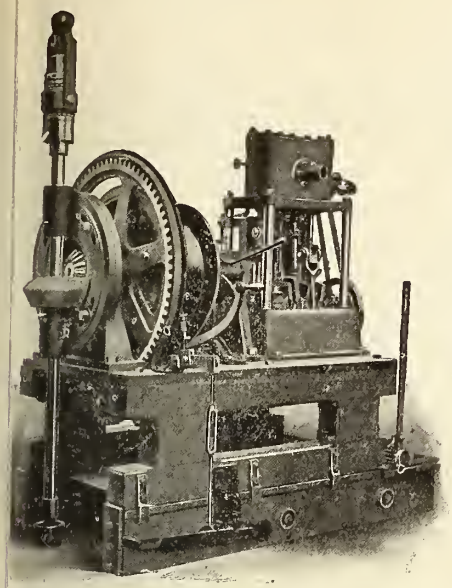

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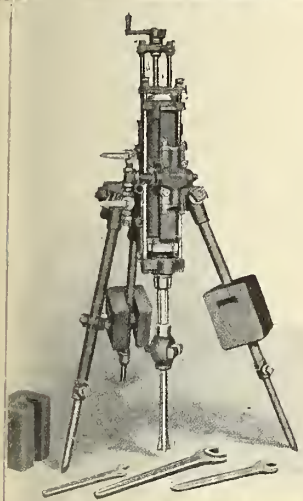

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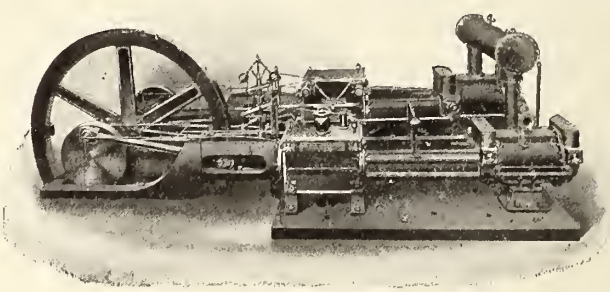

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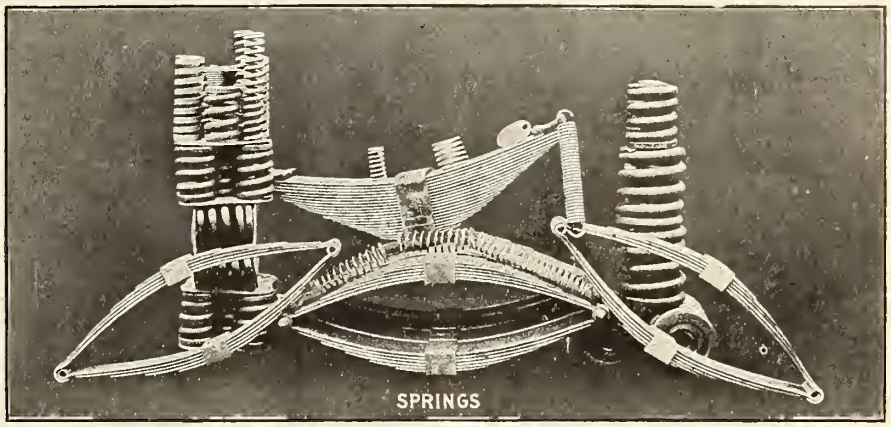
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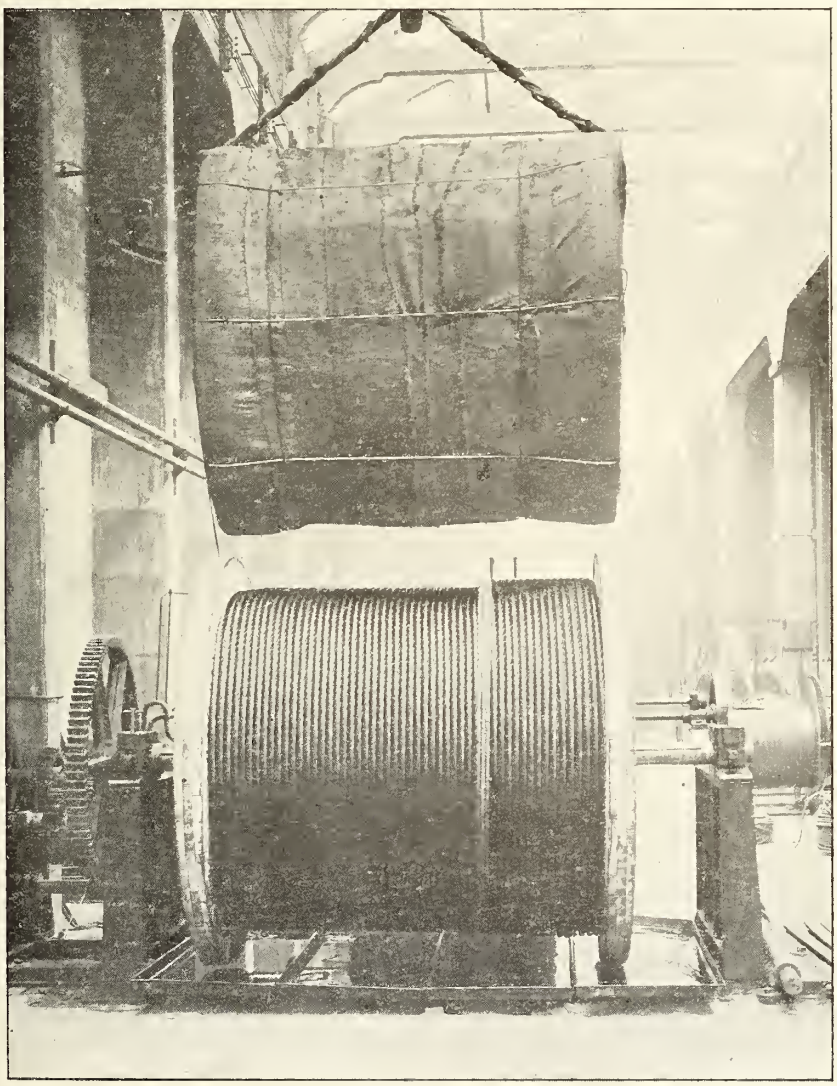

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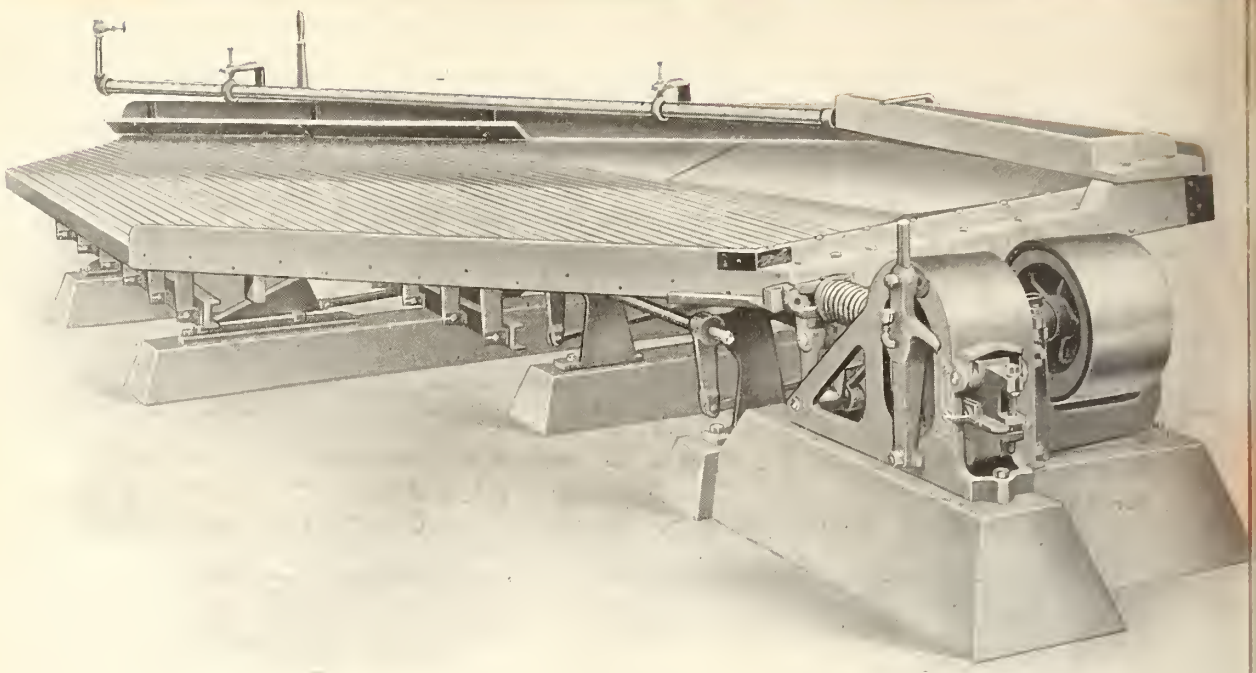

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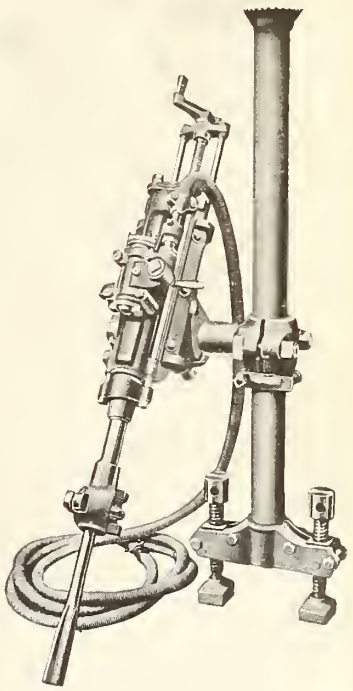

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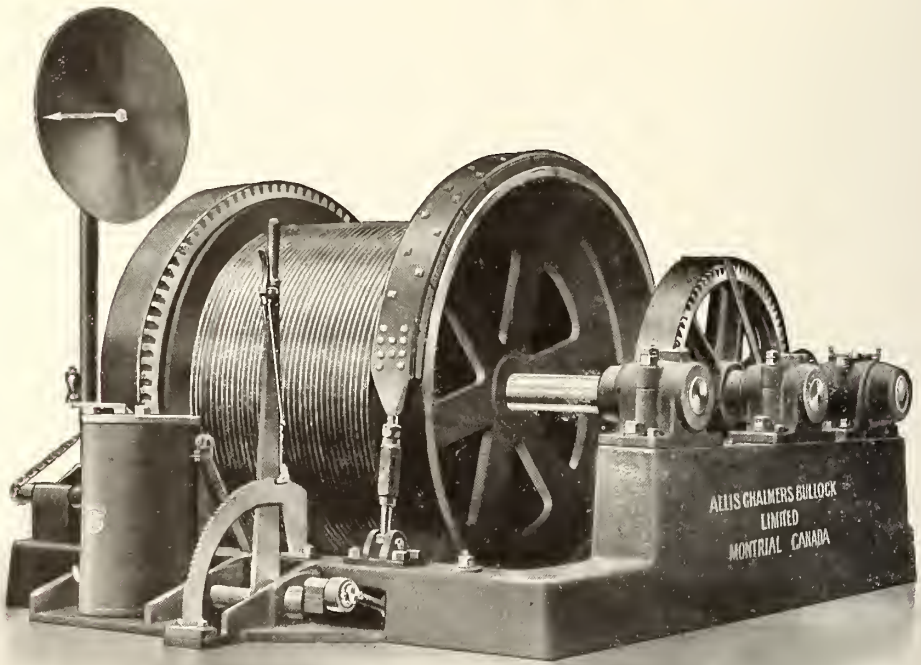

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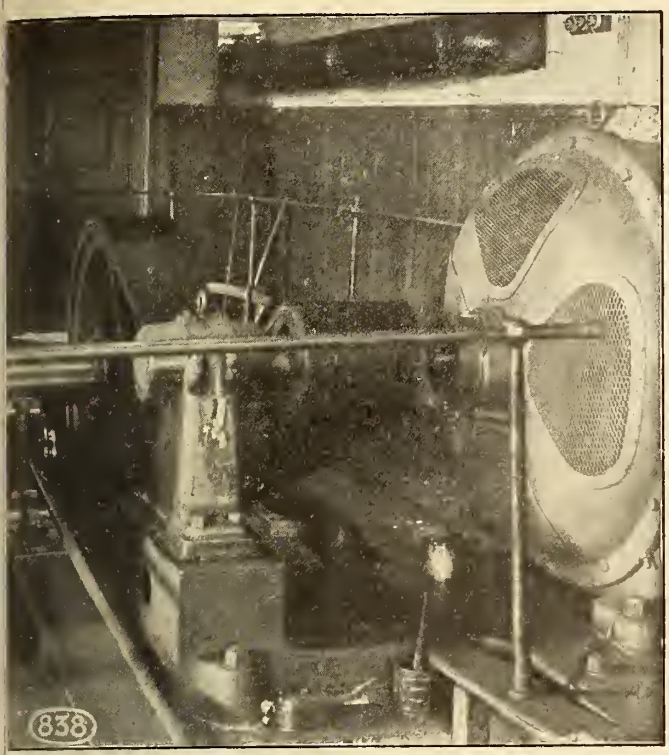
Renold Patent Silent Chains



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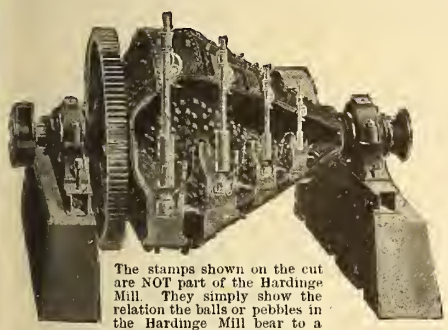

The stamps shown on the cut are NOT part of the Hardinge Mill. They simply show the relation the balls or pebbles in the Hardinge Mill bear to a number of stamps arranged for **Ideal Stage Crushing.**

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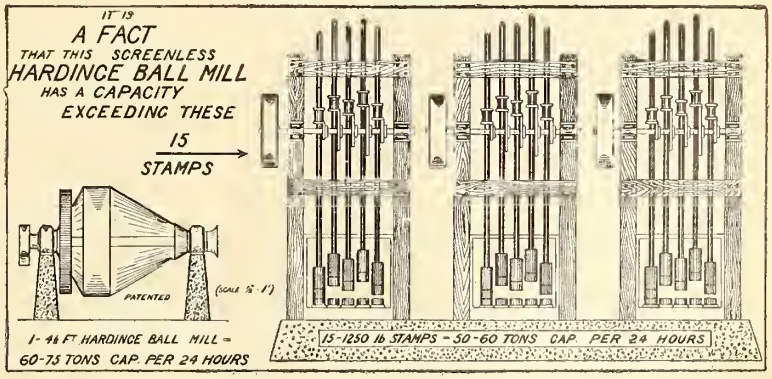

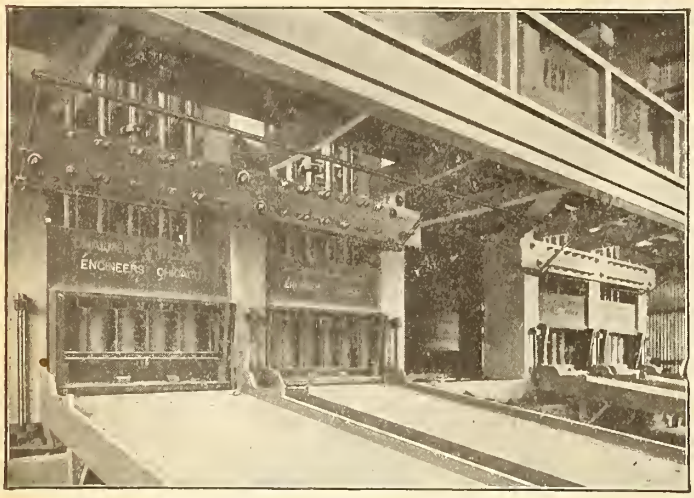

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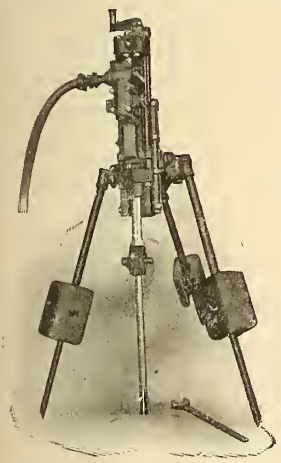

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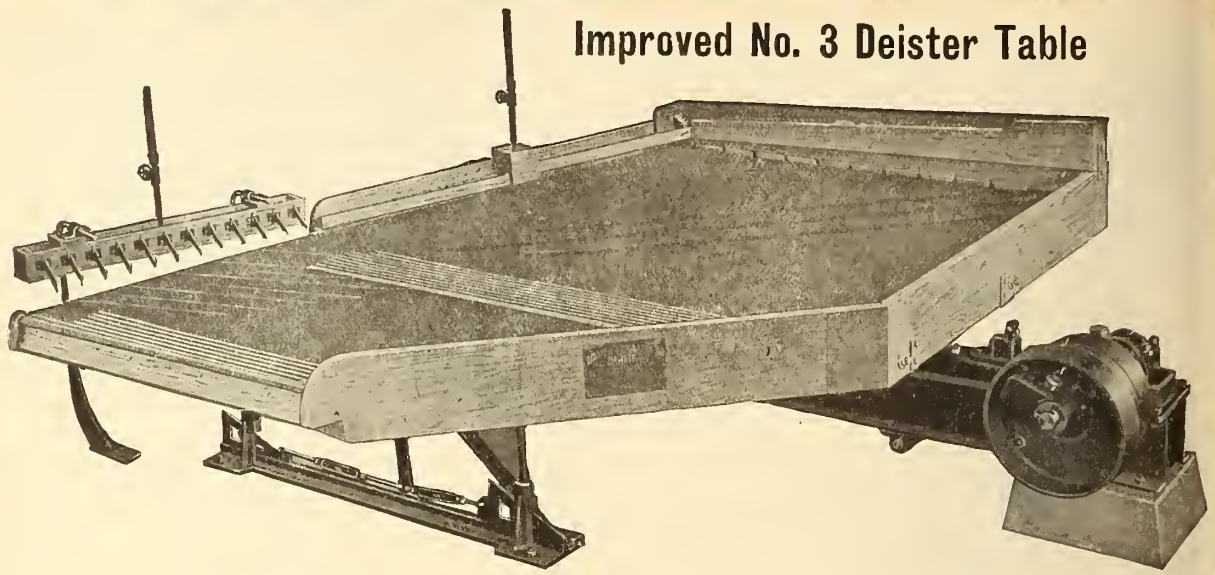

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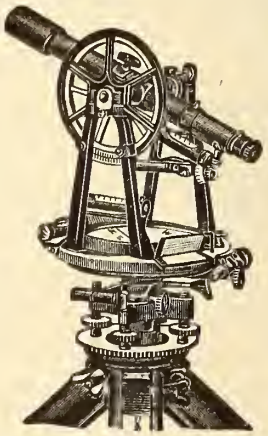

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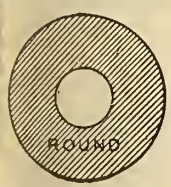

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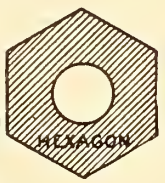

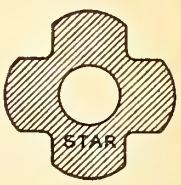

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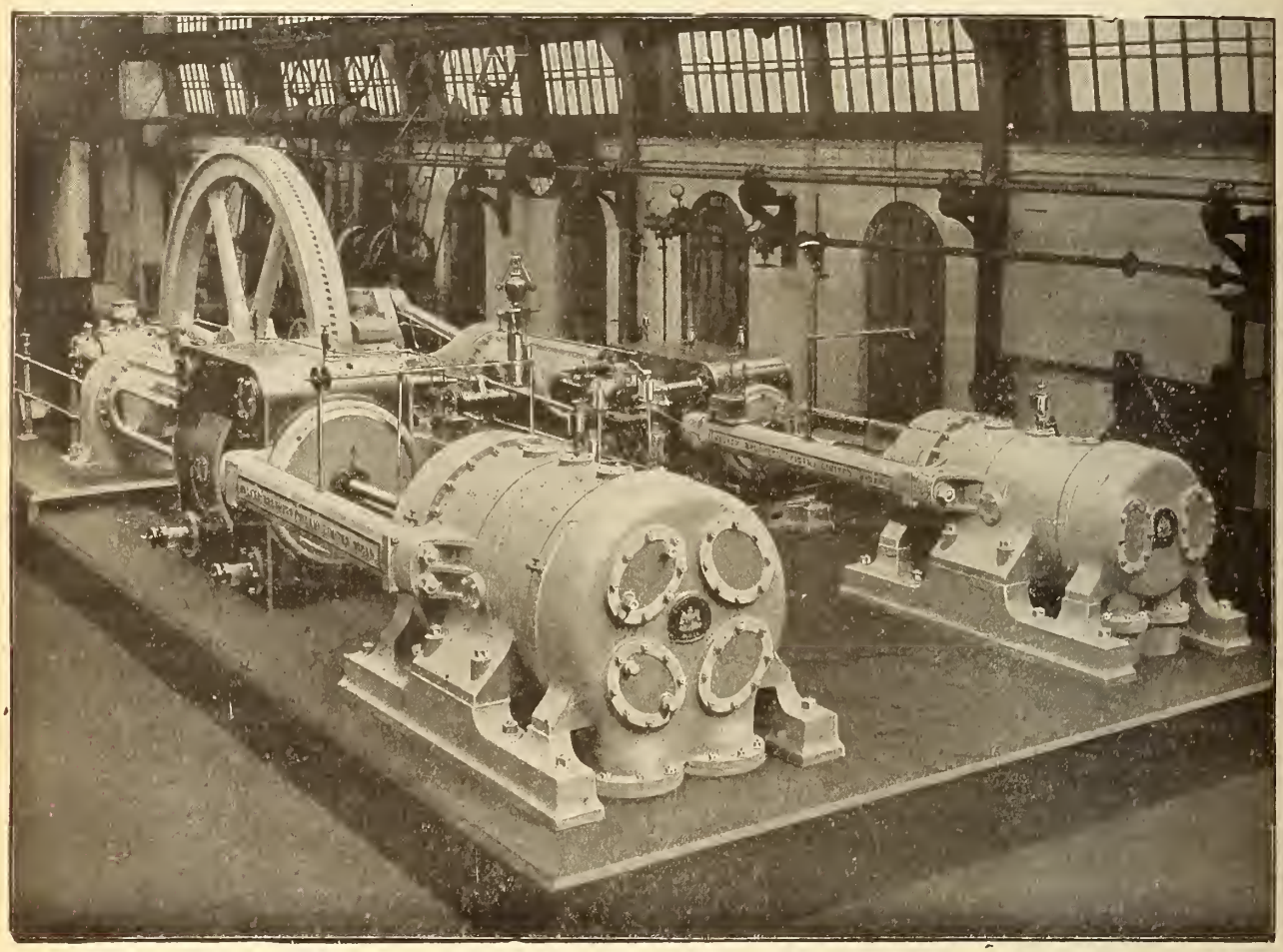

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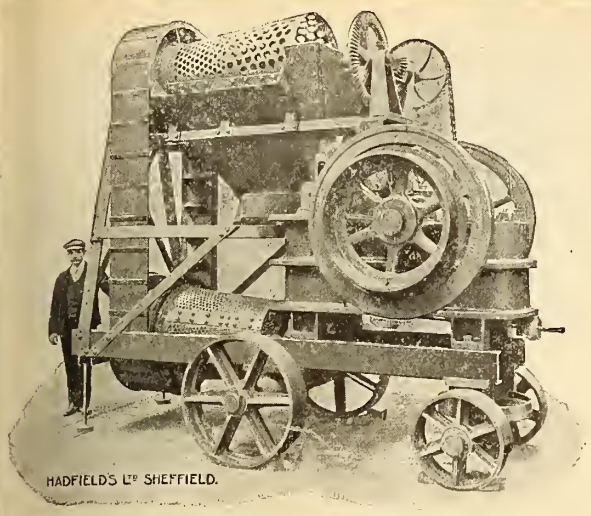

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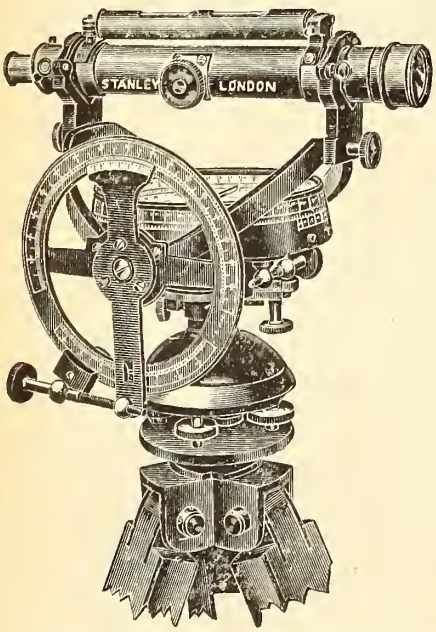

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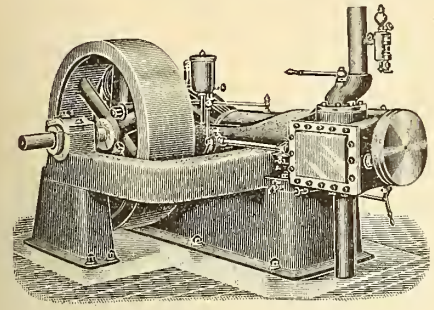

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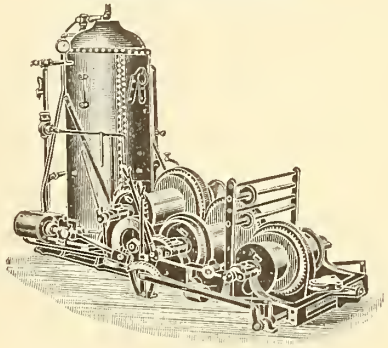

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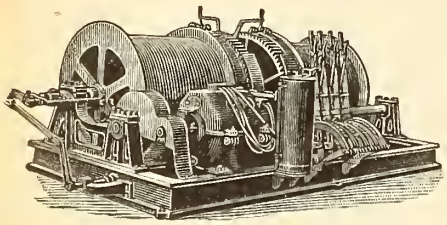

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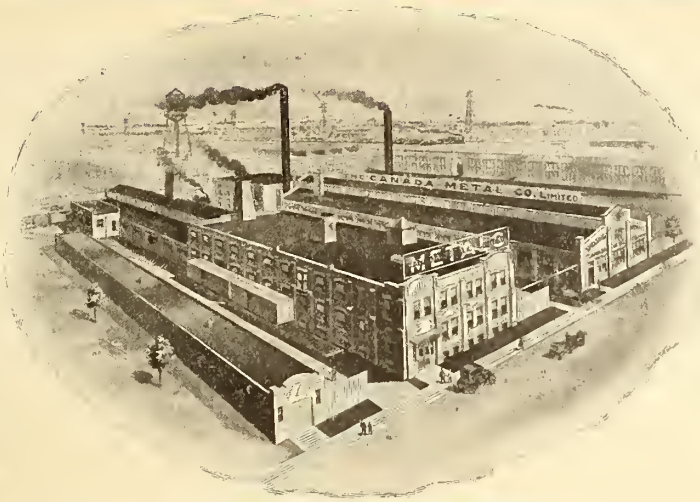

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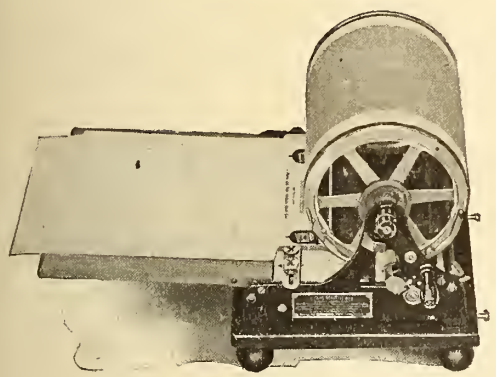

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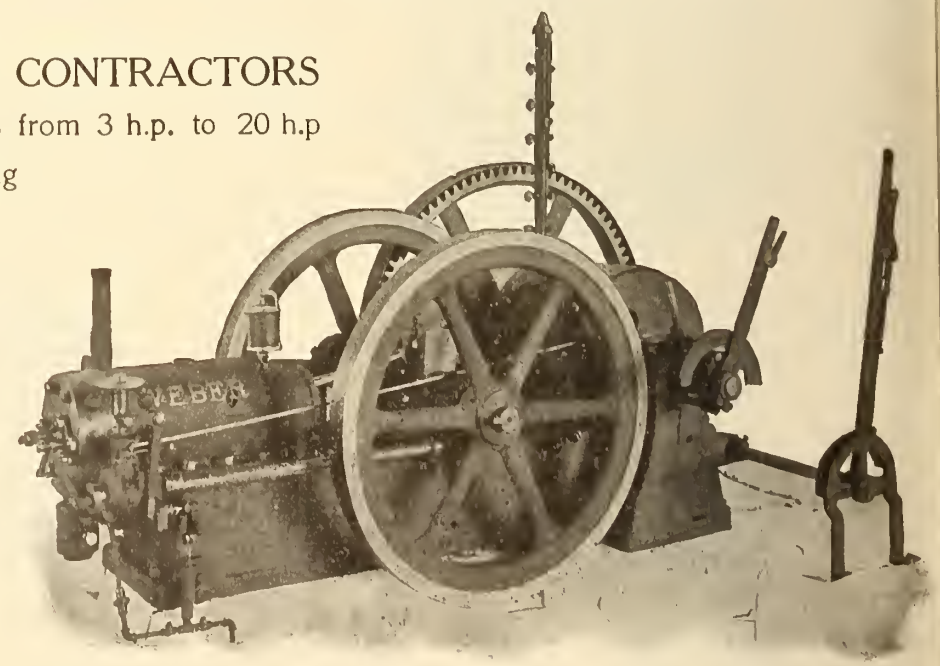

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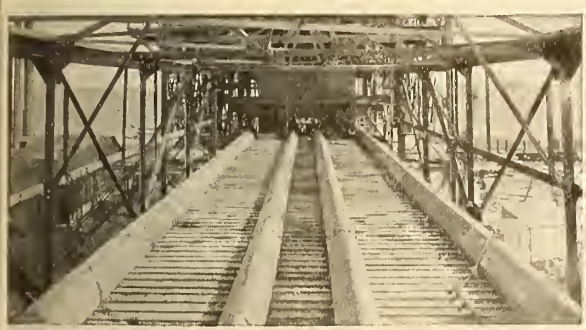

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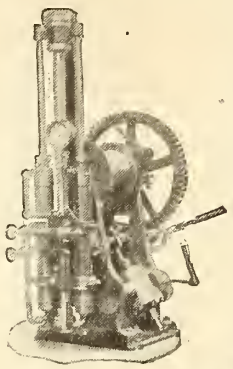

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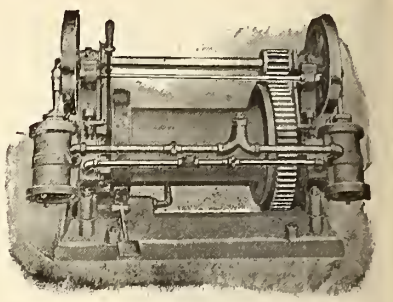

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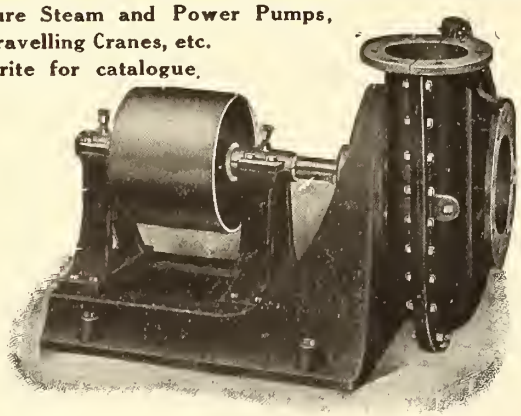

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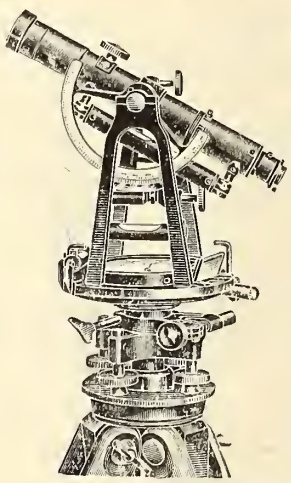

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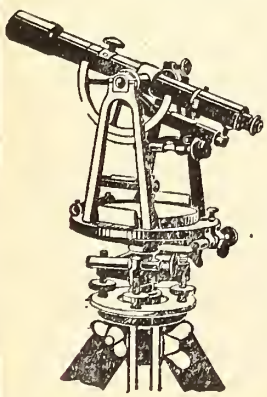

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THE CANADIAN MINING JOURNAL

VOL. XXXII. TORONTO, Sept. 1, 1911 No. 17

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

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CIRCULATION.

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THE USE AND CARE OF MINE-RESCUE APPARATUS.

The United States Bureau of Mines is attacking vigorously the problem of educating the coal miner in the use of mine-rescue breathing apparatus. In addition to distributing carefully written pamphlets, the Bureau has arranged to hold a National Safety Demonstration late in October of the present year. The Demonstration is to be held in Forbes' Field, Pittsburg, under the joint auspices of the Bureau, the American Red Cross Society, and the Pittsburg Coal Operators' Association. The date selected is October 27th. Elsewhere in these columns the reader will find full details.

This is but one of the steps taken by the Bureau to give the movement right publicity. The most effective step is the distribution of educative literature.

The latest bulletin, Miners' Circular 4, compiled by Mr. James W. Paul, is most informing. After a general statement , in which reference is made to the fact that the Government of British Columbia requires breathing apparatus to be kept at coal mines, Mr. Paul proceeds to describe four types of apparatus — the Draeger, 1907 type; the Draeger No. 2, 1910 type; the Westphalia; and the Fleuss or Proto. He advocates the use of mouth-breathing types, in which the eyes are protected by detached goggles and the nose by clips. The helmet, he believes, is not necessary for safe and effective service in unbreathable gases. The chief disadvantages of the mouth-breathing types are that the wearer is forced to breathe through his mouth and is unable to carry on any conversation, although audible signals are used successfully.

The most important preliminary tests to be applied to any breathing apparatus before it is to be used are as follows:

The quantity of oxygen and air circulated is determined by attaching a measuring bag to the inhalation tube leading to the helmet or mouthpiece, opening the exhalation tube, turning on the oxygen, and then noting the time required to fill the bag. The pressure in the intake tube and vacuum in the return tube; the condition of connections and regenerators; the fit of helmet, and the condition of the complicated reducing valves, should all be determined. Simple directions are contained in Mr. Paul's pamphlet covering all these points.

Especial emphasis is placed upon the proper care of apparatus. Such items as the best lubricant to use are clearly stated. The method of disinfecting is given, and so on. These directions strike us as being thoroughly practical and sane.

In discussing actual rescue work, it is recommended that a rescue party should consist of at least five or or six members. In no circumstances should the men, while working in unbreathable gases, separate. Every member of the party should be within easy reach of the others. Relief parties should be stationed at the nearest point in good air, in readiness to start at a moment's notice. Every large mine should have four crews, each of six men, including a captain and a lieutenant. Weekly practices are imperatively necessary.

The Federal Bureau of Mines has organized and established a course of training for miners. At various stations gas-tight rooms, containing imitation mine entries, and overcasts, have been erected. The air is fouled in various ways, such, for instance, as burning straw, damp hay, animal refuse; or by spraying ammonia, or by burning formaldehyde.

* * * *

The efforts of the United States Bureau of Mines should be followed keenly by Canadian coal-mine operators. It is to be hoped that our own Federal Mines Branch will profit by the example set. The Pittsburg demonstration should be attended by many Canadian representatives.

THE PENNIAC REEF GOLD MINES.

A pained subscriber has sent us a marked copy of The Star Lake Mining News, along with a prayer that we do what we can "to stop this sort of thing."

It may be explained that The Star Lake Mining News is one of those journalistic ephimera that live but for a day. It is published in Winnipeg. Its sole object in life is to induce its readers to buy shares in the Penniac Reef Gold Mines, whose mining claims lie in the district of Star Lake, Manitoba, "only 85 miles east of Winnipeg."

So weary are we of "this sort of thing" that only by the exercise of a very stern sense of editorial duty were we able to read through the sheet. Duty performed brought its own reward. A sentence on the first page caused us to prick up our ears. It ran thus: "The first step of the owners was to interest capital, and to this end one of Canada's most prominent mining engineers was invited to inspect the property, and give a valuation of the mining claims." The "most prominent engineer" came and saw and was conquered. We are informed by The Star Lake Mining News that he offered $100,000 for the claims out of hand. This offer was incontinently refused — largely because the owners hankered to give the public a chance. The "engineer," therefore, made a report and received "his usual fee."

That report, if we may judge by quotations, must have been a jewel. It is asserverated that the ore in sight (this term should have no vulgar definition) amounts to 3,000,000 tons, of an estimated value running up to $34,200,000. The engineering feats that have put this ore "in sight" consist in one 500-foot shaft, two cross-trenches, each 200 feet in extent, and four 20-foot pits. Thirty-five (God save us!) assays have been made. The average, and one can imagine that average, gold content is $11.33 per ton!

Why pursue the subject further? We marvelled at the expedition with which that ore, three million odd tons, was visualized—"in sight" is to prosaic a phrase. What wizard had waved his wand? What conjuror has cozened cold Mother Earth?

The first line on page 2 illumed us. There we discerned and recognized with great joy the name of George R. Thurber, a name honoured (for a time, at least) in other parts of Ontario! Now did we know the inwardness of things!

That our readers may join with us in admiring Mr. Thurber, in hailing him as Canada's greatest professional achievement, we need only quote from an editorial that was printed, published, and distributed by the CANADIAN MINING JOURNAL on October 15, 1910. The caption of that editorial is "Fairy Gold." The text runs thuswise:

"A certain son of Belial is loose in the Lake of the "Woods. Here, at Kenora, he has built him a palace "wherein, by occult means, he renders from the rock "gold not extractable by fire-assay nor by any other "device known to man.

"Indeed, if you wish to get some idea of what this "gentleman at Kenora can do to a gold ore, all that is "necessary is to multiply by three or four the results "obtained by an ordinary or garden variety of assay- "sayer. And so convincing is the manner of his "Kenora person, that several mature persons have also "abstained from chipping in with him.

"We are not unfamiliar with the kind of process "that is being exploited at Kenora. There are many "such varieties, based upon the alleged existence of "'queen' gold, 'latent gold,' etc., etc., and etc. But "the real object of search in all these processes is an "other allotropic form of the metal named 'fool's gold.'"

Our opinion of Mr. Thurber is evident. Evident also, is the fact that he is, consciously or unconsciously, the High Priest of the Order of Fakirs. This is an honourary degree attained only by years of hard labour — and usually followed by a longer term of the same.

THE EIGHT HOURS ACT IN OPERATION.

In the annual report of the Inspector of Mines for the Yorkshire and North Midland District, Great Britain, the working effect of the Eight Hours Act is fully discussed. The Act has been in operation for a year. During that time enough has been learned to discredit many prophecies.

When the Act was being debated, before it had be-
e law, its opponents predicted that accidents would
ease immediately after the adoption of the new
slation. This has not been the case. The Act has
no effect upon the accident rate in either direc
. Thus both those who advocated the Act as a
ns of reducing the number of casualities, and those
believed that mischief would result through
ding, have been proven mistaken.

s to the economic effect of the Act, there is no
n for questioning the fact that the output per
has been reduced; or, putting it another way, the
ber of men employed has been increased without
orresponding increase of output. Working costs
higher, except in a few instances where conditions
peculiarly favourable. The most serious loss, how-
, falls upon wage-earners, especially upon those
were formerly accustomed to work overtime.

pecific facts are given by the Inspector to show how
large group of collieries, producing 15,000 tons
day, has been affected.

this group the following changes have been
ed:

.—The number of coal getters was increased 9.5
cent.

.—The working costs were increased 3d. per ton.

.—The number of tons obtained per man decreased
er cent.

.—The stallmen's wages decreased by 6d. per day.

.—The output increased 2 per cent.

o meet the requirements of the Act, many changes
equipment were necessary. At one large colliery
boilers, increasing the steam pressure from 50 to
pounds, were installed; the winding engines were
d with larger cylinders; cages of four decks were
stituted for those of two decks; more pit room was
vided, and the number of underground workers
increased by 11 per cent. By these steps the
put was enlarged 16 per cent., and the working
t per ton was put up 2.5 per cent.

ther similar instances are on record. In general,
Act has made for higher costs, lower wages, less
put per man, and lower wages. On the other hand,
re is a more equitable distribution of wages. Con-
ry to expectation, there has been little or no
eeding up." Despite the shortened hours, there
nothing to show that the men are working at high
ssure. The facts adduced above afford valuable
rmation for Canadian coal miners. Both operators
employees can draw morals from this authentic
ort.

FLIM-FLAM.

A well known mining engineer, who resides in Co-
t, recently took upon his own shoulders the task
correcting certain scurrilous editorials that were
nted in the columns of a third or fourth-grade Eng-
lish weekly. The name of that weekly — and we hope that it is familiar to but an insoluble residue of our readers—is The Winning Post.

Our Cobalt engineer disposed of The Winning Post's arguments in very short order. However, such is the advantage of an editorial chair, The Winning Post gained a Pyrrhic victory over its correspondent by the simple expedient of having the last word. This, however, does not destroy the correspondent's position. The Winning Post asserted that Canadian mining ventures, organized by Canadians and floated in London, had never paid a dividend. To those who know anything about Canadian mining this contention was too absurd to require refutation. In any case, yellow or pink sheets can never be refuted.

As the Cobalt engineer pointed out, it is lamentably true that many of the worst frauds perpetrated in the name of Canadian mining originate in countries other than Canada. On this point we need not dwell —it is obvious. But we shall animadvert for a moment upon a singularly rank instance that is of putative English birth — although Canadian parentage is possible.

"The Field" is ordinarily a reputable paper. It is a dignified London publication, and its wits are quite as nimble as one may be led to expect.

In the advertising columns of The Field, April 22, 1911, there appeared the following:

"Canadian Exploring Expedition to secure known rich gold deposits, etc., under leadership prominent engineer, will RECEIVE Two more GENTLEMEN; small capital required, sharing pro rata; also few more subscriptions £250, sharing pro rata interest; Government endorsement; bank references — Address 'Box 60,' 'Field' Newspaper, Windsor House, Bream's Buildings, E. C."

Instead of comment we are tempted to insert lurid asterisks. For our Canadian readers no remarks are necessary. Only for the sake of our English contributors are we induced to say a few things.

These few things are as follows: Innumerable "exploring expeditions" are organized every year in Canada. One out of a hundred is successful. Canada has a plethora of prospecting talent. Canada, also, has much discovered mineral wealth. Prospecting, to be quite frank, is not usually a paying game. Big corporations avoid it. The man that is fond of the bush and that knows his business, prospects successfully. He is, however, a rare bird. The rarer bird is he who makes money out of his discovery. Usually someone of the vulture species robs the discoverer of his reward.

Just here we are fearful of being misunderstood. Canada needs the prospector. Canadian prospectors are the best and most vigorous of men. But "expeditions" organized by interests that know not Canada,

or by persons who are making money before discovering anything of value, are foredoomed to failure.

All this, however, is incidental to the real point. The reader will notice that the phrase "Government endorsement" is used in the advertisement. Of this we may say, without equivocation, that it is an unmitigated falsehood. No Canadian government gives its endorsement to any mining enterprise, much less to a vague prospecting "expedition." In short, such an advertisement is a fraud, and the advertiser should be punished promptly and severely.

TIN AND TOPAZ IN NEW BRUNSWICK.

Our readers will be interested in Mr. Brock's description of tin and topaz occurrences in New Brunswick. The discovery of topaz crystals an inch in length is noteworthy. The subsequent discovery of tin by Mr. Brock suggests commercial possibilities. The whole association of minerals (quartz, muscovite, mica, feldspar, topaz, fluorite, wolfrfamite, molybdenite, pyrrhotite, chalcopyrite, and cassiterite) is analogous to combinations found in localities where a certain amount of tin is being produced to-day. For example, Beck's description of the Erzebirge tin deposits in Saxony indicates a close resemblance to the New Brunswick occurrence. From the former both tin and tungsten have been mined in considerable quantities.

In Lunenburg County, Nova Scotia, almost precisely the same geologic surroundings are found near the contact of the granite, or greisen, and the pre-Cambrian gold-bearing slates and quartzites.

Mr. Brock's article deserves attention. Tin is a much sought for metal. It is quite within the range of probabilities that parts of the eastern territory will yield tin in commercial quantities.

EDITORIAL NOTES.

The net income of Granby Consolidated for the fiscal year ending June 30th, 1911, was $282,000. The actual output of copper was the smallest on record since the year 1906.

The next general meeting of the Western Branch of the Canadian Mining Institute will be held at New Denver, Slocan Lake. The Slocan district will receive especial attention. Several papers on mining in the Slocan will be read.

On June 30th, the El Oro mine, Mexico, showed reserves of ore totalling 318,720 tons. The average gold content was $9.50; the silver content 6.1 ounces.

In the week ending August 19, Cobalt mines shipped 13 cars of high grade ore and 8 cars of low grade, making a total of 660.24 tons. La Rose was responsible for 4 cars high and 2 cars low; and Drumm[illegible] appeared on the list after a long absence. Thi[illegible] increase is the more gratifying for the reason tha[illegible] proportion of high grade ore is constantly gro[illegible] greater.

An export duty upon crude ores is being discu[illegible] in Australia. The reason adduced is that transp[illegible] tion and labour are so costly that foreign smelters [illegible] an undue advantage over Australian plants.

Personal and General

Mr. O. N. Scott, mining engineer, Toronto, ha[illegible] moved his office from 14 King Street west, to the R[illegible] Bank Building, King street east.

Mr. R. E. Hore, has been examining mining pr[illegible] ties in the Lake of the Woods region.

Mr. F. G. Stevens, Albert St., Kingston, Ont., ha[illegible] turned from a professional visit to the Gaspe p[illegible] sula.

Mr. J. B. Woodworth, Toronto, recently inspe[illegible] several gold properties in Nova Scotia.

Mr. J. B. Tyrrell has returned to Toronto from [illegible] don, England.

Mr. J. E. McAllister, consulting engineer to the [illegible] tish Columbia Copper Company, was in the Boun[illegible] district of British Columbia about the middle of [illegible] gust, looking into conditions at the company's se[illegible] mines and its smelting works.

Mr. W. J. Dick, mining engineer to the Cana[illegible] Conservation Commission, was in British Columbia [illegible] month. Among other mining districts he visited [illegible] the coal mining region in Nicola valley, where se[illegible] coal mines are being operated.

Mr. Jay P. Graves, of Spokane, Washington, U.S.A., vice-president and general manager of the Gr[illegible] Consolidated Mining, Smelting, and Power Comp[illegible] Ltd., went up to the company's newly purchased [illegible] den Creek mine, near Goose Bay, Observatory I[illegible] about the middle of August. He was accompanie[illegible] Mr. F. M. Sylvester, assistant manager.

Mr. J. R. Roaf, who for several years had bee[illegible] charge of the Crow's Nest Pass Coal Company's [illegible] gineering department at its several collieries in [illegible] Crow's Nest Pass district of British Columbia, ha[illegible] tired from that company's service and gone to [illegible] of the new coal districts about Edmonton, Alberta.

Mr. George Alexander, managing director of the [illegible] toine, Jackson, Ruth, and other mining companies [illegible] ing mines in British Columbia, recently arrive[illegible] Kaslo, West Kootenay, from England. The Ruth-[illegible] group of silver-lead mines, near Sandon, Slocan, [illegible] the Silver Cup, in Ferguson camp, Lardeau dist[illegible] are both operating mines owned by Mr. Alexand[illegible] companies.

Mr. Francis H. Shepherd, chief inspector of m[illegible] for British Columbia, of Nanaimo, B. C., has retu[illegible] from Seattle, Washington, where he took the re[illegible] tion mine-rescue course of training at the U[illegible] States Mine-Rescue Training Station, on the ca[illegible] of the University of Washington. The station had [illegible] closed while the officials were away giving instru[illegible] in coal mining districts, but through the courtes[illegible] of the director of the United States Bureau of Mines [illegible] rangements were made for Mr. Shepherd to take [illegible] regulation training course at the Seattle station.

Mr. W. E. H. Carter, Toronto, reported lately upon groups of mining claims in Porcupine.

Mr. R. W. Brigstocke passed through Toronto on his way to Montreal on August 23rd.

Mr. D. Lorne McGibbon has resigned from the Nipissing board of directors. No explanation has yet been vouchsafed. Internal dissension is the probable cause.

Mr. Walter Baelz, a German mining engineer connected with the Imperial Civil Service, is making a tour of inspection through Canada. Mr. Baelz was in Porcupine at the time of the fire, and there lost nearly all his baggage. He is at present in western Ontario.

Mr. H. W. Hardinge has just returned to New York from an extended trip in the west, and expects to go to Europe on professional business next month.

Mr. Duncan McMartin is the Conservative nominee in Glengarry, his place of birth. Mining men are needed in Parliament .

Mr. Reginald Hore, Houghton, Mich., has been examining mines near Kenora, Ont.

CORRESPONDENCE

Editor CANADIAN MINING JOURNAL:

Sir,—In your issue August 1st, there is an editorial entitled "Geology and Mining." I wish to take exception to several points in that article. In the first place the editorial implies strongly that the geologist should not report upon mines, and that he is not qualified to do so. Here you are wrong. The best mining men I know have begun their careers not as operators or managers, but as geologists. The width of view and the habit of close reasoning that characterize the geological training can not be got in any other way.

Again, I believe that the mine manager, or the operating mining engineer is too often poorly fitted to give any opinion at all upon geology. His point of view is narrower and far more specialized than the geologist's.

I hope that you will be able to see that there are two sides to the question.

Yours, etc.,

J. C. C. L.

PALLADIUM FOUND, NOT PLATINUM.

Editor CANADIAN MINING JOURNAL:

Sir,—Recently there was much excitement at Nelson, British Columbia, relative to an alleged discovery of platinum in a mining camp distant a few miles from that city. Undue importance was attached to the reported find and press despatches were sent out, giving wide publicity to the stated occurrence of the metal mentioned. It transpires, however, that the excitement was premature, and the statements published somewhat extravagant.

The first report was, in part, as follows: "An event which is likely to prove of far-reaching importance in the history of mining in the Kootenays, is the discovery of the platinum group of metals which has been made by A. Gordon French, the eminent metallurgical chemist, while investigating for the best means to obtain fuller results from the treatment of the ores from the Granite-Poorman mine. The discovery was made while Mr. French was examining the float gold and slimes caught by means of a new process, invented by him to meet the requirements of the local ores. . . . The platinum group consists of six metals, and of these Mr. French has identified five. . . . as follows: Platinum, iridium, palladium, rhodium, and osmium. Results from a great many trial assays made by Mr. French show highly payable quantities of these metals, especially in platinum and iridium."

Other similarly highly-coloured reports were published, until warning was given that the mining industry of the district must eventually suffer from a reaction should such an unwarranted course be persisted in, and those responsible for the exaggeration were checked and desisted from their folly.

With the object of preventing "wild-catting," E. R. Widdowson, an assayer of years of local experience, and holding the provincial certificate of efficiency requisite for those practising assaying in British Columbia, informed the Nelson Daily News that "palladium is the predominating metal of the platinum group discovered here by Mr. French. It is obtained from a serpentine dike which is probably an alteration of a peridotite dike. The dike material varies in colour from a dark green to a dark yellow, and is so soft that it can be mined with a pick. The metal is a hard silvery white substance, but is not visible in any of the ore I have assayed. In all, I have made some 50 or 60 determinations for palladium, and the other rare metals, for my various clients, and I am well able to confirm the presence of the metals discovered by Mr. French. However the find may turn out commercially, I think the thanks of the mining community are due to Mr. French for the careful research work he has carried out and is continuing at the present time."

Later in the interview, from which the foregoing is quoted, Mr. Widdowson said: "I can safely say that the metals are present and that I believe they are in sufficient quantities to be of commercial value when a satisfactory method of treatment shall have been decided upon. The various interests are at present going fully into this branch of the question, and no doubt before long a process will be discovered which will extract the metals on a commercial scale."

Since the interview with Mr. Widdowson was published I have ascertained that the investigations had been going on during several weeks before the newspaper man indulged in his hyperbolics. The results obtained by local chemists were confirmed by others in the United States, so that the occurrence here of palladium has been definitely established. The value of the discovery commercially has yet to be determined.

Victoria, B. C., August 16, 1911.

E. JACOBS.

RECIPROCITY AND THE MINING INDUSTRY

(Written for the CANADIAN MINING JOURNAL by A. B. Willmott.*

Now that an election on the reciprocity issue is near at hand, it seems opportune to consider the effects which the proposed changes will have on the mining industry. In the table below all the changes that affect the mineral industry are given.

Import Duties on Products of the Mine.

Article.	Imports into Canada Present Rate	Imports into Canada Proposed Rate	Imports into United States. Present Rate	Imports into United States. Proposed Rate
Asbestos, crude	20 p.c.	Free	Free	Free
Asbestos, ground	25 p.c.	Free	25 p.c.	Free
Asbestos further manufactured	25 p.c.	22½ p.c.	25 p.c.	22½ p.c.
Cement per 100 pounds	12½c.	11c.	8c.	8c.
Coal, slack, per short ton	14c.	14c.	13.4c.	13.4c.
Coal, bituminous, per short ton	53c.	45c.	40.2c.	40.2c.
Coke	Free	Free	20 p.c.	Free
Feldspar, crude	Free	Free	Free	Free
Feldspar, ground	Free	Free	20 p.c.	Free
Fluorspar, crude, not ground, a ton	Free	Free	$3.00	Free
Grindstones, not mounted, per cwt.	15-25 p.c.	5c.	8¾c.	5c.
Gypsum, crude, not ground, per ton	Free	Free	30c.	Free
Iron ore, per long ton	Free	Free	15c.	10c.
Mica unmanufactured	Free	Free	5c. lb. and 20 p.c.	Free
Mica, ground	20 p.c.	Free	20 p.c.	Free
Mineral Waters, not bottled	Free	Free	8c. gal	Free
Oxide of iron as a colour		22½ p.c.		22½ p.c.
Paving stone and paving brick	22½ p.c.	17½ p.c.	25 p.c.	17½ p.c.
Salt in bulk, per ton	$1.00	Free	$1.40	Free
Salt in packages, per ton	$1.50	Free	$2.20	Free
Salt cake, per ton	Free	Free	$1.00	Free
Soda ash, per lb.	Free	Free	¼c.	Free
Slate, roofing, per 100 square feet	75c.	55c.	20 p.c.	55c.
Stone, building, undressed	15 p.c.	12½ p.c.	10c. c.ft	12½ p.c.
Talc, ground	Free	Free	35 p.c.	Free

A study of this table shows that there are no very startling changes. The most striking are the reductions on cement, coal, and salt when imported into Canada, and the reduction on coke and gypsum when imported into the United States. In considering the changes, the view-point of the writer has been that of the Canadian producer of minerals. Changes in the tariff may benefit the producer by enlarging his market or decreasing his cost of production. Per contra, the changes may be injurious by decreasing the market or increasing his cost of production. Many changes may have little effect either way. As there have been no changes in the import duties on dynamite, machinery, drill steel, and other items entering into cost of production, there has been neither benefit nor injury from the operating standpoint. The only exception is that in the case of coal, producing mines in the Province of Ontario will benefit to the extent of 8c. a ton on the coal consumed, which may amount to some thousands of dollars a year in the aggregate.

Beneficial Changes.

COKE.

Coke is produced in the Provinces of Nova Scotia, Alberta and British Columbia. That of Nova Scotia is consumed in the steel industries of that pro and none is exported to the United States, ther ing no smelter industries in the New England St Alberta and British Columbia sold in Canada in 291,453 tons of coke, which were consumed by lead and copper smelters of British Columbia. In dition there were marketed from these provinces in the United States 77,407 tons. The Crow's Nest district produces the best coke west of Pennsylva and so it has been sought by the copper smelters the Northwestern States, because of the lower fre rates and in spite of the American duty. It is p able that the abolition of the United States im duty of 20 per cent. may extend somewhat the over which this coke can be marketed.

GYPSUM.

By the proposed agreement the American im duty on crude gypsum is reduced from 30c. a to nothing, while the duty of ground gypsum remains same at $1.75 In 1909 the production of Canada as follows:

Crude. . . . . 423,474 tons, worth per ton, $
Ground . . . . . 8,814 tons, worth per ton, $
Calcined. . . . . 40,841 tons, worth per ton, $

Total 473,129 tons, worth $809,632.

Of this amount the exports amount to 315,201 t of crude, almost entirely from the Provinces of N Scotia and New Brunswick. Ground and calcined g sum were not exported, and cannot be, owing to high rate of duty. Canadian exporters will pr ably reap the benefit of this reduction of 30c. a

*Consulting Mining Engineer, Lumsden Building, Toronto.

one would expect will extend their markets.

A.

1909 the United States imported in all 403 tons ica. Of this, 167 tons were sent by Canada, valued 133,000, and on which a duty of 5c. a pound and per cent. was paid. Canadian producers will eforth have a perference in American markets by abolition of this duty and should extend their s as well as receive more for their products.

Tc.

here is in Canada one mine producing talc, and mill grinding it. The production in 1909 was 4,350 , valued at the mine at $10,300. The ground pro- t is consumed largely by the paper trade of Can- though small amounts have been marketed in at Britain and the United States. The reduction of import tariff of the United States from 35 per . to nothing will undoubtedly enable this mill to ease its sale in the United States.

Injurious Changes.

CMENT.

1909 Canada produced cement valued at $5,346,- which constituted 97 per cent. of the Canadian sumption. From the United States was imported ent to the value of $51,222, and from Great Bri- to the value of $104,060. There were 22 plants peration, with a capacity of 50 per cent. above Canadian requirements. These requirements, how- , are rapidly growing and in a couple of years overtake the capacity of the mills. The reduc- on the import duty from 12½c. to 11c. per 100 nds will, however, tend to increase the importa- s and so limit the possible markets for Canadian ducers. It should also be noted that one of the f items in the cost of manufacturing cement is , and that the 14 plants located in Ontario are pay- 53c. a ton duty on all the coal they use. This is cient reason why they should have a higher pro- ion than the American plants, which have the ad- tage of duty-free fuel

CL.

oal is produced in Canada in the Provinces of a Scotia, Saskatchewan, Alberta, and British Col- bia. The Nova Scotian coal is marketed in the itime Provinces and the St. Lawrence Valley as west as Montreal. Ontario and Manitoba procure r steam coal from Pennsylvania. Saskatchewan supplies of lignite for domestic purposes and pro- es its steam coal from Alberta. Alberta and Bri- Columbia have their own supplies of excellent m coal.

wing to the American duty of 45c. a long ton, a Scotia coal is shut out of the New England mar- which it could otherwise reach. This coal is, ever, shipped by the St. Lawrence as far as Mont- , where it begins to meet Pennsylvania coal. The uction of the Canadian import duty from 53c. to . a short ton will undoubtedly make the competi- for the Nova Scotia miners in the St. Lawrence ley much more difficult. Their market will prac- lly be restricted by the terms of the pact, no com- sating advantage in the New England market be- given them, as the American duty remains un- nged.

lberta and British Columbia have in the Crow's st Pass some of the best coal on the continent, the rket for which is at present not large. The com- ies operating there would welcome a very sub- tial reduction in the American duty, as it would enable them to ship large quantities of coal southwards into the United States. They would even welcome absolute free trade in coal between the two countries, a policy to which the Nova Scotia operators are quite opposed. The latter argue, and quite properly, that free trade in coal would cause them the loss of the Quebec market, for which they have spent large sums of money in terminal plants for handling. They would at once be compelled to abandon these plants and construct similar ones in New England and would have to spend, in addition, large sums of money in building up a new trade. All of this might be lost through the sudden cancelling by the United States of free importation.

The proposed arrangement has done nothing to increase the markets for the western operators and has without any compensating advantage lessened the market for the eastern producers. It would seem that a true reciprocity would have brought about a reduction of 8c. a ton on the American duty as well as on the Canadian. The loss of the Canadian trade in the St. Lawrence valley would then have been offset by a gain for the Canadian producers in the Crow's Nest Pass district.

SALT.

Last year Canada imported from the United States 81,900 tons of salt, and exported to them 683 tons. Salt is imported free from Great Britain and free from all countries when used in the fishing trade. 61 per cent. of the Canadian consumption is imported and 39 per cent. produced in the counties of Ontario bordering on Lake Huron. There is here a large area underlain by salt of the finest quality, but it finds a limited market in Ontario and Manitoba alone. The eastern provinces and Quebec are supplied by Britain, and all brought in free of duty on merely nominal freight rates by vessels seeking a return cargo from Britain.

Under the proposed free exchange of salt the Canadian producer is bound to suffer severely. One of the chief items of expense in producing salt is the evaporation of the brines. The Canadian producer pays 53c. a ton duty on his coal which the American across the Detroit River receives free. Further in the vicinity of Bay City waste slabs from the saw mills provide the necessary fuel. There are good reasons why the import taxation on coal should be kept up. One of these is that this country requires large sums of money for running expenses and there is probably no easier or more equable form of taxation than one on coal. The transportation companies and manufacturers are the original payers, and through them it is distributed fairly equally over all classes of the community. But if the salt producers, cement producers, and other mining industries are called on to pay this coal taxation they should be given compensating protection for their own products.

SALT CAKE.

One of the most natural industries for Canada would be the development of the alkali trade. The raw material for this is salt, which exists abundantly in western Ontario and is so located that the materials of production can be cheaply assembled. The consumption in 1909 was as follows:

Soda ash	30,560,464 lbs.,	valued at	$249,882
Salt soda..	11,318,633 lbs.,	valued at	106,440
Sulphate of soda	1 961,561 lbs.,	valued at	7,511
Total value			$363,933

Some years ago a plant was established at Sault Ste. Marie, Ont., well equipped and able to produce and sell these commodities in Canada at the current market prices in the United States. As soon as this plant was in operation the American alkali trust cut the prices until they finally succeeded in destroying the business, and the plant was dismantled. Mr. Fielding was appealed to to put a small duty on the production of this plant, sufficient to give it the Canadian market, which market it was willing to supply without any advance in the usual market prices. This protection was refused, and after the plant was dismantled American prices were advanced to the usual point.

Under the proposed arrangement alkali products are put permanently on the free list and the possibility of building up this industry in Canada is practically annihilated.

Inconsequential Changes.

The other changes proposed do not appear to be of much value to the Canadian producer, either one way or the other. Ground asbestos is reduced from 25 per cent. to nothing, and manufactured asbestos from 25 to 22½ per cent. The United States produces no asbestos and this may allow of a little ground asbestos being exported. The United States takes our crude asbestos free and still maintains the prohibitory tariff of 22½ per cent. against manufactured articles.

FELDSPAR.

The reduction of ground feldspar from 20 per cent. to nothing is not likely to induce the establishment of any mill in Canada for grinding. As the market for ground feldspar lies almost wholly in the United States, and as the treaty may be abrogated at any time, a manufacturer preparing to grind feldspar will almost certainly put his mill on the American side of the line.

FLUORSPAR.

This material is at present not produced in Canada, though there is a considerable market here. One promising prospect is known which may be able to supply the Canadian market. The admission of crude fluorspar from the United States free of duty will prevent the development of Canadian deposits and will therefore work as much harm to Canadian industry as the opening of the American market will bring benefit.

GRINDSTONES.

Nova Scotia and New Brunswick produced last year 4,275 tons of grindstones, valued at $54,664. Of these, stones to the value of $13,451 were exported to the United States, and Canada (mainly Ontario and Quebec), imported from the United States grindstones to the value of $66,922. The maritime provinces may possibly extend their New England trade slightly by reason of the reduction in duty, and will lose a corresponding part of their trade in Quebec.

IRON ORE.

The reduction in duty on iron ore passing from Ontario to the United States of 5c. a ton, is not likely to increase the exportation of that commodity by a single ton. Ontario consumed in 1909 543,000 tons of foreign ore and 220,000 tons of Ontario ore. The exportation amounted to 43,000 tons, or one-thirteenth of what was imported. As there is no probability of Ontario meeting her own requirements for years, the advantage of an export market is slight. Iron production in other provinces of Canada is practically nil.

MINERAL WATERS.

The reduction in the import duty of the United States on unbottled mineral waters from 8c. a gallon may induce a slight export trade. Bottled mineral waters are now admitted into both countries at the rate of 17½ per cent.

ROOFING SLATE.

The Canadian duty on roofing slate has been reduced from 75c. per 100 square feet to 55c., and the American duty from 20 per cent. to 55c. The only Canadian quarry is located in Richmond County, Quebec, from which last year 4,000 tons, valued at $19,000, were produced. The imports in that year amounted to $72,000 from the United States. As the Canadian producer was quite unable to take care of his own market, one fails to see how the change in tariff rates can be of any advantage to him. Besides this, the reduction of the Canadian duty will discourage the development of the slate deposits that have been recently found near Haileybury.

PAVING MATERIAL.

Last year Canada imported from the United States paving blocks of the value of $58,335. As the total exports from Canada to all countries of all kinds of stone, wrought and unwrought, amounted only to $5,000, the amount of paving blocks exported must have been very small. The reduction on the import duty should increase the market for the American producer and with no corresponding increase for the Canadian producer. Imports into Canada of paving bricks amounted in value to $101,000, and there were no exports. The Canadian reduction in duty will probably here also increase the market for American material and discourage further Canadian production.

BUILDING STONE.

In 1909 we imported from the United States building stone to the value of $102,000, and exported to them similar material worth $27,000. The mutual reduction in duties will probably result in advantage to the American producer and discourage Canadian production.

Sins of Omission.

An impartial consideration of the proposed arrangement would seem to indicate that the Canadian mineral industry will receive no great advantage. On the other hand it may suffer considerable loss. The changes are not large, and while some are benefitted, and some injured, the industry as a whole is left about as it was.

One cannot help regretting, however, that the opportunity was not taken to bring about changes which would have been of the greatest value to the industry. For instance, the zinc producers of British Columbia, who have large and valuable deposits of zinc, are suffering severely because of being shut out of the American markets. The American import rate is a variable one. but on the material which would have to be shipped is at the rate of 1c. a pound, or about 20 per cent. on the value of the refined material. This is a prohibitive rate. As Canada accepts American metallic zinc free of duty it would have been a fair thing to have asked them to have accepted our zinc ore free. This would have been a true reciprocity.

Again, cobalt oxide is subject to a heavy duty going into the United States, while our cobalt ores are accepted free of duty. This militates against the Canadian smelters engaged in treating cobalt ore and tends to make it more advantageous to ship ore to the United States for treating. The Government could have fairly insisted that a true reciprocity would have admitted not only cobalt ore but the refined product

into the United States, particularly as we receive the refined metals free of duty.

e same conditions of affairs applies to the large l industry centering around Sudbury. The d States has no nickel mines of its own, and re- Canadian nickel ore and nickel matte free of It puts, however, a duty of 6c. a pound (which rohibitive rate) on refined nickel, and so prevents stablishing of a nickel refining industry in On- We take back from their refiners metallic l free of duty. A fair reciprocal deal would be bolition of the American import duty on metallic l, thus giving the opportunity for the establish- of a nickel refining industry in Ontario. This ion has been up for consideration before, but ly with the idea of compelling the refining of l ore in Canada by means of an export duty. This rhaps a questionable policy, but there can be no t about the fairness of allowing a nickel refiner erate in Canada on the same terms as in the d States.

lead ore the Americans place a duty of 1½c. a d, which effectually prevents the operating of British Columbia mines. Here, also, we are tak- back from the United States metallic lead made our own ores at a low rate of duty. It would been of the greatest advantage to our lead pro- rs if lead ore could have been placed on the free

New Brunswick and Nova Scotia two promising nony mines have been operated, but the Can- market is limited. The American duty on llic antimony amounts to 1½c. a pound, while received into Canada free of duty. The removal e Americans of this import taxation would have of great advantage to the producer.

rundum ore is admitted free into the United s, whereas the ground product is taxed $5 a ton. Owing to freight rates, it is necessary to concentrate this material at the mine, and so the bulk of the exports from Canada pay a heavy taxation. The reduction of the rate on corundum would have been of very great advantage to the producer.

Crude graphite is admitted into the United States free of duty, but the partly manufactured material is taxed at the rate of 20 per cent. Here also is exemplified the usual attitude of the Americans, who are willing to take our raw material but strive in every way possible to put the industries dependent on these raw materials in their own country.

Crude barite is subject to an American duty of $1.50 a ton, whereas the manufactured article pays $5.25 a ton. The abolition of this duty would lead to a large industry in Canada.

A consideration of the very numerous ways in which the tariff might have been changed to the advantage of the Canadian mineral producers leads one to criticize adversely the changes which have been made and the methods by which they were brought about. No two ministers of the Crown, no matter how clever, could known the details of the mineral industries of Canada, far less of all the industries of the country. Sir Wilfrid Laurier was perfectly right when he declared that no changes would be made in the tariff until the question had been considered by a commission. A serious mistake was made in allowing the matter to be dealt with by two men who were without adequate advice. It seems that in a few cases personal friends of the ministers advised them on a few items. The great majority of the men engaged in the mining industry were entirely unconsulted as to the changes that ought to be made. The agreement and the method in which it has been brought about, reflect no credit on the commissioners, nor do they accomplish for the mining industry what they might have done.

TIN AND TOPAZ IN NEW BRUNSWICK

Written for the CANADIAN MINING JOURNAL by
R. W. Brock.*

paz and tin have been found by the Geological ey near Burnthill brook, southwest Miramichi r.

olybdenite in small amount in quartz veins has been known to occur at this point, being noted he reports of the Geological Survey for 1866-69 e 206), for 1879-80 (part D, page 45), and in XIV. (page 206A).

st summer the locality was visited by Dr. T. L. ker for the Mines Branch of the Department of s, who found that wolframite, as well as molyb- te was a constituent of the veins.

st winter Mr. Lodge, of Moncton, and Mr. Frieze, oaktown, who took up a mineral location at this t, sent in specimens from their claim, which on ination by Mr. R. A. A. Johnston, mineralogist he Survey, were found to contain topaz as a gan- mineral with the quartz. The crystals were wea- ed. Some were fairly large, exceeding an inch in length and three-quarters of an inch in diameter. Except as a microscopic constituent of a British Columbia granodiorite, this was the first known occurrence of topaz in Canada.

As there seemed a possibility that tin might also be found with such an association of minerals and that fresh crystals of topaz might be clear and of gem quality, I recently availed myself of an opportunity to spend a day or two at the occurrence. It is reached from Boiestown, on the Fredericton branch of the Intercolonial Railway, by driving about nine miles to Campbell Settlement, and a day's poling up the southwest Miramichi in a canoe.

The rocks are argillites, considered by Bailey and Ells to be of Cambro-Silurian age, that have been invaded by a granite batholite. Along the contact of the granite the argillites are metamorphosed to spotted schists and hornfels.

Granite porphyry and aplitic dykes form the country rock. A few basic lamphrophyres were also seen, but at least some of the latter are old-

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*Director Geological Survey.

er than the granite, as the quartz veins run uninterruptedly through the basic dykes.

Within the highly metamorphosed zone of the sedimentaries which forms a border, roughly half a mile or so wide, along the granite contact, the mineral bearing quartz veins are developed.

About Burnthill brook the veins appear to be best developed and most highly mineralized on the sidehill facing and opposite the mouth of the brook. Near the granite contact, which crosses the brook about a quarter of a mile from its mouth, veins do not seem so numerous nor so well mineralized.

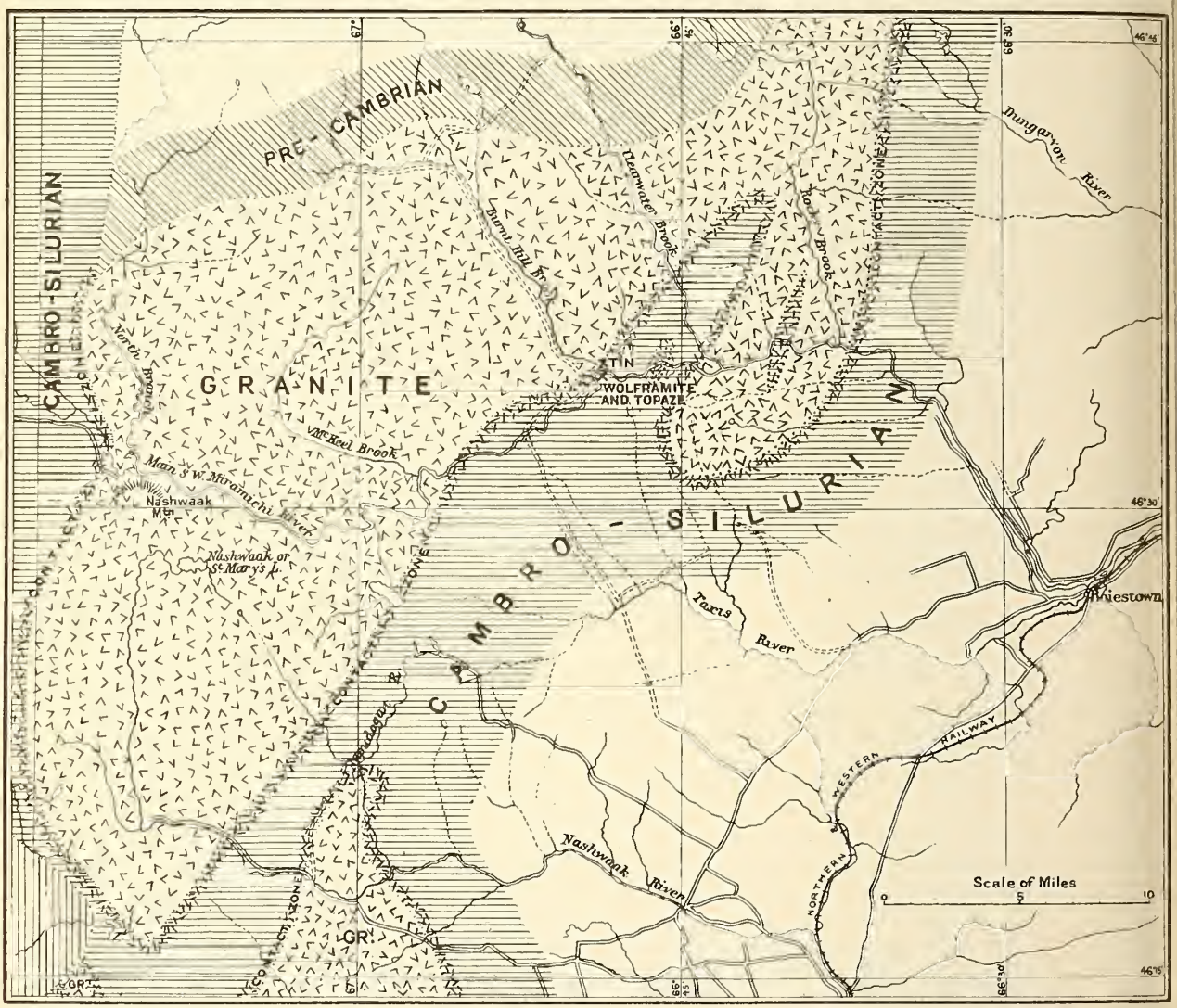
The strike of the country rock varies somewhat but is about N. 67 deg. E.* dip 55 deg. N. Both the sedimentaries and the granite are heavily jointed, the joint planes having a direction of from N. 20 deg. to N. 40 deg. W.

Quartz is developed parallel to the strike of the schistosity of the sedimentaries and parallel to the joint planes. Parallel to the strike, the quartz is irregular, forming lenses and sending irregular stringers into the country rock. Between such stringers the country rock is often silicified. Parallel to the joint planes the quartz occurs in well defined, regular veins which can be traced in some cases for several hundred feet, but some can be seen to pinch out.

*Directions are magnetic.

Some inclusions of country rock occur in the and the wall rock is occasionally silicified, so there has been replacement as well as vein fil The majority of the veins are under a foot in but at the point where the specimens were obta last winter (they were mostly float), I had a uncovered for about 50 feet that averaged at two feet.

On the east side of Burnthill brook, at its m a mineral-bearing quartz vein is bordered by gre a rock consisting of silvery mica and quartz. mica of the greisen, which is muscovite, is often s gated in bands. A little farther north is another in which greisen predominates. North of this,



the granite contact, I found a four foot dyke greisen, parallel to the joint planes and the qu veins. In it were a few quartz stringers and dr of quartz. It was in this greisen that I found stone (cassiterite). There is, therefore, evidentl gradation from the greisen to the quartz veins, the veins are clearly contact phenomena of the truded granite. The following minerals were served in these veins: quartz, muscovite, brown m feldspar, topaz, fluorite, wolframite, molybde pyrrhotite, chalcopyrite, and cassiterite.

The quartz, which is milky and vitreous, is the c gangue mineral. It occurs massive and crystall in vugs and druses. Muscovite is most plentifu

greisen but is also found in the typical quartz . The brown mica was seen in one of the quartz n.

ldspar was found in one of the banded quartz-en veins.

e topaz occurs in a great many, if not in most, of the quartz veins and in considerable quantity. It is mo frequently found as crystals lining vugs and dr es, but it also occurs massive. The crystals are mi oscopic to thumb-large in size. Little unweather-ed aterial could be obtained, and the topaz seen was mo ly cloudy, or stained with iron oxide. Some crys-tal were almost milk white, but some small clear ye w crystals of gem quality were found. In one sm l vein a druse with a surface area of about eight sq re feet was completely coated with topaz crystals. Th dark blue fluorite also occurs in druses but spar-ing.

he brownish black wolframite occurs in consider-ab amount, usually more or less segregated into bu hes which are commonly near the centre or along th edges of a vein. Although bunchy, it is suffi-ci tly plentiful to warrant some prospecting. The mo bdenite is less abundant. Its occurrence is simi-la to that of the wolframite.

he pyrrhotite and chalcopyrite are only sparingly pr ent. The iron sulphide is later than the wo ramite. The brown cassiterite was found in the gr sen in small amount only, but it may occur also in he quartz veins.

he granite in the neighbourhood of Burnthill bro k is for the most part drift-covered, but some is ex osed in the brook itself. Some small quartz veins an pegmatite dykes were observed in it. The quartz ve s were similar to those in the sedimentaries, but only molybdenite was observed in them. There is no reason, however, why tin-bearing greisen, or wolfram-ite-topaz veins should not be found in the granite, especially in fractures near its contact with the sedi-mentaries, where pneumatotytic action would be as apt to occur as in the sedimentaries near the contact.

The district is one that is worth some prospecting. While one cannot yet state that it is present in com-mercial quantity, the wolframite is present in suffi-cient amount to warrant prospecting, and there is a chance that prospecting might reveal larger and rich-er veins. There is also a possibility of finding more tin. Greisen is notably a tin-bearing rock, and the association of minerals is favourable. Some topaz of gem quality would no doubt be found. The stone in the rough is not worth much, but it has some value.

While there are no roads, if a workable deposit were found, transportation would not be difficult. In winter supplies might be brought on the ice or a road would not be difficult of construction; in summer they might be floated on scows down the river from the National Transcontinental Railway and the products floated on down to Boiestown. The chief difficulty in prospecting is the paucity of rock exposures, the wooded nature of the country and the depth of wash and drift over much of it.

To prospect, the contact of the granite should be sought and followed, and prospecting carried on both in the granite and in the metamorphosed zone of the argillites. In the latter the strike of the rocks should be followed as the promising mineral-bearing veins are parallel to the joint planes at right angles to the strike. Where float is found in quantity the source is usually close at hand.

PROSPECTING THREE CENTURIES AGO

o Mr. W. F. Ferrier, of Toronto, the writer is in-d ted for the opportunity of glancing over, gloating o r is the apter phrase, a beautifully preserved little v me printed in the year of our Lord, 1639.

he title page, a delightful example of Carolian type-se ing, is so explicitly descriptive that I reproduce it h e. Cold, modern print robs this title of half its c rm; yet the naivete cannot be missed.

ere is the page:

A DISCOVERY OF SUB-
terraneall Treasure, viz.

C all manner of Mines and Mineralls, from the Gold to the Coale; with plaine Directions and Rules for the finding of them in all Kingdomes and Countries.

And also the Art of Melting, Refining, and Assaying f them is plainly declared so that every ordinary man, that is indifferently capacious, may with small charge presently try the value of such Oares as shall be found either by rule or by accident.

hereunto is added a reall Experiment whereby every gnorant man may presently try whether any piece of Gold that shall come to his hands be true or counterfeit, without defacing or altering the forme thereof, and more certainly than any Goldsmith or Refiner could formerly discerne.

Also a perfect way to try what colour any Berry, Leafe, Flower, Stalke, Root, Fruit, Seed, Barke, or Wood will give: with a perfect way to make Colours that they shall not stayne nor fade like ordinary Colours.

Very necessary for every one to know, whether he be Travailer by Land or Sea, or in what Country, Dominion, or plantation soever hee shall Inhabite

Imprinted at London by I. Okes, for Iasper Emery, and are to be sold at his shop at the signe of the Eagle and Child in Paul's Church-yard next Watlin-Street.

M D C XXX IX

What sublime assurance exudes from every line of this fascinating page! With what eager credulity the good subjects of King Charles must have proceeded to read, mark, and inwardly digest every hint of the way to wealth! Note the seductiveness of the wording—"so that every ordinary man, that is indifferently capacious, may with small charge presently try the value of such Oares." Was ever better phrase coined—"indifferently capacious"! The quaint priggery of it!

The ingenious author, one Gabriel Plattes, dedicates the child of his brain "TO HIS WORTHY FRIEND-

MASTER William Englebert Esquire, Health and Happinesse Temporal and Eternall, is heartily wished." In the course of the dedication we learn that the author desired to share with others his knowledge of the secrets of nature. "Also," he writes, "when I heard the manifold complainings of indigent people, of the hardnesse of the World, and of the difficultie of obtaining their livings: I have knowne many people of indifferent vertuous dispositions, for very want of meanes, to take in hand some actions which were not laudable." What a soul-searching confession!

The dedication concludes with a petition to William Englebert, Esquire, to cause the light of his countenance to shine upon the author, "your bounden Servant, Gabriel Plattes."

There follows a foreword addressed to the reader, a foreword as ingenuous, and as full of self-appreciation as one could wish. Gabriel Plattes explains his reasons for perpetrating the book. "Whereas" quoth he, "divers reasons have joyned together to move mee to take in hand this Taske: I will declare some few of those that may give the best satisfaction to the Reader, in this manner following. First, when I considered the great number of Treasure and riches which lyeth hidden in the belly of the Earth, and doth no good at all: and also the great benefit which might accrew to divers Kingdomes and Countries, by setting people on worke; . . " and so on. In praise of his own prospecting methods he has this to say: "I dare hazard a Wager of twenty to one, that there will be more good Mines discovered within seven years after the divulging of these Rules and directions, than hath beene in twenty-seven yeares before." How rarely modest is our good friend Gabriel Plattes!

There is a strong tincture of caution, however, in Mr. Plattes. He admonishes his readers not to risk everything in prospecting, and not to deem the "rules and directions . . . unpossible ever to faile: but rather to make this a part of his businesse, when hee shall come to such places as yeeld strong probabilities."

He then proceeds no longer "to stay the Reader with Preambles," and signs himself "Your hearty Well- wisher, G. P."

Like all of the chapters, the first is a strange admixture of common-sense, imagination, and superstition. One can see that the author was more than ordinarily observant. In his own quaint way he was part philosopher and part charlatan. He opens his discourse with what is intended for a study in geology, Chapter 1 being "a plaine Demonstration of the naturall cause of the generation and production of Mountaines and Mettals: whereby the Seekers may obtaine a good competent measure of Knowledge to guide them where to seek for the other External signes" of mineral deposits. By a beautiful process of reasoning it is shown that "there is no probability that any metalls can be generated neare unto the North and South poles of the globe, for those can by no meanes have any convenient Matrix for such a generating, being by all probabilities nothing but two Islands of Ice." To this effect the thesis is further developed: "Now whereas the North and South, by reason of their coldnesse, cannot suffer the said condensed Meteors to descend in forme of Water, but in the forme of Snow, Haile, or some substance of like nature, which there cannot melt in the superficies for want of heate, it is very probable that the new Accretion this way produced, doth presse downe still with its weight the said Islands of Ice towards the C[enter], where the centrall heate melteth it off continuall[y], which meanes the spherical forme of both Earth and Water are perpetually preserved." Thus we are asked to look upon the cumulative pressure of snow and ice at the poles as preserving the sphericity of the globe.

So confident is Mr. Plattes in his belief that [all] the mountains of the middle zones contain valuable metals, that he utters the following challenge: "And if any man be of a contrary opinion, I will not [envy] him; but as for my owne part, I will sell my Interest and hope of Mettalls in those places [this refers to the poles] for a Farthing, although I had a device how the cold there could not prevent my seeking [after] them."

It is now shown that "in Vallies and plaine Champion Countries, there is no hope" of finding mineral deposits. The reason adduced is that "the wombe of such earth is not apt for such a generation." Mountains, and mountains only, are to be prospected. Before touching the origin of mountains, the belief is expressed that they are the result of the action of water, "but whether this was done by Noahs Flood or by the Sea in former Ages, is doubted." The result that no further work was done on these.

Chapter 2 is practical. In it are given "the signes of Mines and Minerals, with the manner how to worke to find the same." The first paragraph directs the prospector how to begin: "When we come to the Rocky and Craggy Mountaynes, the first thing we are to observe, is the barrenesse of them; For the more barren they are, the greater probability there is that they containe rich Mines and Minerals." The [word] "barren" evidently means absence of vegetation.

Next, the searcher is instructed to hunt for springs of water issuing out the said mountains. The water being found, it is to be boiled in a "new clean pipkin," to the consistency of "thinne Oyle, but not so thicke as a Syrrup," When cold it must be placed in an "urinall" and set for three days in the coldest place that can be found. The reader is then enjoined "to observe it exquisitely what residence [residuum] it yieldeth: if nothing settle but a black earth or middle, it is a signe of COALES: if some part thereof shoot into Ice [crystallize], or a substance like Ice or Vitroll, then to observe the colour thereof." If the colour be green, it is an evident sign of copper. If whish. "then it may signify any other Mettall without exception."

J. C.

(To be continued.)

A press despatch sent out from Seattle, Washington early in August was as follows: "One thousand tons of copper from the Guggenheim Alaska mines is being loaded on the steamer Protesilaus for shipment to Hamburg. This is the first consignment of Alaska copper for Europe." In connection with the foregoing it will be recalled that the first through train carrying freight over the Copper River & Northwestern Railway left Kennicott, the interior terminus of the line, for Cordova, Prince William Sound, on April last, loaded with 1,100 tons of copper ore from the Bonanza mine. This ore was shortly afterwards shipped from Cordova Bay by steamer to Tacoma, Puget Sound, Washington, distant about 20 miles from Seattle.

The Auriferous Ferro-Dolomites of California

By William H. Storms.*

There is a remarkable similarity between the gold-aring ferro-dolomites of the now famous Porcupine strict, of Ontario, Canada, and those of the Mother de of California. To such an extent is this true, at, in some instances it is difficult to distinguish in hand specimen between those for Porcupine and ose from the California localities. This makes the ology of these far separated regions of particular terest to geologists, mining engineers, and, in fact, all who are engaged in mining in either region. A mber of interesting and valuable contributions, de-riptive of the Porcupine district, have appeared dur-g the past few months in the CANADIAN MINING URNAL, and I believe a brief description of the fer--dolomite veins of the Mother Lode of California nnot fail to be of equal interest at this time.

The gold-bearing belt of California extends in a rthwest direction from the Mexican border, the en-re length of the state, and beyond it into Oregon, it that portion commonly known as the Mother Lode restricted to five counties in the east central part the state, and within this area it possesses distinc-ve features that entitle it to be considered almost as separate mineral province.

The impression commonly entertained by those un-miliar with this world-famous gold-producing region that the Mother Lode forms a great and continuous ein, or lode, which runs uninterruptedly through the untry for several hundred miles. Such, however, not the case. What is known in California as the lother Lode is not confined to a single vein, nor is it ally continuous throughout its length of over 100 iles, but occurs as a series of fissures of branching pe, which have an approximate parallelism. These ssures are found cutting indiscriminately through he various kinds of rocks which happen to be in its ourse. Beginning at its southern end, it appears as large outcrop of white quartz, near the site of the ld village of Bridgeport, in Mariposa county. Bridge-ort, together with many other of the towns of early ays, is now merely a memory. This quartz outcrop ccurs in clay-slate, and is near a large mass of gran-te, which sweeping down from the Sierra Nevada, uts off the southeasterly extension of the earlier ocks. From this place in a northwesterly direction, hrough Mariposa and Tuolumne counties and extend-ng into Calaveras county, the great dolomitic lode ap-ears at frequent intervals, usually as a wide mass of lolomitic rock, which is undoubtedly of intrusive or-gin. In some localities the vein is but a few feet in vidth, but within a short distance swells to a hundred feet or more in width, with occasional branches into the country, one notable instance being found about a mile north of the Rawhide mine, in Tuolumne county. Often the composition of this dolomite is varied by the occurrence in it of a greater or less amount of iron carbonate, forming, then, the rock ankerite (fer-ro-dolomite). This rock appears in huge outcrops, often more than 100 feet, and from that up to 300 feet in width, being always accompanied by quartz in the form of veins, lenses, or masses of irregular shape. Generally the larger of these masses take the form of an elongated lens, which lies practically parallel to the strike of the Lode, these lenses being scattered throughout its width. The more prominent lenses are usually connected by smaller veins of quartz which cross the intervening mass of ferro-dolomite in varying direction. Very often, in fact nearly always, the entire mass of ferro-dolomite is a perfect network of quartz veins, large and small, with masses and stringers. Sometimes the smaller veins have a radial arrangement about a larger nucleal mass, branching out from it like the spokes of a wheel, though without any regularity as to separating distance.

The quartz being much harder than the dolomitic rock, has been better able to withstand erosive agencies, and as a consequence often forms wall-like outcrops of dazzling whiteness, conspicuous objects in the picturesque landscape. These huge outcrops of ferro-dolomite and quartz frequently appear as conical hills in the centre of the mountain valleys, or as ridges rising above the general level of the adjacent country. Among those of the first mentioned type are Mount Ophir, and Penon Blanco (white cliff), in Mariposa county; McAlpine hill, and Quartz Mountain, in Tuolumne county, and Carson hill, in Calaveras county. Typical ridges formed by the great ankerite and quartz vein are those near Coulterville, in Mariposa county, and Golden Rule Hill, Whiskey hill, and the Rawhide hill, in Tuolumne county. Numerous outcrops of the same material appear elsewhere, but usually these merely form a portion of a group of hills or ridges, not being particularly conspicuous. Outcrops of this material also occur in the northern part of Calaveras county, near San Andreas, and in Amador county, in the town of Jackson, where it outcrops for nearly a mile and then disappears to reappear in El Dorado county, nearly 20 miles away. There are several long intervals of this kind along the Mother Lode where the dolomitic vein is not seen for miles, though quartz veins are of frequent occurrence in these intervals, being in schists or slates.

Throughout the entire length of the Mother Lode, wherever the ferro-dolomite is found, it presents essentially the same characteristics, one of the most important of which is the almost constant occurrence of a bright-green micaceous mineral called mariposite. The colour is due to the presence of chromium, and not to copper, as was supposed in early days, considerable work having been done then on some of the claims in the belief that the ore was rich in copper. Serpentine very commonly occurs along the Lode, in irregular intrusive masses often of great size, and it is in the proximity of the serpentine that the mariposite is most abundant. There are large masses of dolomitic rock, however, in which little or no mariposite is visible. While the serpentine does not always accompany the dolomitic vein, it occurs at many places along the Mother Lode where no sign of the dolomite can be found. As a rule, however, they are both found in the same localities.

Aside from their geological interest, the economic features of these occurrences are of importance. In most of the mines the dolomitic mineral is auriferous, the gold occurring in both the "free state," and intimately associated with pyrite. It is usually more abundant in that which is intersected by numerous veinlets of quartz, but the dolomite is itself gold-

*Mining engineer, 2437 Hilgard Ave., Berkeley, Cal.

Rawhide Mine, Tuolumne County, California

bearing when little or no quartz can be seen. In value these ores range from the merest trace of gold up to thousands of dollars per ton. In the Rawhide mine, near Jamestown, in Tuolumne county, was found a shoot of ankerite a great deal of which contained from ten thousand up to over twenty thousand dollars per ton in gold. These were not hand specimens, but tons of astonishingly rich ore. Similar ore has been found in the App mine, at Quartz Mountain, about three miles south of the Rawhide. It is scarcely probable that these two instances are the only occurrences of rich ankerite along the Mother Lode. In many places the mineral constitutes pay ore, and in some of the mines it is the chief source of the gold. The quartz so commonly associated with the ferro-dolomite is usually gold bearing in all of the mines in which it occurs, but like its occurrence elsewhere, it is by no means always rich.

As to the origin of the dolomitic veins, there seems to be no doubt (as far as the California occurrences are concerned), that they are the result of the alteration of ancient basic dikes which were intruded into the slates and schists in which they are now found, and in most instances they are undoubtedly older than the other dike-rocks with which they are associated. These intrusives are principally diorite, diabase, various phases of granite (chiefly aplite), serpentine, and gabbro. It seems not unlikely that these great masses of ferro-dolomite may have originally been gabbro, or some similar rock. There are many instances along the Lode where the gabbros have been altered to serpentine, every stage of transition between the two rocks being found, but the serpentine for most part has evidently been derived from peridotitic rocks.

It is well known that a lime-magnesian carbonate, and a lime-iron carbonate associate themselves in many proportions to form ferro-dolomite, and for this reason the dolomitic lode presents many phases. In some instances the outcrop consists of great masses of red and brown iron oxide and quartz, as at the Pine Tree mine, in Mariposa county, and at Quartz Mountain, in Tuolumne county, while in other localities it appears as a gray, lustreless mass, with little sign of the presence of iron in any form. Again, it is bright and "lively," filled with scales of mariposite and minute veins of quartz. Usually the rock is rather coarse in texture, occasionally fine-grained, sometimes dull, sometimes glistening, like the surface of new fractured marble.

Too little careful study has been given to the origin and the subsequent alteration of these great dolomitic masses, and we still have much to learn concerning them. Investigation of these deposits has thus far been almost wholly confined to the economic features, and it is, after all, the economic phase that makes the proposition attractive, for this succession of outcrops of ferro-dolomite and quartz constitutes one of the largest, and in many respects, one of the most interesting series of auriferous deposits in the world.

COAL AND GOLD ORES.

Coal and gold ores are not often found in close proximity, but the Rand is a notable exception. In the shallower portion of the Far Eastern Rand, between the Apex mine and the Welgedacht, the coal measures are found near the surface, and are underlaid by the auriferous banket beds. The coal measures also contain a small percentage of the yellow metal, and many years ago an attempt was made to recover this gold from the ashes. The recovery was, however, very small as to be unpayable. At the Buffelsdoorn mine a small seam of coal was found in the banket beds.

SUGGESTED AUSTRALIAN EXPORT DUTY ON ORES.

For some time there has been an agitation in Australia for an export duty on crude ore, the contention being that the dear labour and high railway rates in Australia prevented the local smelters from successfully competing with foreign smelting works. An export duty would, it is contended, mean an increase in supplies to local works. But it would be adverse to the outlying districts, such as Whim Well. This mine, being near the seaboard, can ship its ore at a cheaper rate to European smelters than it would cost to ship to the smelters in New South Wales, and it costs much less to smelt on this side than in the colony. An export duty would, therefore, be such a burden on some mines that it might compel them to close down entirely.

McIntyre - Porcupine Mines, Ltd.

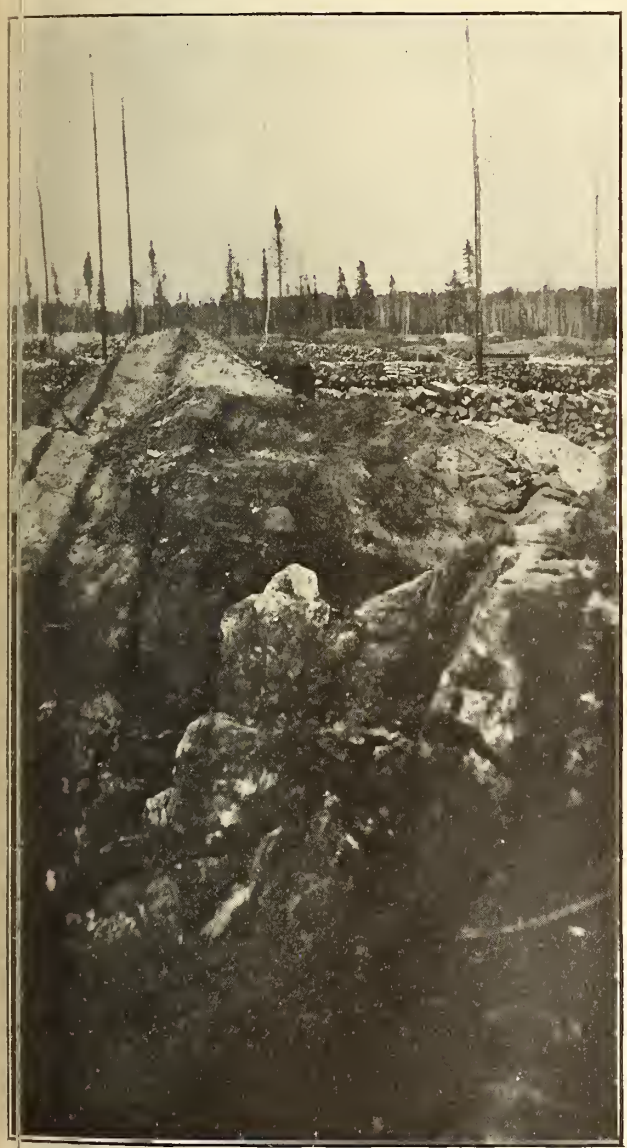
(Written for the CANADIAN MINING JOURNAL by V. H. Emery).*

[illegible]e general location of the above property may be see[illegible] in the accompanying map, fig. 1, which is a reproduction on a small scale of a survey made of the district surrounding Pearl Lake. The map shows the location of the quartz outcrops, and the direction of the general strike of the veins in the district.

Geologically the McIntyre is situated in the much de[illegible]ed quartz-porphyry zone, which, as is shown in fig[illegible]1, passes from the Hollinger through to the east en[illegible] of Pearl Lake, the strike of which corresponds al[illegible]ost exactly to that of the veins. This quartz-porphyry intrusion has been greatly metamorphosed by pressure, giving it a schistose appearance, and in some places becoming quite talcy. At the south of this intrusion the rock is an amygdaloidal basalt, while in the north it is chiefly composed of basalt commonly called green-stone.

The surface development of the McIntyre may be seen in part by the accompanying photographs. A 12-drill compressor will be in operation by the first of September. The contract for a forty-stamp mill has been let, a portion of which it is proposed will be used for customs work for some time. The general process

General View McIntyre Camp, Porcupine.



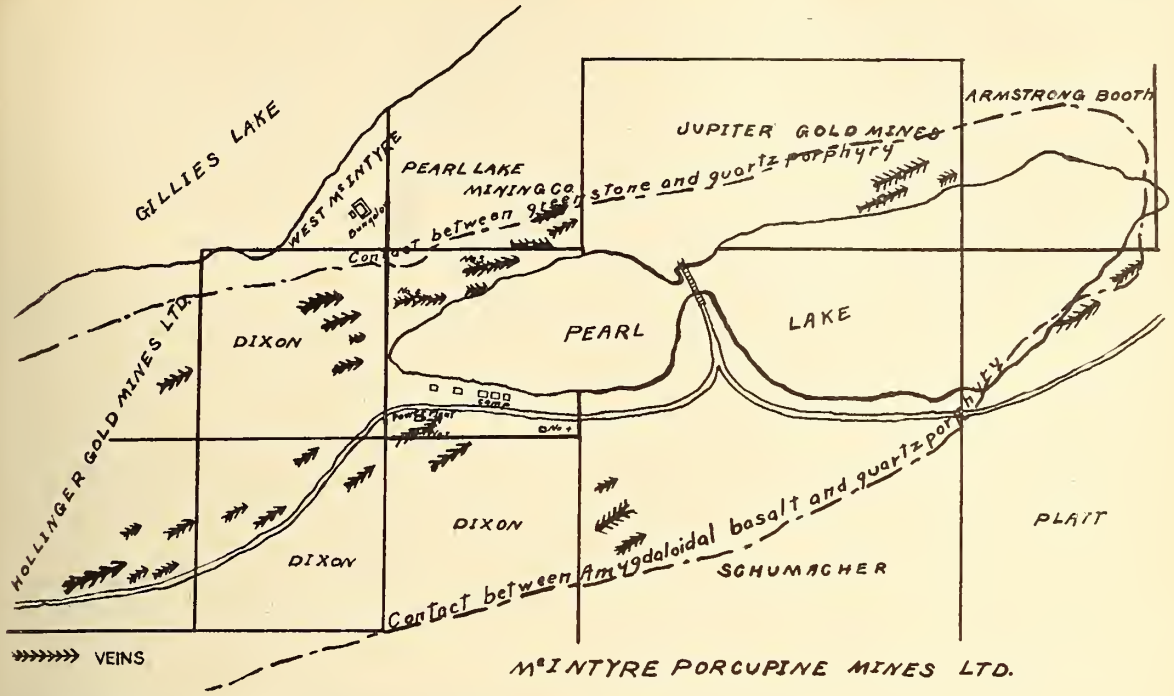
McIntyre No. 2 Vein, 200 Feet West of Shaft.

McIntyre No. 1 Vein.

McIntyre Power Plant.

[illegible]ining Engineer, Porcupine, Ontario.

Large Vein Uncovered on Dixon Line Running Into McIntyre.



McIntyre No. 2 Vein, Showing Dump.

of treatment of the ore will be amalgamation followed by cyaniding.

Considerable underground work has been done. Four shafts have been sunk on veins to depths from 75 to 100 feet, all of which have developed high grade ore. About 1,000 feet of drifting and cross-cutting have also been completed, which has in some instances opened up extremely rich ore shoots.

Two shot drills have been working continually since operations commenced, and a diamond drill for the past two months. In all nine holes have been drilled, some to considerable depths the result of which has been very encouraging. Large high grade ore bodies have been located at depths both under the lake and on the land property.

When the compressor commences operating, development work will be carried on at a very rapid rate, accompanied with systematic sampling, a thing that is essential in this district for determining the extent of pay rock in the schist, which in some instances extends from one quartz vein to another.

It is expected that by the time the mill is ready to receive ore that sufficient of the ore now located will be in readiness to keep it running at its fullest capacity.

THE SEARCH FOR PROMISING MINES.

Mr. Sidney J. Jennings, the vice-president of the United States Smelting, Refining and Mining Company, has stated that in the year 1910 an examination of the reports submitted resulted in the rejection of no fewer than 514 mining properties. A preliminary examination was made on 124 properties, with the 46 properties only was further work done, but only two of these were found sufficiently attractive to warrant purchase. These figures show the trouble involved in finding a suitable mine, and the large expenditure necessary to do so.

A Visit to the West

(Special Correspondence.)

As I have just returned from spending a month in southern Alberta and western Saskatchewan, where I had occasion to look into the local coal situation, I have jotted down a few notes that may be of interest to your readers.

Glancing first at the prairie deposits, it is well-known, of course, that the coal of these regions is a low-grade bituminous fuel, in most places resembling closely the product of the Lethbridge mines. Further west, in the Crow's Nest Pass country, the coal is of distinctly higher quality.

The growth of the agricultural industry is so pronounced that land for from 50 to 100 miles surrounding the present lines of railroads is taken up by farmers. Hence the need of local fuel supplies is becoming more and more pronounced; and the country is being prospected systematically. The result has been the discovery at numerous points over the southern Alberta prairies of outcrops of coal, usually in the bottoms of the coulees. In thickness the seams run as high as 9 feet. They are practically flat, and should be easily worked by tunnel from the outcrop.

These discoveries give some idea of the extent to which the prairie is underlain by coal measures. No doubt, deposits could be located at many points by shaft, if local conditions warranted the expense.

The point of my remarks is, however, that farming on a large scale, implying the use of steam-driven machinery, is creating a large demand for cheap fuel. Steam and gasoline engines are being used extensively already to break the land. The farmer pays as much as $15 per ton for coal laid down at the farm. Seldom does he pay less than $10 per ton for coal distributed by rail from the Lethbridge and Taber districts, and then hauled by team to the farm. Coal from Fernie and Cranbrook costs correspondingly more.

In some cases the farmer or rancher owns the mineral rights as well as the surface. In all cases a lease on the coal rights can be secured. Thus many farmers are producing coal on a scale sufficient to meet the requirements of themselves and of their immediate neighbours. Local sources of supply mean a saving of from 50 to 75 per cent. in the cost of fuel. Incidentally, the steam traction engine is more popular than the gasoline traction, because it is decidedly more fool-proof. It will be used exclusively wherever cheap coal can be obtained, and will replace the horse to a very large extent. The gasoline traction engine, on the other hand, is a constant source of trouble. The expense bill is so high that it is doubtful if the most competent mechanic can operate them to commercial advantage. Supplies and repair parts are exceedingly difficult to obtain, and the engine is apt to be put out of commission at any time.

It is probable within a few years many small coal workings will be opened all over the western prairies. Coal thus produced is always cheaper than that brought in by rail from the larger mines.

* * * * *

On my way east I stopped for a few days near the Manitoba-Ontario boundary to examine and report upon a gold mining property that has been quietly developing during the past two years. I would like to point out that in the excitement of eastern booms we are all apt to overlook the west. Western Ontario and eastern Manitoba are worth looking over. Study of coal conditions in Alberta and Saskatchewan is very profitable. In all of these districts there are many excellent chances for investment.

W. E. H. Carter
*Mining Engineer, 85 Front St. East, Toronto.

Electrothermic Smelting Zinc Ores.

On two or three occasions Hon. Wm. Templeman, Dominion Minister of Mines, has publicly mentioned that in connection with the experiments being carried on by the Mines Branch of the Canada Department of Mines in the reduction of zinc ores he has "secured the services of W. R. Ingalls, of New York, who is said to be the greatest expert in zinc on the continent." Mr. Ingalls, who is editor of The Engineering and Mining Journal, New York, contributed to the annual meeting of the Canadian Mining Institute held last March a paper on "The Problem of Mixed Sulphide Ores." The text of this paper was printed in The Engineering and Mining Journal of July 29. The following excerpt from Mr. Ingalls' paper is here given. After dealing with various methods of treatment that had been tried, Mr. Ingalls continued:

"For those places where it is desired to develop a market for miscellaneous ores, a place to which any miner can send and sell small outputs, or even an occasional lot of ore, it seems to be necessary to develop some system of pyrometallurgical concentration, or what may be roughly characterized as smelting. This idea is under consideration in some experimental work that is now being done by the Department of Mines of the Dominion of Canada. Along with that work, attention is also being directed to the subject of electrothermic smelting.

"The possible treatment of zinc ores in the electric furnace is not a new idea. Attempts to smelt zinc ore in such a furnace have been made from time to time during the last 25 years. In fact, the Cowles brothers, who achieved distinction in connection with the aluminum industry, were engaged in an attempt to smelt zinc electrically before they directed their attention to aluminum. The list of proposals for electrothermic smelting of zinc is almost as long as those for the blast-furnace smelting of this metal, and those in the field of hydrometallurgy. At least two ambitious attempts at electric smelting on a commercial scale have been made. Both were failures, not only commercially, but also metallurgically. I am disposed to think that such metallurgical difficulties as have been experienced in the electric smelting of zinc ores can be surmounted, but even with this assumption I am by no means prepared to say, at the present time, that electric smelting would have any advantage over smelting in the standard way. My present view of electric smelting isofar as zinc is concerned, is simply that it is an unexplored field of metallurgy. In ploughing this field we may find something of value, but as to whether we shall or shall not we cannot at present say."

Tentative Program and Rules

First National Safety Demonstration.

Under auspices of U. S. Bureau of Mines, American Red Cross Society, and Pittsburg Coal Operators' Association.

Non-competitive exhibition of skill in first aid to the injured in mines, to be held in Forbes Field, Pittsburg, Pa., October 27, 1911, 9 a.m. to 1 p.m.

Not more than one team of five men to represent any one coal mine, or the U. S. Bureau of Mines, or state mine departments, provided that coal mining companies operating more than one mine may enter additional teams representative of groups of miners, veners, trapper boys, or other mine workers.

All persons entering to submit certificates showing that they are, or have been, bona fide mine workers.

All entries to close one month prior to date finally elected for the meet.

Coal companies entering teams to be invited to present, not later than one month in advance of meet, a list of five events as their choice, these to be submitted to the managers, who will select five for adoption from the various events suggested, each entering team to exhibit in those events suggested by them and such others of the five as they may elect. All teams to exhibit in unison.

Should any unusual or valuable events be suggested, the managers may increase the program by one or two such special stunts.

In addition to the five first aid events there will be a representation of a coal dust explosion, with rescue by helmetmen and first air treatment.

Exhibition of skill in adjusting and use of rescue apparatus by teams of four with a captain; entries to be as above for first aid teams.

Exhibition in use of fire extinguishers upon a fire by members of the rescut crews.

9. Souvenir badges of the American Red Cross, souvenir buttons of the U. S. Bureau of Mines, and souvenir programs to be presented to individual entrants; a souvenir first aid box to be presented to each team entering; a souvenir pennant with the name of the company sending entrant, and to be used on the field as a marker, to be presented to the company represented.

1. There will be introductory remarks by the Director of the Bureau of Mines and a member of the Executive Committee of the American Red Cross.

2. Presentation of souvenirs will be made at the close of the exercises in brief addresses by speakers of national repute.

Le Roi Mining Co. in Liquidation.

A meeting of shareholders in the Le Roi Mining Co., Limited (in liquidation), was held in London, England, on July 14 "to consider an offer which the liquidator has received for the purchase of the Canadian assets of the company." The Financial News' report of the proceedings follows:

Mr. A. J. McMillan (the liquidator), who presided, said that since the company went into liquidation last September he had been in negotiation with various parties in England and in Canada, but the offer made by the Consolidated Mining and Smelting Company of Canada, Limited, whose headquarters are in Toronto, Ontario, to purchase the Le Roi Company's Canadian assets for $250,000, was the best he had received, and he recommended that it be accepted. The offer provided for the payment by the Consolidated Company to the liquidator of the Le Roi Company of $250,000 for the Le Roi mine and the mineral claims adjacent thereto owned by the Le Roi Company, together with the machinery, plant, ore dumps, water rights, and real estate also owned by the company. That purchase price did not include cash on hand at the close of business on May 31, 1911, nor accounts receivable as on that date, both of which would be retained by the Le Roi Company, while the mining stores and supplies on hand at the mine were to be taken over by the purchasing company upon a valuation.

The purchase money would be paid as follows: Within 48 hours after the receipt of a cable advice of the ratification of the sale — which cable he proposed to transmit that day if the meeting confirmed the sale —the purchasing company would, for the purposes of that agreement, pay into the Dominion Bank, in Toronto, the sum of $25,000, and upon acceptance of a title a further sum of $100,000 would be paid into the same bank for transmission to the credit of the Le Roi Mining Company at par of exchange. At the expiration of one year from the date of ratification the balance of $125,000 would be payable, together with interest thereon from the date of ratification at the rate of 5 per cent. per annum, the purchasers having the option of making the final payment at any time after acceptance of title, with interest from the date of ratification to the date of such payment. These were the essential features of the agreement.

They would notice that the company's smeltery at Northport, Washington, and assets connected therewith, were not included in the terms of sale. Efforts were being made to dispose of that property, but up to the present time no definite offer had been received for it. It was impossible, therefore, to at present say what might be derived from the sale of the remaining assets of the company; but he was doing his best to dispose of them to advantage.

There was not very much to say in regard to the subject under consideration, and he did not think it really admitted of much discussion. While the price was not a large one, when compared with the original purchase price paid by the late Mr. Whitaker Wright or under his auspices, it was the best offer he had received, and, in his opinion, it was the best the shareholders would ever receive, so he advised them to accept it.

Mr. Grinke-Drayton, the late chairman of the company, having first remarked that he was satisfied the shareholders would never get a higher offer for the property, moved that the same be accepted.

Report of U. M. W. of A. Executive

The Executive of District No. 18, United Mine Workers of America, in which district are all the local unions concerned in the strike of miners and other coal mine employees in southeastern British Columbia and Alberta, issued under date July 29, a report addressed to the officers and members of local unions in District 18. After dealing with other matters relating to the lack of agreement between the members of the U. M. W. of A. and the Western Coal Operators' Association, the report gives a table showing the differences between the rates paid by the operators to the miners under the agreement that expired on March 31, last, and those that would be paid according to scale recommended by Dr. C. W. Gordon, chairman of the Board of Conciliation and Investigation, and that by Mr. A. J. Carter, the member of the board who represented the employees and who presented a minority report. The following part of the report of the executive will be of more general public interest:

"Reviewing the report of Dr. Gordon generally, as affecting the wages of our members, the advantages granted on the low rates would be offset by the reductions made on contract rates on pillars, leaving the majority of our members in the same position as heretofore, notwithstanding the many changes that have occurred, adversely affecting our wages, that were forcibly drawn to the attention of the board.

"In replying to the communication of the Minister of Labour we stated that we were prepared to make an agreement on the basis of Secretary Carter's report, and have, up to this time, steadfastly refused to consider an agreement on the basis of the report of Dr. Gordon. Our specific reasons for taking this position are:

"1.—That the advance suggested on the day wage scale is not what we are entitled to, and is only offered as a compromise, and in conjunction with the reductions specified.

"2.—That we do not consider that we should at this time submit to any reductions.

"3.—That no advance is granted on contract rates generally.

"4.—That no recommendation is made regarding the General Provisions of Agreement.

"It would be well in considering the action to be taken to carefully review the position of the District as it is after the suspension of four months.

"Up to this time, no attempt has been made to operate the mines without recognizing the organization but the members must be prepared for such a contingency, as this will undoubtedly be done, if the operators can force a guarantee of protection from the government.

"The action of the Boards of Trade delegate meeting at Macleod points in this direction, and gives in addition, an example of what might be expected from the particular portion of the community they represent.

"We are still of opinion that with continued firmness on our part we will be able to arrive at a better agreement than has governed us during the past few years, and we would like you to give this matter your earnest consideration from all standpoints before rendering a decision."

In addition to circulating the report from which the foregoing extracts have been made, the Executive of District 18 sent representatives to address the miners in some of the larger centres. A press despatch dated Fernie, August 11, published in the Nelson Daily News gave figures showing the result of the voting for and against acceptance of the recommendations of the chairman of the Board of Conciliation. The ballot of 17 local unions resulted in an aggregate vote of 393 in favour and 2,240 against acceptance. Returns had not been received from Coleman and Canmore, but these cannot materially affect the position. As more than half the votes were recorded at British Columbia collieries, figures from those follow in detail, while those from Alberta are given in totals only:

Places.	For	Against
Fernie	105	583
Michel	60	433
Hosmer	50	130
Corbin	3	46
In British Columbia	218	1,192
Alberta (13 locals)	175	1,048
Aggregate of votes	393	2,240

A Suggestion about the Treatment of Porcupine Ores

(Written for the CANADIAN MINING JOURNAL by Phil H. Moore.)*

Although at the present stage of the mining excitement in the Porcupine gold fields, more attention has been given to the finding of gold-bearing rock than has been given to the process of recovering the gold from the rock, it is inevitable that within a comparatively short time the milling of Porcupine ores will be the chief problem that the mining engineers will have to solve. In the case of the Dome and Hollinger mines the engineers in charge have evidently had it in their minds that considerable experimenting will have to be done on Porcupine ores before they could take the final steps in designing larger and more permanent milling plants. Hence the comparatively small installations that are now going into these extensive and valuable mines.

In many cases it is neither convenient nor expedient for the smaller mines to wait until the larger companies have demonstrated what really will be the best treatment of Porcupine ores. With an idea of helping out the engineer that is in charge of a comparatively small proposition but who sees sufficient values in sight to warrant the building of a small plant, where it is even more important to save all the values possible in

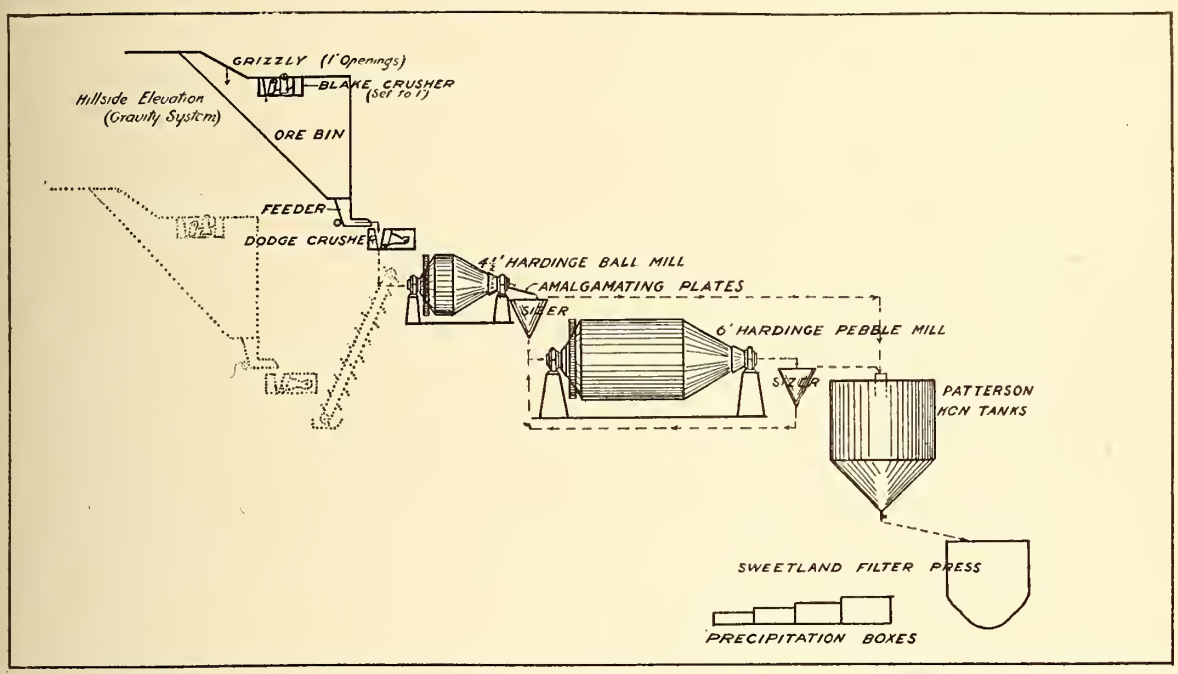
*Mining Engineer, King Edward Hotel, Toronto.

ore, than it is in a large, I have prepared the flow t accompanying this article.

his flow sheet has been prepared after making care- tests of Porcupine ores, and after investigating carefully the performance of the machines and aratus included, and deciding that they are the efficient machines on the market that have come in my notice.

s will be seen by the flow sheet, the ore to be ied is dropped through a one inch grizzly, and the -size goes to a Blake crusher set to one inch. The duct from the 1-inch grizzly and from the Blake her goes to an automatic feeder and into a Dodge her that reduces the product so that it will pass ree-quarter-inch ring. This in turn is fed into a foot Hardinge ball mill, which reduces the rock hat it would pass a 20-mesh screen. Owing to the cal shape of this machine, however, a screen is not l, and by the elevating or lowering of the discharge the product from this mill can be regulated to any desired. The product from the Hardinge ball sumed, and maintenance expense. One 4½-foot Hardinge ball mill will do the work of 15 stamps, but costs one-third less and requires no heavy foundation and less power to operate. The same applies to the Hardinge pebble mill when compared to the old fashioned square ended tube mill. The fact that these mills require no screen, is in itself no small item in operating expense.

The Patterson agitation tank is an improvement on the old style Pachuca agitation tank. In a fifty to seventy-five ton plant such as the flow sheet calls for, it will probably be necessary to use three of these tanks. The product passing from these tanks into a thickening tank would then pass direct to the Sweetland filter press, which is a pressure and not a vacuum machine. This press is the nearest thing to an automatic filter press that the writer has been able to find on the market, and sufficient demonstrations have been given, and sufficient testimonials are available so that the writer has adopted the press as being the best thing on the market at any price. And hence it



Flow Sheet of 50-75 ton Amalgamating & Cyanide Plant, furnished by P. H. Moore, King Edward Hotel, Toronto, Ont. Note : Dotted lines indicate Flat Elevation (Elevator System)

l passes over an amalgamated copper plate. From th experience of J. M. Elmer, of Tuolumne, California, a many others, it is believed that quicksilver may b introduced into both ball and pebble mills of the Hardinge type without flouring, in some cases sodium amalgam being used. In the writer's opinion it will b unnecessary to introduce mercury into the ball mill, as with a well amalgamated copper plate all of the coarse gold that leaves the Hardinge mill will be caught b fore the pulp leaves the plate and the finer values carried by this pulp will be caught in the cyanide proces following. The material passing over the copper pl te will go into a sizer the over-size passing into the Hardinge pebble mill for sliming, and the undersize p sing direct to the Paterson agitation tanks. The w ter is not allowed space to go into the merits of th Hardinge type of ball and pebble mills. But it suffices to say that on account of the conical shape of th se mills they are in the writer's opinion the most efficient machine, considering first cost, power con- is suggested in the flow sheet. When it comes to the precipitation of the gold carried in the solution taken out of the slimes, undoubtedly the zinc dust process is more up to date than precipitation on zinc shavings. I suggest that the cyanide solution should be introduced into the Hardinge pebble mill and carried through the entire process. A preliminary agitation would thus be given to the pulp while in the process of being slimed in the pebble mill.

In a few words, it is the intention of the writer to convey the suggestion that the treatment of Porcupine ores may best be simplified by treating the ore from the start with the intention of sliming the entire product, paying but little attention to the recovery of the gold in the earlier stages of the process. As it is necessary to treat the tailings from a stamp mill or other crushing agent by the cyanide process, it seems entirely unnecessary to divide these tailings into "sharps" and "fines," as this would require two separate treatments. Also it seems unnecessary to at-

tempt to make a high recovery by amalgamation. The writer would suggest that in case of certain ores heavy with concentrates, an additional concentrating plant could be added without much cost, and these concentrates might be treated with bromo-cyanide at slight cost per ton.

The cost of the entire plant as shown in the flow sheet should not exceed $25,000, erected in the Porcupine district, providing the haul was not too great from the railroad. The above sum includes the necessary steam boilers, engines, and pumps. Or, in case of electric power being available, the necessary motors to run the plant. A 60 h.p. will be all the power required. 90 per cent. of the total gold contents of the ore should be saved by this process, at a cost not exceeding $1.50 per ton.

An Enormous Deposit of Coal

Occasional reference has been made to the great size of the deposit of coal the Corbin Coal & Coke Company, Limited, of Spokane, Wash., U.S.A., has during the last three years been engaged in opening in the southeastern part of the Crow's Nest district, East Kootenay, British Columbia, but no conception of its astonishingly large proportions has been generally obtained. One principal reason for the comparative lack of information in regard to this altogether unusual occurrence of coal is the fact that the Corbin Company has avoided publicity. Nevertheless it is a fact that a phenomenally large body of coal is being explored, though as yet without any clear idea of how big it really is, development work not yet having reached the limits of the coal.

In response to an appeal for information, Mr. E. J. Roberts, of Spokane, managing director of the company, lately showed our British Columbia correspondent blue prints of the plan of surface workings and gave him particulars, of which the following is only a brief summary: The mine that has during the last two years been producing coal is at a comparatively low elevation—about 500 feet above the tipple. The main entry here has been driven approximately 2,000 feet and the coal deposit found to be at its widest part fully 300 feet in width. Farther in it has narrowed considerably, what appears to be a large point of rock having come into the coal. Development work is not being continued here, however, for there is so much coal available that the driving of additional length of entry would only involve maintenance costs that are quite unnecessary so long as the further opening of the coal body in that part of the property is not required.

At an elevation of about 1,200 feet above the main entry, on Coal Mountain, there occurs what is known locally as "the upper big showing," About 400 feet lower down the mountain, or 800 feet above the main tunnel, there is another big outcrop of coal, known as "the lower big showing." During the last six months these "big showings" have been partially prospected. An underground cross-cut shows the coal of the upper showing to be 96 feet in width where prospected by this working. Analyses of every 10 feet of coal give the following average percentages for 12 tests: Moisture, 0.87; volatile combustible, 18.47; fixed carbon, 67.86; ash, 12.80. The highest results were from the sample taken from the last 9 feet of coal cut in this tunnel, namely: Moisture, 0.45; volatile combustible, 15.70; fixed carbon, 77.40; ash, 6.45.

The lower big showing has been cross-cut by an adit which at 370 feet from its portal entered slate rock. Analyses, 37 in number, gave the following general average percentages: Moisture, 0.73; volatile combustible, 20.03; fixed carbon, 64.25; ash, 15.00. The highest results were from coal cut between 20 and 30 feet in from the portal of the adit. They were as follows: Moisture, 0.60; volatile combustible, 22.49; fixed carbon, 68.31; ash, 8.60. This lower showing has been cut in pits sunk through the surface wash deep varying down to 15 feet, and the vertical depth of the underground working where it reached the slate is approximately 200 feet below the coal cropping cut in the pit immediately above it.

This enormous deposit of coal continues to be a problem to those engaged in exploring it, and much more development work will be necessary ere it can be understood. The fact remains, however, that there is a great quantity of bituminous coal of excellent quality, occurring under conditions that will admit of its being mined at very low cost.

CANADIAN MINING INSTITUTE — WESTERN BRANCH.

The eleventh general meeting of members of the Western Branch of the Canadian Mining Institute will be opened at New Denver, Slocan Lake, B.C., on Wednesday evening, September 13, 1911, when routine business will be transacted and several papers, some having particular reference to the mining industry of the Slocan district, will be read and discussed.

All members of the Canadian Mining Institute in good standing resiring in Western Canada and the neighbouring parts of the United States are, by virtue of such membership, also members of the Western Branch. Members are earnestly requested to make every effort to attend the ensuing meeting, and are cordially invited to contribute papers on matters relating to mining or metallurgy for reading at it; also, to inform the secretary that they will do so, if such be their intention.

Non-members will also be heartily welcome to attend, and to take part in the discussion of the papers that shall be submitted to the meeting.

The town of New Denver is situated on the eastern shore of Slocan Lake, which is one of the most beautiful lakes in the Kootenay district. For a pleasurable early autumn vacation the lake possesses the advantages of fine scenery, good boating, and fishing. Excellent hotel accommodation is obtainable. Local residents have offered to cordially co-operate to make a visit to their town and district thoroughly interesting and enjoyable. There are beautiful drives along the lake shore, and numerous launches are available for outings on the lake. Facilities will be afforded for visiting several important silver-lead mines and concentrating mills situated six to nine miles from New Denver. A short railway trip will take visitors into the heart of the Slocan Mountains and mining country.

It is requested that those who purpose attending the meeting — especially if to be accompanied by ladies —will please notify the undersigned, so that accommodation may be arranged for in good time.

E. JACOBS,
Secretary of Western Branch of C.M.
Victoria, B. C., August 12, 1911.

Coal Lands of the Hastings (B.C.) Exploration Syndicate, Ltd.

The Head Syndicate, Limited, a British organization of which Mr. James Head, of London, is chairman and Mr. Leslie Hill, of Nelson, B.C., is general manager and mining engineer, has for some time been continuously developing the southern portion of the coal lands of the Hastings (British Columbia) Exploration Syndicate, Limited.

These lands, which join on to the south end of the property of the International Coal & Coke Company, Limited, of Coleman, Alberta, comprise 6,520 acres, giving a total length of ten miles on the coal seams, with an average width of one mile on their dip. The area was originally located and purchased from the Government of Canada by the Hastings Syndicate and the Kootenay Supply Company, jointly. In 1909 the Head Syndicate was formed to purchase the interest of the Kootenay Supply Company and to develop the property. An option of purchase of the interest of the Hastings Syndicate is now held by the Head syndicate.

The conglomerate overlying the coal seams forms a continuous ridge from the International Coal & Coke Company's property to Lynx Creek, a tributary of the North Fork of Old Man River. The ridge rises abruptly from Lynx Creek and reaches a vertical height of 1,000 feet in a horizontal distance of 2,500 feet. The average vertical height above Lynx Creek for 8½ miles is not less than 900 feet, so that it is estimated there are at least 45,000,000 tons of workable coal above adit level. There are three seams of coal, averaging, respectively, 10 feet, 12 feet, and 15 feet in thickness. The coal is of similar excellent quality for coking and steam purposes as that for six or seven years mined by the International Company, and still being produced by it. The extent and continuity of the coal seams and the excellent quality of the soil, together with the large tonnage above adit level, combine to make this property one of the most important and valuable yet opened in Alberta east of the Rocky Mountains.

The Head Syndicate has established a substantial and comfortable camp near where Lynx Creek crosses the coal seams. Previous to 1909 the Hastings Syndicate and the Kootenay Supply Company developed the northern half of the property by means of open-cuts and cross-cut tunnels, and proved the continuity and regularity of the coal seams. The additional work since done by the Head Syndicate has shown that the seams of coal extend without a break for the whole distance—8½ miles—over which development has been done. Work now in progress includes driving a tunnel about 1,000 feet on the highest seam, and from this the other seams will be cross-cut.

A route for a railway line has been surveyed up the North Fork of Old Man River, this passing within four miles of the present mine workings. This railway, when constructed, will connect with the Canadian Pacific in Canada, and with the Great Northern Railway system in Montana, U.S.A. The construction of a branch line four miles, from the North Fork up Lynx Creek, will provide railway transportation facilities for the Head Syndicate's coal mine. The problem of transportation of coal from the mine to markets on both sides of the International Boundary line, is, consequently, a simple one, which is another distinct advantage to the property, the opening of which to a producing stage on a comparatively large scale is not likely to be much longer delayed.

Non-Working of Coal Mines Involves Heavy Loss

In the course of an interview with a representative of the Vancouver Daily Province, Mr. A. C. Flumerfelt, of Victoria, B.C., formerly actively associated with the management of the Granby Consolidated M. S. and P. Co., and afterwards president of the International Coal and Coke Co., operating in Alberta, in the eastern part of the Crow's Nest district, is reported to have said:

"I regret there have not been any recent developments which indicate a settlement of the unfortunate labour difficulties in Alberta and eastern British Columbia. The position is a serious one and can not be fully appreciated by those not directly interested.

"The actual loss to the miners and other employees by reason of their stopping work is about $20,000 a day. The suspension of work occurred on April 1, and has now lasted 85 days, which figures up a loss in wages of about $1,700,000. Apart from the loss sustained by labour, which also includes that caused by the reduction of train crews, there is an economic loss running into many millions, which can never be regained. Then, too, this has a very serious aspect when one contemplates the possibility of its continuance later on in the year, with the prairie provinces unsupplied with fuel. Surely this is a matter requiring the attention of the Dominion Government, as well as the Provincial Governments."

Terms of Settlement Recom'ded by Conciliation Board.

The Fernie "District Ledger," which is the official newspaper of District 18, United Mine Workers of America, in the course of its comments on the recommendation made by the Board of Conciliation before submitting its report to the Minister of Labour, says, in part:

"The proposed basis of agreement as summarized by the chairman is as follows:

"1.—Advance in day wages of 10 per cent. on wages below $3, 8 per cent. from $3 to $3.50, and 5 per cent. for rates above $3.50.

"2.—Differential in pillars of 5 cents to 7 cents, according to conditions. Application left to arbitration.

"3.—Contract rates to remain unchanged generally.

"4.—Advance in contract rate of 3 per cent. at Lethbridge.

"5.—Readjustment at Lille by making rate proportionate to seam.

"All other matters in agreement to be disposed of as the board shall direct."

The recommendations of the board were not accepted by either the operators or the representatives of the employees.

OBITUARY.

A familiar figure in the mining circles of eastern Ontario was removed by death on Tuesday, August 15th. Early on the morning of that day, William Arthur Hungerford passed away at his home in Madoc.

Mr. Hungerford was born in County Cork, Ireland, in 1847. When but 17 years of age he came to Canada. For some years he worked in London, Ont. The rush caused by the discovery of gold near Madoc attracted young Hungerford in 1868. This was his first taste of mining. For 27 years, with Belleville as his headquarters, Mr. Hungerford devoted a large part of his time to developing mining properties in Hastings county. His name is associated with the history of many gold mines in that region.

For the last five years of his life Mr. Hungerford lived in Madoc, where he took an active part in public life. His last venture was the organization of the Canadian Talc and Silica Company.

Upon the mining history of eastern Ontario Mr. Hungerford left a permanent mark. He was one of those rare persons who, although living in a district that attracts little public attention, yet manage by persistent effort to rouse the interest of financial men.

N. Ramsay Pennypacker, mining engineer, who died at Saranac Lake, N.Y., August 20th, in his 30th year, received his degree of Engineer of Minnes from Lehigh University. He was born at "Mt. Pleasant," Harford County, Maryland, and was named for his mother's forefather, Col, Nathaniel Ramsay, of the Maryland Line in the Revolutionary War. He had charge for a year or more of the mines of the Pennsylvania Feldspar Co., in Ontario. In 1907 he went to Nevada for Philadelphia capitalists and reported in favour of silver prospects at the place which became widely known as Rawhide. At that time Rawhide consisted of two or three tents. In a year 5,000 people were made homeless there by a fire. Afterwards he went to Cobalt for Philadelphians, and after investigation obtained an option on a prospect. The plants to complete the contract fell through by reason of his falling ill in 1909 with the disease from which he died two years later. This property soon showed rich native silver and was capitalized at a million and a half dollars. In 1909 he planned an expedition to the then new Porcupine district. One of his exploring party was Hollinger, who a short time later located the famous Hollinger gold mine. He was a son of Isaac Pennypacker, of Pennsylvania. He was a member of the Delta Phi fraternity.

Consolidated Mining and Smelting Co's Metal Production.

The tonnage of ore received and smelted at the Consolidated Mining and Smelting Company of Canada's smeltery at Trail, British Columbia, during the fiscal year ended June 30, and the gross value of the metals recovered therefrom are as follows:

Tons of ore (including concentrates) received during year, 392,751; tons smelted, 388,774; gross value of metals—gold, silver, lead, and copper—recovered therefrom, approximately $4,438,000. Of this gross value, 55 per cent. was represented by gold. The corresponding figures for the fiscal year ended June 30, 1910, were: Tons of ore smelted, 487,125; gross value of metals recovered, $5,911,767; proportion of gold to gross value, about 48 per cent.

The average prices of metals for the last fiscal year show little variation from those of the previous year. The company's last annual report gave the average quotations during the year ended June 30, 1910, as having been: For London lead, £12.921 per long ton; New York silver, 51.948 cents per oz.; and electrolytic copper, 12.981 cents per lb. Average prices for year ended June 30, 1911, as Engineering and Mining Journal quotations, were: London lead, £12,949 per long ton; New York silver, 53.696 cents per oz.; electrolytic co 12.337 cents per lb.

The tonnage of ore smelted at the Trail smeltery the gross value of metals recovered during all years the beginning of 1894 to June 30, last, were: smelted, 2,847,458; gross value of metals, $47,084 The respective quantities of metals recovered last are not yet available, but the next following fi show them for all years to June 30, 1910: Gold, 95 oz.; silver, 16,999,873 oz.; lead, 220,872,555 lbs.; co 43,453,814 lbs. Approximate figures of aggregate recoveries to June 30 last are: Gold, 1,100,000 oz. ver, 18,700,000 oz.; lead, 255,000,000 lbs.; co 48,000,000 lbs.

The ore receipts during the year under notice the various mines operated by the company will pro be found to have been about as follows:—

Mine.	
Centre Star group, Rossland	19
St. Eugene, East Kootenay (concentrate)	
Richmond-Eureka group, Slocan	
Phoenix Amalgamated, Boundary	
Queen Victoria, Nelson div.	
No. 7, Boundary	
Molly Gibson, Nelson div.	
Snowshoe, Boundary (leased)	
Sullivan, East Kootenay (leased)	
Total from company's own mines	3

The foregoing figures have been compiled, as cerns the last three months of the period under re from newspaper reports, so necessarily are subj revision. For nine months, to March 31, figures obtained at Trail some time since. Allowing th total from the company's own mines, as shown ab approximately correct, it would appear that the of custom ore and concentrates received during las was nearly 58,000 tons.

With regard to the decrease in tonnage of ore sm last year, as compared with that to June 30, 1910, ly, 388,774, as against 487,125 tons—while no inf mation has yet been made public by the company, i be pointed out that the larger part of the short attributable to the much lower tonnage of ore re from the Snowshoe mine, in Boundary district—8 tons, as compared with 182,383 tons in the pr year. The quantity of lead-silver concentrate re from the St. Eugene mine was about 8,000 ton than in the preceding year, but, on the other han Sullivan mine shipped last year 33,852 tons of ore, as against 6,704 tons to June 30, 1910. Then was less custom ore obtainable from several mines, which were deprived of milling and ra transportation facilities, some of them as a result destructive forest fires of last summer. Apart, th from the matter of smaller ore receipts, it may pected that one subject will be dealt with in the pany's report for last year, namely, that the po at the Centre Star group of mines at Rossland is now than in several years past, particularly in reg there being now available, in the War Eagle m this group, much ore containing a comparatively value in gold.

The Canadian headquarters of Mr. A. A. Hassa in future be Cobalt.

Industrial Section

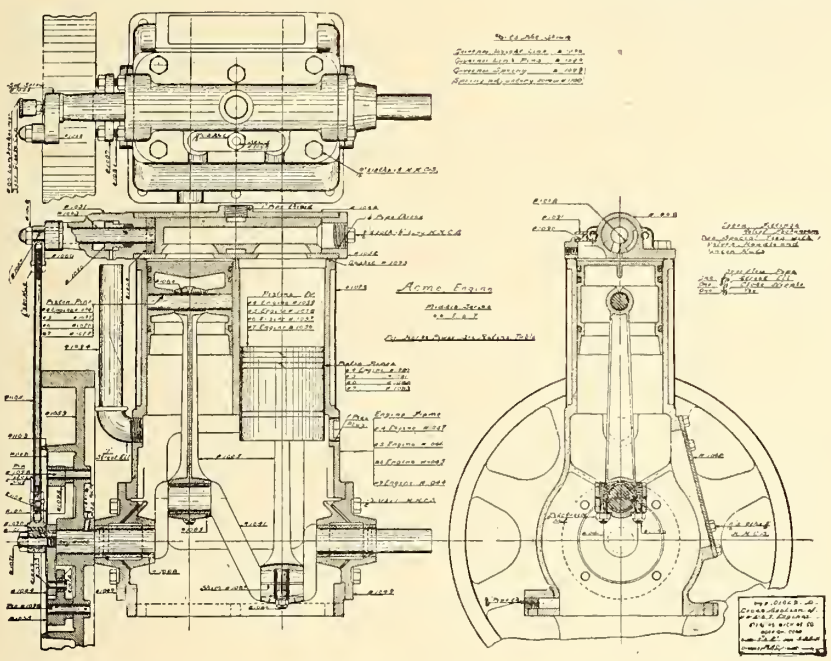
THE ACME STEAM ENGINE.

With the rapid growth and popularity of the gas engine, the impression has become quite general that the small steam engine is no longer an important factor in engineering fields.

This impression is entirely erroneous, so far at least as the experience of one of the largest manufacturers of small steam engines in this country goes. The mechanical stoker and similar advances in steam engineering have made the small steam engine indispensable. This is particularly true in plants where steam is a source of power, for in such plants the small steam engine proves an auxiliary which is very hard to equal both from the standpoint of economy and efficiency.

The Acme Engine, formerly manufactured by the Rochester Machine Tool Works, of Rochester, N.Y., and now by the Sterling Machine Company, of Norplicity of construction, the type of valve which adjusts itself to wear, the large bearing surfaces which are thoroughly lubricated at all times by a splash of oil, they are especially suited to drive mechanical stokers, for direct conection to small gear driven pumps, for driving rock drills and small friction hoists, and any variety of belt or direct driven pumping machinery for contractors or irrigation purposes.

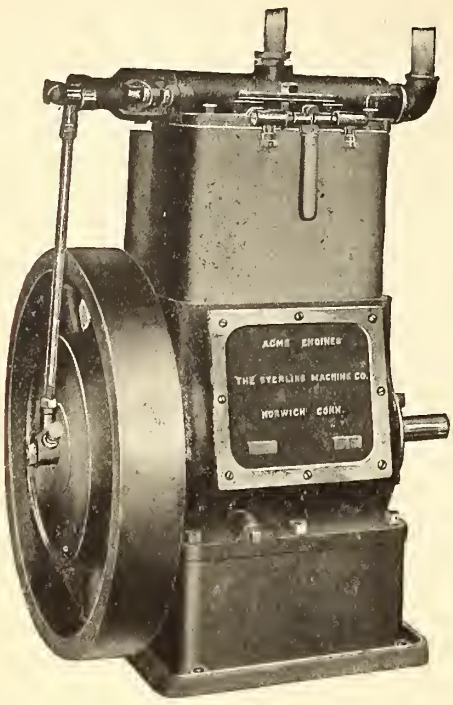
The character of internal construction is especially interesting, showing as it does the influence of automobile engine practice in many of the details. For example, the crank shafts are drop forged and ground to very accurate size, the connecting rods are of the popular I-beam section, bushed with bronze at both ends, the bearing cap on the crank end being held in place by castle nuts and cotter pins as is common in automobile work, the piston rings are of the diagonal cut type, two being placed above the wrist pin and



wich, Conn., is one of the best known small steam engines on the market. It has been manufactured for the past twenty years and improved from time to time to meet the demands of the day for a strong, simple, and economical unit.

The manufacturers have recently added several interesting features to this engine and a general description is given herewith which it is hoped will prove interesting to the readers of this paper.

These engines are of the vertical 2-cylinder single acting enclosed type with a balance rocking valve and are splash lubricated. They are built in three series of sizes, the small series being 2 1-8-in, 3-in., 3 5-16-in., by 1-2-in. stroke. These small engines are identical in external appearance. The middle series is 3 5-16-in., 4 in., 4 9-16-in., 5-in. x 5-in. stroke. These four sizes being also identical in external appearance and practically of the same weight. The large series of three engines is 5-in., 6-in., and 7-in., being also of the same external size and general appearance. This range of sizes covers all the applications to which these engines are especially adapted. Because of the extreme simone below. These rings are re-turned after cutting and ground to accurate size. The valve is a simple one-piece casting which is ground on the outside to fit a very accurately bored chamber and is fastened to the extended valve stem with a cross key in just the same way that the ordinary Corliss valve is fastened. A further point of considerable interest is the matter of automatic cylinder relief valves which are built into the cylinder heads to relieve any water that might otherwise cause damage. The governor is of a very simple type, consisting of four main pieces. The action of the weights being modified by means of a hardened roller which travels in a milled arc. The entire governing mechanism is contained in an oil pocket, only the pin to which the lower end of the valve rod is connected being extended through, and further, inasmuch as this mechanism is on the outside of the fly wheel, it is very readily gotten at. There are but two grease cups requiring attention, all other surfaces being amply lubricated by the internal splash. Provision is also made in the base of the engine for the elimination of the condensation which may collect and



the leakage from the valve stem stuffing box falls down into the engine base through the vent pipe at the end of the engine. The entire series of engines are built with new and accurate jigs on the interchangeable plan.

Exhibit of Jones and Glassco.

At the Canadian National Exhibition, held in Toronto, the firm of Jones & Glassco has an extremely creditable exhibit.

It would take up too much space to describe this exhibit in its entirety. But some salient features deserve special mention. Amongst these is a rotoscope fitted with a Renold chain, 1-inch pitch, 2½-inch wide, driving from a pinion to a wheel in which provision has been made for easy examination of the chain. A variable speed motor is used, making it possible for the chain speed to be varied from 700 F.P.M. to 200 P. M.

There will also be installed in action a chain-drive operating a fan. Moreover, in an elaborate machinery show case about 8 feet square, and 12 feet high, practically all the types of chains manufactured by Messrs. Hans Renold, Ltd., will be exhibited, along with specimens of special spring sockets, etc.

In addition, there will be in operation a centrifugal machine manufactured by Watson, Laidlaw & Co., Glasgow, and a complete exhibit of the cotton driving rope turned out by Messrs. Kenyon & Sons.

INDUSTRIAL NOTES.

From the Jeffrey Manufacturing Company, Columbus, Ohio, we have just received a Bulletin (No. describing their Single Roll Coal Crusher. The growing demand for screenings is so large that in many places lump or runofmine has to be reduced to a smaller size. The Jeffrey Single Roll is capable of reducing lump coal to any size required. The manufacturers claim that it cannot choke, that it will start under full load, and that, in a single operation, it will reduce lump to stoker size. The crusher can be supplied on trucks with motor drive attached. In design it is simple, and easily repaired.

The Apex Mining Co., Porcupine, has purchased from Mr. Phil. H. Moore a Class A McKiernan-Terry shot drill. Also the Miller Lake-O'Brien mine has purchased a similar drill. A Class B drill, capable of drilling 1,500 feet, has been acquired by Mr. Alex Miller for the Scottish Ontario mine at Porcupine.

The Robb Engineering Co., Amherst, Nova Scotia, and South Framingham, Mass., has recently received an order from the Sturgeon Lake Development Co. of Toronto, for two Robb-Mumford boilers, 54-inch by 18-foot, and one stack 48 inches in diameter and 80 feet high, with smoke connection.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

South Cape Breton Mining Society.

For many years the need of a mining society in Cape Breton has been apparent. The meetings of the Canadian Mining Institute, which are necessarily held in Quebec or Ontario, are inaccessible to the mining profession in Cape Breton. Owing also to circumstances which are unavoidable, there are very few members of the Canadian Mining Institute connected with coal-mining, and even of these the majority belong to the Western Branch. So far as distance is concerned, the meetings of the Nova Scotia Mining Society are almost as ungettable in Halifax, as the meetings of the C. M. I. in Montreal and Toronto. When it is considered that over a third of the entire Canadian coal output is produced in Cape Breton, it is evident that the lack of a mining society must have meant the loss of many valuable contributions to mining literature. For several months past a movement has been shaping itself among the officials of the two large Cape Breton coal companies to form a mining society, and this has at length taken definite shape. A society has been formed which will be known as the South Cape Breton Mining Society. The president is Norman McKenzie, the superintendent of No. District of the Dominion Coal Company, and the vice-president is J. C. Mitchell, manager of Dominion No. 6 colliery. The secretary is M. A. McInnis, superintendent of District No. The assistant general manager of the Dominion Coal Company, D. H. MacDougall, is the honorary president. The first general meeting of the Society was held in Glace Bay on the 19th of August, and took the form of a "smoker." With few exceptions, all the managers and underground managers of the Dominion Coal Company were present, together with representatives from the Sydney mines collieries, the department mine inspectors, and local notabilities. Although this meeting was only inaugural there was complete unanimity of opinion that the Society was very necessary, and the nucleus of a large membership is already assured. It is understood that four meetings will be held annually, and the next meeting will be for the purpose of reading and discussing papers.

It is to be hoped that eventually both the new society and the Nova Scotia Mining Society will become affiliated

Canadian Mining Institute in such a manner that, while ining their own individuality and management, and hold- their meetings at home, each mining society will subscribe ederated transactions, and get the benefit of all the mining pers read in Canada at a cost which would not be larger, and m be considerably less, than the cost of issuing separate tr sactions of meetings.

n addition to the benefits which will be derived from the p aration and reading of papers, the new society will pro- v e a much needed medium through which the members of the co mining profession in Cape Breton can voice their views o matters affecting the mining profession, such as, for ex- a le, the necessity for more generous expenditure on techni- ca education.

U ted States Coal in Competition with Canadian Coal.

he recent action of the Dominion Government in tempor- a y remitting the import duty of United States coal passing in the western provinces, although doubtless dictated by ne- c sity, and, from the viewpoint of the Government, quite d ensible, cannot be viewed with equanimity by any person i erested in the Canadian coal industry. The following ex- t ct, taken from the "Coal Trade Journal," of New York, is e of 16th August, merits the careful consideration of coal o rators and miners both in the West and in the East. Com- m ting generally on United States coal exports, the writer in t "Coal Trade Journal" states:

"Larger shipments will be made to Canada in future years a that country is growing, not alone in population, but com- r cially and industrially, and the greater the growth, the l ger the shipments of American coal will be, as there are p ces in the Dominion in which the home product cannot be l d down as cheaply as coal from the United States. Canada i ports almost as much coal from this country as is produced l all Canadian operators combined during a year, and when t re is trouble between miners and operators in the Domin- i the American producers gain. This is indicated by the d lers placed for coal in the United States as a result of the s rtage in western Canada caused by the strike of miners in t t territory, and it must be remembered how the Nova Scotian s ike helped the American producers to some extent, while t t was in force."

The operators in Nova Scotia have a very distinct recol- t tion of how the strike there helped the American pro- d cer, and it is more than probable that the Alberta operators w ll have a similar recollection when they look back some few y ars hence.

Canada takes 72 per cent. of the entire bituminous coal ex- rt of the United States. For the year ending 30th June, 11, Canada imported from the United States 8,627,963 tons soft coal, an increase of 1,359,205 tons, or 18.7 per cent. re than in the 12 months ending 30th June, 1910. Con- r sely, the United States imported from Canada 1,452,146 tons, m pared with 1,356,840 tons in the previous year, showing an c ease of 95,306 tons, which is a very insignificant quantity m pared with the enormous increase of exports from the n ited States to the Dominion. Averaged over the past de- d e, the yearly increase of Canadian coal production has not e ceeded half a million tons, whereas the coal output of the n ited States has gone up five million tons per annum.

The net result of the United Mine Workers strikes in Al- e ta and in Nova Scotia has been to displace millions of tons f Canadian coal by United States product, and coming events w ll prove to both the Canadian operator and the Canadian m ner how much easier it is to invite the invader than to re- c ver the trade he has taken from us. It is a grim commentary o this situation that the Government should have considered it n cessary to remove the import duties, and that the proper t rritory of Canadian coal mines should now be supplied by U ited States coal which is yielding no income to the Canadian revenues. In the St. Lawrence market the effect of the 1909 strike is still being felt by the Nova Scotian mines, and it is not probable that all the ground which has been lost will ever be recovered. Very recently a United States coal company took a large contract from the city of Montreal at a price which the Nova Scotian mines could not touch, and this is only a typical instance of what is occurring every day. Surely the folly of allowing Canadian labour relations to be endangered by strike mandates issued from Indianapolis could scarcely be more strikingly demonstrated.

Nova Scotia: Glace Bay.

The outputs for the first half of August were lessened by a general holiday on the occasion of the Provincial Workmen's Association's annual excursion, but there is a possibility that the record figure obtained in July may be slightly exceeded in August.

Extensive diamond drilling operations are being undertaken by the Dominion Coal Company at the Springhill mines, with a view to finding a suitable field for new winnings. The output is still steadily increasing.

With the accretion of the Springhill men, the membership of fthe Dominion Coal Company Employees' Benefit Society now amounts to 9,150 members, and the gross accumulated funds of the Society are now over $100,000.

The Dominion Iron & Steel Company have acquired extensive limestone deposits at Port au Port, Newfoundland, which they are at once commencing to develop. Work is now in progress on the loading arrangements and plant. The additional blast furnaces which the Steel Company are intending to install will require larger supplies of fluxing material than the present quarries will supply in the shipping season, and in addition to the Port au Port development the Steel Company have this year commenced another quarry at Ball's Creek, in the George's River limestone near Sydney.

NOVA SCOTIA.

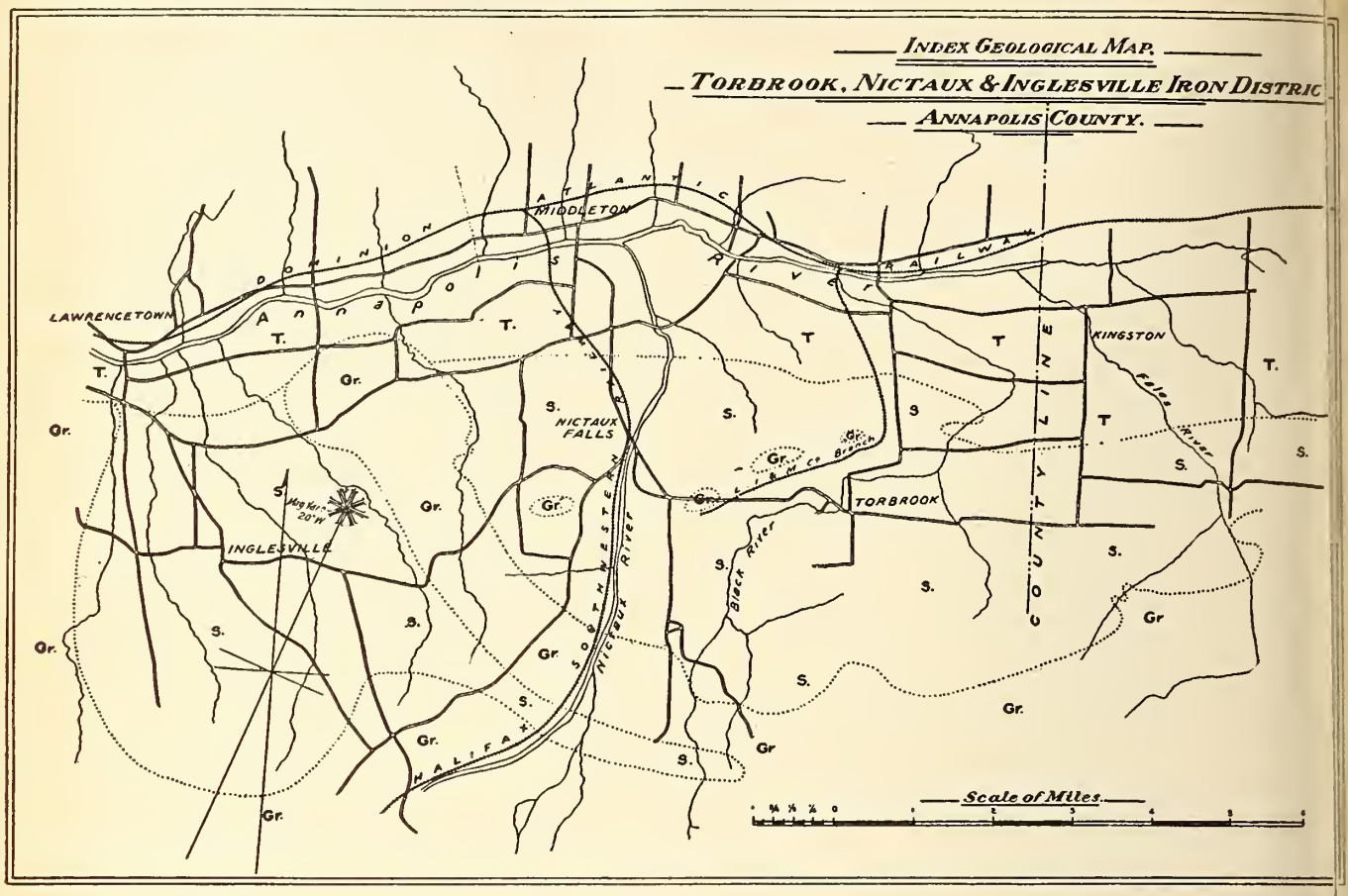
Halifax.—The news of the shutting down of the Torbrook iron mines, owned and operated by the Canada Iron Corporation, Limited, reached Halifax some days ago. The closing of these important mines, it is hoped, is temporary. The Torbrook and Nictaux iron ore deposits are situated in the eastern part of Annapolis country. The workings are connected by a spur with the Dominion Atlantic Railway. When the Londonderry blast furnace was working, a considerable tonnage of ore was shipped there. Latterly some thousands of tons have been mined and shipped abroad.

The ores include hard red hematite, slightly high in phosphorus, and dark grey, low grade magnetites that carry varying percentages of lime. The latter are ideal ores for magnetic treatment.

As early as 1825, a small Catalan forge was operated in the Nictaux region for a short time. A charcoal furnace was also run for a short time. Many unsuccessfufl attempts were made to establish an iron industry. It was not until 1891, however, that serious mining was undertaken. In that year, Major R. G. Leckie, who was at that time general manager of the Londonderry Iron Company, acquired a large extent of territory and opened what is still known as the Leckie mine. The Leckie mine, which produced a high grade red hematite, was active until 1906. In 1903, it was again opened by the Londonderry Iron and Mining Company, an organization controlled by the Drummonds, of Montreal, and later merged in the Canada Iron Corporation.

Since 1906 the Leckie and the other mines have been worked irregularly. The otal output has been about 500,000 tons.

The failure of the Nova Scotian Government to send an exhibit of minerals to the Toronto Exhibition is much to be regretted. Nova Scotia can make a display that brings water to the mouth of the investor. As reports from Toronto state that many foreign mining men are passing through Toronto, it is a great pity that Nova Scotia's mines are not to be ad-



GENERAL INDEX OF SYMBOLS.

T.	TRIASSIC SEDIMENTS	Or.	CAMBRO-SILURIAN (OR DOVICIAN)	Gr	GRANITE
C2.	MILLSTONE GRIT	€.	CAMBRIAN.	□	LIMESTONE (PLATE I)
L C2.	LOWER CARBONIFEROUS LIMESTONE	M.	MEGUMA (GOLD BEARING SERIES)	△	DOLOMITE (PLATE I)
L C1.	CARBONIFEROUS CONGLOMERATE.	PC1.	GEORGE RIVER SERIES	○	IRON (PLATE I.)
D.	DEVONIAN.	PC.	UNCLASSIFIED PRE-CAMBRIAN	■	PITS AND SHAFTS.
S.	SILURIAN.	Tr.	FINE TEXTURED INTRUSIVES		IRON OCCURRENCES.

ed. Your correspondent is of the opinion that both the g Society and the Government are to blame. Nova will certainly have to do more advertising, or else be ut in the cold.

coal mines of the province are doing better than ever. This season's St. Lawrance trade promises to exceed last season.

Progress is being made at Dr. Cain's manganese property, nor of New Ross, Luuenburg County. It is reported that shipments will be made very soon.

Prospecting for tungsten ores is very active. Several old gold properties are being re-opened. It is rumoured that the old Dufferin is soon to spring a surprise on the public by showing signs of life. The Dufferin mine had a square deal. It should prove attractive.

ONTARIO.

Porcupine.—Every day brings its quota of new population. The whole camp is flourishing. The talk of the day is the auctioning off of lots at the Timmins townsite. High prices are expected. What effect this movement will have upon South Porcupine and Goldenville remains to be seen.

Nearly 500 men are at work at the Dome and more will be employed as soon as they can be obtained. The branch railway across the Dome Extension to the Dome is practically completed. The Dome siding will accommodate scores of cars.

Rebuilding is proceeding with remarkable vigour. Before the end of the current year the plants on the Foley-O'Brien, Dome, Dome Extension, West Dome, Apex, Dome (major), and on many other properties will have been restored completely.

Two hundred carloads of lumber are on their way to Porcupine. This implies a large amount of building. It must be remembered that many of the new buildings are to be of fireproof construction. Hence the railway traffic will be very far from now on.

Southeast Shaw is looking up well. There is room for the belief that this will make good.

At the Preston East Dome Manager Thorne is employing about 60 men. When the Dome siding has been completed necessary machinery will be rushed in.

The Hollinger office building is almost completed. Here, also, progress depends largely upon railroad construction.

A 10-stamp mill has been ordered for the Vipond. Mr. Pourrier has returned, and the mine is bustling.

C. Cleveland, a Nevada man, is to assume the management of the West Dome. Concrete buildings will be erected. Everything is now ready to commence reconstruction.

BRITISH COLUMBIA.

Hot weather experienced in July in the Cariboo district shortened the hydraulicking season for placer gold mines in the vicinity of Barkerville. Water in insufficient for continuing operations, so the season is practically over, unless copious rains shall come to give a fresh supply for gravel-washing. Very little news will be obtainable concerning operations on creeks in Atlin camp until after the close of the year's work and operators shall come south for the winter. Placer gold mining is being carried on in Fort Steele mining division, East Kootenay; there is activity on Perry Creek, and Wild Horse Creek is still receiving some attention as well. Placer mining returns for last year showed that gold to the value of $15,000 was recovered in the Omineca country, while Liboet was credited with a production of only $7,000—the smallest output for that district on official record. It is probable the total value of the placer gold production in 1911 will be higher than that of 1910. Totals in recent years were: In 18[illegible], $647,000; 1899, $477,000! in 1910, $540,000.

East Kootenay. 6

Coal mining has been at a standstill five months. As the combined output of Crow's Nest Pass coal mines last year was 1,365,000 long tons of coal, or an average of nearly 114,000 tons per month, the loss of production this year is already a serious one. After deduction of the proportion of coal made into coke, calculating with last year's average figures as a basis, the loss this year is already approximately 430,000 tons, net, of coal and 90,000 tons of coke, which represents a decrease in value of average production this year as compared with last of nearly $2,000,000. Further, even should there not be longer suspension of production than the five months abovementioned (and there probably will be) it will take several weeks to get the mines into full working condition again, so that a considerable margin will have to be allowed as an additional decrease in value of coal and coke produced this year. Then there is the contingency of a probable loss of market to also take into account, so the year's statistics of production may be expected to compare unfavourably with those of 1910.

Slocan.

Prospects for this district continue to improve, that is for the district as a whole. In the eastern part of Slocan, the construction of a spur from Three Forks, on the Canadian Pacific Railway from Slocan Lake to Sandon, to near Bear Lake, is in progress. This new line will give excellent transportation facilities to the Lucky Jim and Rambler-Cariboo mines, both of which have been at much disadvantage, in regard to shipment of ore, ever since the destruction in July, 1910, of bridges and trestles along several miles of the Kaslo & Slocan railway. As development work has been continued in both mines, and much ore has thereby been rendered available for shipment, production will be comparatively large whenever arrangements for freighting shall be favourable. The intended immediate resumption of work at the Deep mine of the Whitewater group, has been announced. Of these three mines, Mr. O. E. LeRoy wrote in his official report for 1910 (see "Summary Report" of Geological Survey, 1910): Whitewater.—The Whitewater includes the Deep property, as both are on the same vein, and are operated under one management. The destruction of the mill and village by fire in July caused a temporary cessation of mining operations. During 1909 a crosscut tunnel was driven to the vein from the valley of Kaslo Creek, which gives a vertical depth of about 1,400 feet below the apex of the vein, and about 400 feet below the Deep or lowest drift tunnel. The raise to connect with the present workings will be completed this winter, and at the same time intermediate levels and cross-cuts will be driven to prospect the vein between the main cross-cut and Deep tunnels. This is the most important development work recently undertaken in the Slocan district, and the results obtained will have a marked influence on further developments of similar character elsewhere in the district. Lucky Jim. This mine is the only one in the district worked almost exclusively for zinc. During the year 1909 about 4,700 tons were shipped, with zinc content ranging from 39 to 54 per cent. In 1910 No. 5 tunnel has been driven 200 feet vertically below the old workings, and has encountered two orebodies, the size and character of which has not yet been definitely ascertained. No. 6 crosscut is now being driven some 400 feet vertically below No. 5. The work this season was greatly hampered by the fire which destroyed all the buildings. Rambler-Cariboo.—Mining was seriously interrupted by the fire which destroyed the mine buildings in July, and the mine was only put on a working basis again in the early part of November. The orebody discovered in 1909 has been partially developed to the 8th and 9th levels, with very encouraging results. The shoot pitches to the south, and all the lower levels will be driven in that direction during the winter and the ground thoroughly explored. The development work is sufficiently advanced to permit immediate

and extensive stoping. The clean lead ore contains up to 64 per cent. lead and 175 oz. silver per ton.'' Quite recent advices are to the effect that shoots of ore of shipping grade have been opened on both the 1050 and 1250-foot levels of the Rambler-Cariboo mine, and that the 1400-foot level is being advanced with the object of cutting the oreshoots at the lowest level in the mine.

About Sandon, an amalgamation of the Slocan Star group with the Star M. and M. Company's claims, over which there had been litigation during eight or nine years up to the close of 1909, has been carried out, so that hereafter there should not exist any bar to the more ecenomical and thorough mining of fore-bodies occurring in both properties. Both the Richmond-Eureka and Ruth-Hope mines continue productive. Up Cody Creek, progress is being made towards again obtaining an appreciably large production of silver-lead ore from the Noble Five, Reco, Surprise, and Sunset mines.

Mines tributary to Slocan Lake give promise of making a larger total output this year than during any year for a long time. The more important producers are the Standard, Van-Roi, and Hewitt-Lorna Doone, each with much ore available and its own concentrating mill to make it marketable. Lower down the lake, the Ellis Silver Mining Company's Eastmont mine, and the Enterprise, both in Ten-mile Creek camp, are the more prominent properties. There are others, in Slocan City division as well as in other parts of the extensive Slocan district, that will also add to this year's total output of ore.

Nelson.

Gold is now produced to a greater value than any other metal in this mining division, and most of that comes from mines in Sheep Creek camp, where the Queen (in largest proportion) and the Nugget are steadily maintaining an output. The Granite-Poorman, situated within a few miles of the city of Nelson, is also a regular producer, having a valueble group of gold-baaring claims and a 20-stamp mill. Silver, lead, and copper ores also occur in this division, and in past years these metals have been produced to a comparatively large aggregate value, but at the present time they do not add much to the district's total value of mineral production. It is stated that several mines near Nelson, which have been asquired by a syndicate, are to be worked again, but so far little actual mining is being done on them. As some of them have been large producers in past years, it is hiped they will ere long be again on a profit-earning basis. Meanwhile, though, the best results are expected from Sheep Creek properties, where the Mother Lode, Kootenay Belle, Summit, and others have been proved to possess orebodies that it is believed will yield gold in payable quantity.

Rossland.

There is little information concerning this camp other than the customary report of continued production from the Consolidated Company's Centre Star group, the mines of the Le Roi No. 2, Ltd., and, in smaller degree, the Le Roi. Now that the last-mentioned mine has been acquired by the Consolidated Company, it is likely more ore will be mined in it and sent to Trail, since under the altered conditions it will probably be found profitable to utilize ore that previously could not be mined and smelted at a profit. There is not much to tell of the South Belt properties, of which the Blue Bird is now the most important, for it is almost alone in its continued aetivity.

Boundary.

The closing of the Granby Company's mines and dsmeltery, owing to the practical impossibility of securing a suitable supply of coke at moderate cost, has given part of this district a set-back for the time being. The cessation of work at the Snowshoe mine, by the Consolidated Company, has added to difficulties of the situation in Phoenix camp. Ae the time of writing the British Columbia Copper Company is operating its mines and smeltery, though under conditions that are n ordinarily profitable, the greater cost of Pennsylvania cok being a serious matter where, as in the case of Boundary di copper ores, the margin of profit is small when the pri copper is low, as at present. This company is developin McKinley mine, in Franklin camp, north fork of Kettle under an option of purchase. The Greenwood-Phoenix way Company is still driving its big tunnel, which is well on towards 3,000 feet. Railway construction up the fork of Kettle River is encouraging owners of mining perties about Beaverdell and other parts of the distri consider the practicability of turning to profitable ac some of the ores known to occur there.

Similkameen.

Coal mining is reported to be active around Princeton. erection of works for the manufacture of cement in the ity of that town is in progress. The completion of the way from Princeton to Coalmont, and the opening of a property in the neighbourhood of the latter place, are in Both placer and lode properties in Tulameen district are examined by prospective purchasers, while work is being ranged for to further test the river gravels of the Tula and some of its tributary creeks for both gold and platinu which latter metal an estimate of production in all yea date gives a total of about 20,000 oz.

Nicola Valley.

The Nicola Valley Coal and Coke Company is adding la to the coal-handling plant at its Middlesboro colliery and also made provision for much new exploration and dev ment work underground. Two or three other properties being got into shape for producing coal, of which there is mated to be about 30,000,000 tons in 12 square miles of bearing country in the valley.

Coast.

Coal mining is by far the most important branch of mining industry of the Coast district. Last year Vanco Island coal mines produced 1,616,030 long tons of coal; year, so far as known to the writer, all the mines are tinuing production, so that there is no good reason to su the current year's total output will be smaller. The se producers are: The Canadian Collieries (Dunsmuir) ,Lim with mines in both Extension and Cumberland districts; Western Fuel Company, with several mines near Nanaimo Pacific Coast Coal Mines, Ltd., with mines near Nanaimo at Suquash; and the Vancouver-Nanaimo Coal Mining pany, operating in the vicinity of Nanaimo. Prospecting coal is being done in various other parts of Vancouver Is and in some of the smaller islands lying east of it.

The Tyee Copper Company is receiving ores for redu at its smeltery at Ladysmith, Vancouver Island, from a ber of mines in the Coast district, and others in sou Yukon and Alaska. Two mines in Portland Canal distric among the shippers to its works, these being the Por Canal Mining Company's gold-silver-lead mine and the Cliff copper mine. Much development work has been do both mines, and both now have railway connection with wart, at the head of Portland canal. Prospecting on Portland Canal district claims is reported to be, in severa stances, satisfactory. At the Hidden Creek mine, Observe Inlet, which is an arm of Portland Canal, the Granby pany is doing much work, both underground and in su improvements. The directors have appropriated $200,000 this work, which is being carried out energetically an far as underground development is concerned, it is gene understood, with excellent results, much ore of good grade ing been found. In various parts of the Skeena district development of both coal and metal bearing claims is pushed on, while Queen Charlotte Islands are also rece attentiol both on coal and metalliferous properties.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—Reports from Scheelite, Moose River, Halifax Co., show that the incline shaft at the tungsten mine has now reached an extension of 400 feet. A considerable amount of crosscutting and drifting has been accomplished. The 50-ton mill will soon be completed. The mill will consist principally of two sets of rolls, trommels, and Deister and Wilfley tables. W. Victor Hills, late of Denver, is in charge of the technical management, whilst Mr. H. C. Borden, of Halifax, directs financial affairs. No ore will be shipped until the mill is running.

ONTARIO.

Elk Lake, Ont., August 25.—Men going in from Gowganda to the Hudson Bay mine at Hanging Stone Lake, yesterday, were set upon by strikers. They turned back to Gowganda and asked aid of the provincial police.

The provincial constable at Gowganda refused to assist them, and application was made to District Chief Calbeck at Cobalt for adequate police protection. Failing this, a force of militia will be asked for.

There is a Socialist speaker at Elk Lake and Gowganda, inflaming the members of the Union with incendiary speeches.

Porcupine, Ontario, Aug. 14.—The McAulay-Brydge claims in Bristol township have been sold to Mr. B. E. Cartwright, of the Temiskaming mine at Cobalt, and the Pearl Lake mine at Porcupine, and associates for $5,000,000. The deal was completed when the decision of Mining Commissioner Price was given in favor of the owners respecting the recent law suit that was filed against the claims.

Cobalt, Aug. 16.—Mr. Sam Cohen, who has just returned from a visit to the McEaneny property at Porcupine, reports developments on this holding of the Crown Reserve. Recent trenching has opened up a 12-foot vein of quartz and schist carrying free gold and paning well. The McEaneny property adjoins the Hollinger, and from the strike of this vein and that on the main lead on the Hollinger, it is believed that further development will reveal that it is an extension of the big vein. A shaft has been put down fifty feet and some drifting done on another lead with promising results. Fifty men are employed and a small plant is furnishing power.

Sudbury.—At Long Lake, the Canadian Exploration Company is pushing on development work with highly satisfactory results. The addition to the mill of ten stamps with enlarged cyaniding plant, ensures an increased output of the precious metal.

Cobalt.—Eleven bars of bullion were sent out by the Crown Reserve mine August 24, to Montreal, and will be shipped to Mocatta & Goldsmith, London, Eng., who have purchased the greater portion of bullion shipped from Cobalt. The consignment contained 14,773 ounces of silver and was valued at $8,000. This is the first bullion from the Crown Reserve during August.

BRITISH COLUMBIA.

Fernie, Aug. 14.—The ending of the balloting and the announcement of the results throughout the mining district last Saturday marked the end of the excitement over that affair and the town of Fernie has settled down to a quietness which is noticeable to all. Not a ripple of excitement of any kind disturbs the surface of current events; there is no current.

The Corbin mine is still working and has turned out 45 cars of coal in the two weeks operations have been carried on. This coal all goes to the American side, and is cleared through United States Consul Denison's office here.

Absolutely nothing is known of any new move being made by either side to the dispute and it looks as though the Dominion election made matters too delicate for harsh measures to be adopted.

Kaslo.—The Deep Mine, Ltd., will resume operations at once with a crew of 30 men, who will continue at work all winter. The narrow gauge road will be put in order and several cars of lumber will be hauled up for the purpose of rebuilding the structures destroyed by fire last year. This will also enable the Utica mine to ship several hundred sacks of ore, the result of last winter's mining, and will also be a great assistance to those who wish to develop properties in this promising district.

Nelson.—The mill at the Molly Gibson mine is now in steady operation, and about 300 tons of ore are being run through every week. Development of the property is being continued in addition to the getting out of ore for the mill.

Victoria.—The next general meeting of the western branch of the Canadian Mining Institute will be held at New Denver, Slocan Lake. The date has not been definitely determined, but it will be during either the second or third week in September. It is intended to give especial attention to the reading and discussion of papers on subjects connected with mining in Slocan district.

Vancouver, August 19.—Forty-eight thousand acres of bituminous coal lands on Copper River, a tributary of the Skeena in northern British Columbia, have been acquired by a syndicate of London financiers from the Vancouver owners. It is proposed to organize a company and proceed with development work on an extensive scale. The programme already adopted provides for the expenditure of at least $600,000 in development work and equipment during the next twelve months. The deal was negotiated by Mr. R. H. Frisby, who returned to Vancouver a few days ago, after a ten months' stay in London and Paris. Mr. Frisby, accompanied by two engineering experts, has left for Prince Rupert en route to the property, where a small force of men have been engaged at development work since early last spring.

MINING NEWS OF THE WORLD.

OUR EUROPEAN LETTER.

British mining markets still dull—International Miners' Convention passes many resolutions—Colliery results good—His Majesty's Chief Inspector of Mines writes on mining ventilation—New machinery in Cornwall—Rand outputs and profits—Scottish and German oil developments.

Exclusive Correspondence of the "Canadian Mining Journal."

London, August 18th, 1911.

The condition of the mining markets here is still not good and general dulness and apathy rule. Of course, the abnormally good summer weather has a great deal to do with this. With the coming of such a rare heat wave as we have just been experiencing in this country brokers, dealers, and investors all flock away from town into the country or down to the shore, and markets become silent wastes. Apart from this, however, there have been many other distinctly adverse factors and curiously enough these factors are equally unconnected with the intrinsic values on the market itself. For example, political, financial, and labour troubles have been very strong. At the time of writing the country is in the throes of the great-

est labour upheaval it has ever known and people's thoughts are more likely to be fixed on questions of transport and food supplies than upon stocks or shares—anyhow for the time being. Considering the many irritating factors at work it is surprising that the mining and oil share values are not lower than they are and that they can so well resist such malign influences is some proof of their general level of sound value.

In the last week of July the International Miners' Congress was held in Lindon, miner labour delegates attending from Germany, Austria, France, Belgium, Holland Sweden, and Bulgaria, as well as, of course, from Great Britain. Resolutions were carried advocating the nationalization of all mines and their exploitation by the State for the national benefit. Under French law all minerals are the property of the State, and resolutions demanded that no further mining concessions should ever be granted to private individuals. This was an echo of the resolutions passed at mining labour conventions in France, Germany, and Austria recently.

Another resolution demanded that inspectors of mines in Europe should be men of practical experience who should be elected by the miners from among their own ranks and paid by the State. A minimum wage for coal miners was also demanded. This, it was said, is supposed to prevail in Great Britain, and in connection with this discussion it transpired that there had been an enormous increase in the number of men employed in the British mining industry. In 1868 the number employed was 346,820, whilst now it well exceeds one million, an increase of about 300 per cent. The thing that interferes apparently with the mininmum wage in this country is the ever-present question of payment for abnormal working places. German and Belgian delegates demanded that the employment of children under 14 years of age in mines should be entirely prohibited, and that no one under 16 should be permitted to work underground. Belgian delegates were in favour of the limitation of the production of coal. This question is one which has been before the Miners' International Congress for many years, but the difficulties in the way of a working agreement covering all the countries of Europe have so far proved insurmountable.

The reports of a number of British collieries which make up their accounts to the end of the calendar year have come to hand recently, and as the group, though not large, is a representative one, the returns given a good idea as to how the industry fared in 1910, as compared with 1909. As might be expected, the record on the whole is a good one, for it has to be remembered that the comparison is with a particularly difficult period when not only were the average prices of coal low, but the cost of production was increased, owing to the friction between masters and men over the readjustment of hours and wages consequent upon the coming into force of the Miners' Eight Hours Act. The latter factor was still operative last year to the extent of the increase in wages per ton of coal raised, which resulted from the readjustments referred to, but, with the exception of the unfortunate dispute at the Cambrian Collieries, there were few serious stoppages. Prices during the first half of the year, moreover, steadily improved, and though there was some reaction in the autumn, the average figures realized were decidedly better. The Welsh companies have, undoubtedly, suffered more from the Eight Hours Act than the collieries in the north of England, and in Scotland, the restriction in output under the new arrangements being greater, while interruptions of work were more frequent, but the good demand for bunker coal, consoquent upon the revival in the shipping trade, has helped the companies, even in this section, to make a very good showing. In other districts the results were still more satisfactory. In the aggregate, the advance in profits is equal to about 50 per cent., which more than wipes out the decline of 36 per cent. which occurred in 1909, and while the individual returns vary considerably, in only one instance is there any falling off in profits.

A most interesting series of mining publications under title of "Modern Practice in Mining," is being issued in t country. Volume IV., which is just issued, deals with ventilation of mines and is from the pen of R. A. S. Redmay who is His Majesty's Chief Inspector of Mines. Mr. R mayne's position adds considerably to the importance of t work, although the natural importance of the subject is c siderable at any time. Just at present even more than us attention is being given to it, as a result of recent seri colliery explosions and the keen interest now veing evin in the problems of coal dust and firedamp explosions, which in some degree related to the problem of ventilation. The r of explosion is, however, not the only thing to be kept in mi and Mr. Redmayne wisely devotes a good deal of space t consideration of the chemical and physiological properties mine gases.

In this country particularly the increasing depth and area mine workings is adding greatly to the difficulties of venti tion, for not only is the mechanical problem of supplying greater than formerly, but the difficulties of supplying a sa factory quality of air are increasing even more rapidly. Te peratures up to 94 degrees Fahrenheit have been recorded the working face of the Pendleton Colliery, and as high as degrees at some of the Belgian collieries. Unfortuuately t air below ground is usually, although not always, exceedin humid, so that the physical labour of mining at great dep is very exhausting. Mr. Redmayne hints at the urgency of new ventilation problem in his introduction, but it is greatly be regretted that he does not attempt any critical study of t aspect of the question. He suggests auxiliary fans and frigerated air, and the indications are that ultimately a care control of temperature, humidity, and composition will necessary in the deeper and more extensive mines.

Mr. Redmayne does not specifically refer to colliery warni issued at times of low barometer, but he discusses the effect a fall in the barometer generally, and points out that the fo ing of the mine air which accompanies such a change usua results from the expansion of the foul gases in the wastes of t mine or goaf, and not from an eruption of fresh firedamp, si the discharge pressure of this last is usually far too high be effected by a small change in the atmospheric pressure. Redmayne also refers to the curious fact, several times not by different people, that the fouling of the mine gases f quently precedes the fall in the barometer by a brief interv

The author is at his best when describing mining pract or experimental facts. When he comes to discuss scienti principles, or theory, he is much less satisfactory. Mining gineers seldom approach their engineering problems in a ve sound and logical way, but prefer empiricism and an avo ance of scientific argument. The chapter in this book devot to fans and the calculation of air currents are in some pa quite crude, and as a whole are defective in logical treatme One other complaint must be entered. Less than eleven pag are devoted to colliery explosions and "gob fires." It is arg able, of course, that a discussion of colliery explosions is o side the scope of a book on ventilation, but if it is tackled at its importance demands a more complete and a more up- date discussion than Mr. Redmayne has accorded it.

An interesting roasting plant is being supplied to a prom ent tin mine in Cornwall. The plant consists chiefly of t Humboldt mechanical roasting furnaces, patented of the la est type. These patented furnaces are in this case used f roasting down pyritical concentrates carrying tin oxide. Th represent the latest development in the multiple hearth type roasters, both as to capacity and adaptability to various grees of calcining, and are an innovation for Cornwall, whe they will not doubt perform the same satisfactory service they are doing at other mines recently furnished with san in the Pyrenees and elsewhere.

tops of the furnaces serve for a preliminary drying of re, which is then fed mechanically on to the uppermost a of the furnace, travelling down gradually to the lower hs, and meeting on its way the fire gases which are moving the opposite direction on the counter current principle. A tical ring shaft extends through the centre of the furnace carrying easily exchangeable arms with stirring rabbles to move the material along on each of the five hearths. The oasting can easily be changed through all stages from a "sv et" to a "dead" roast. The normal capacity exceeds 10 tons per day when roasting down the ore from 30 to about 3 per nt. of sulphur. The furnaces are entirely self contained, and require very little foundation. All wearing parts eas east renewable. There is every reason to believe that their use will prove of material benefit to the mine. Their introduction in a larger sense appears to mark another decided advance above certain obsolete mining practice, by modern ore dressing science such as is consistent with safety and reliability.

The creation of a new record in the Witwatersrand gold output has not been accompanied by a corresponding expansion in profits. The net earnings of the controlled mines in July amounted to $4,900,000, as compared with $4,880,000 in June, a total which has not been exceeded during the past two years. But seeing that the yield from these mines was advanced by over $400,000, and moreover, that a newcomer — the Brakpan — is responsible for nearly $65,000 of profit, the expansion of $20,000 in the total is not altogether satisfactory. Broadly speaking, the failure of profits to keep pace with the increase in output arises from efforts to combat a "temporary falling off in the grade of the stopes in some mines by increasing the tonnage, and as this was not always accompanied by any appreciable saving in costs, the expansion in profits obviously could not be large. In some cases, indeed, growth in quantity failed to compensate for reduction in value. For example, the Geduld Deep endeavored to offset a drop in grade in the Geduld Estate and Jumpers Deep sections by increasing the tonnage from 67,300 to nearly 69,000. But costs were above the normal — possibly in consequence of extra expense due to the caving in of the No. 1 shaft — and the profit came out $10,000 lower at $110,000. A somewhat similar instance is supplied by the Crown mine. This company treated 143,000 tons, as against 141,000 tons, yet the mining profit of $549,750 is only $2,250 in excess of the June total.

Believers in oil and its future, and they are many, are disregarding the apathetic position of the public towards oil shares at the present time. They are looking more towards the increasing evidence of the expanding use of oil. This country's oil deposits are found in Scotland, and it is rumoured, on what appears to be good authority, that an offer has been made on behalf of certain powerful interests to acquire the properties owned by the four oil-producing companies operating in Scotland. The price mentioned is $15,000,000, and this figure, if correct, appears to be sufficiently tempting to cause the directors to think very carefully before rejecting the proposal. There is a good deal of unrest just now oming the shareholders of these Scottish oil companies, owing to the severe competition with which they are faced, and a meeting was held recently at which representatives of the various undertakings attended in the hope of agreeing upon some definite line of action which would be acceptable to all concerned. A committee was formed, and there the matter rests for the present. As regards the source of the reported offer to buy up the principal oil-producing properties in Scotland, America, would, of course, "be the most likely "port of origin" for such a proposal.

It is persistently rumoured that the German Government is contemplating far-reaching measures for the protection of the petroleum industry. The National Liberals have been urging the necessity of counterecting the policy of the Standard Oil Company and its offshoots. A resolution calling for inquiry was adopted by the Reichstag, although the Government did not define its attitude. It was stated here recently that the Government is actually preparing a Petroleum Monopoly Bill for presentation to the Reichstag next year. The accuracy of this statement has been semi-officially denied, but in a form which suggests rather that no definite decision has been reached than that the reports are without foundation.

COMPANY NOTES

INTERCOLONIAL COAL.

Intercolonial Coal preferred declared a dividend of 3½ per cent, payable September 1 to shareholders of record 18th inst. Books will close from August 18 to September 1, inclusive.

KERR LAKE DIVIDEND.

Kerr Lake directors have declared the regular quarterly dividend of 25c. per share and 15 cents per share extra, payable September 15, to holders of record September 15.

CROWN RESERVE DIVIDEND.

Crown Reserve declared a dividend of 2 per cent., with a bonus of 3 per cent., payable on 15th September of record 31st August. Books will not be closed.

GRANBY FOR YEAR.

The net income for Granby Consolidated for the fiscal year ended June 30th was approximately $282,000, assuming a copper cost of 10¾ per pound and selling price of 12.33. Production was 17,795,215 pounds of copper, the smallest since 1906, when slightly over 16,000,000 pounds were produced.

NIPISSING HALF-YEAR.

The financial statement of the Nipissing Mines Company for the half year to July 1, was recently published and in itself gave no clue to the causes for the decline in the stock, the mine being stronger in cash assets at the end of June than it was at the same time last year. The output, however, showed a considerable falling off, and the figures of output for the first half of the year show that production fell below dividend requirements a little, owing to the power shortage early in the year. The output for June, however, was the biggest of the yeaf, so the company is picking up again.

The shipments by months, with the estimated value, were:

	Shipments Ounces.	Net value at at the mine.
January	331,038	$158,046
February	194,185	95,121
March	332,352	168,338
April	406,933	207,679
May	444,053	219,324
June	535,148	262,945
	2,243,709	$1,111,453

Last year, according to the annual report, the cost of producing silver was 14.72 cents per ounce. Taking the same cost this year, and assuming the average price of silver to be 53 cents per ounce, a net profit of 38,28 cents per ounce is shown. On a production of 2,243,709 ounces for six months this shows a net profit of $858,891. Dividend requirements in this period call for $90,000.

THE McKINLEY DIVIDEND.

The McKinley-Darragh-Savage mines have declared the regular quarterly dividend of 3 per cent. and also a bonus dividend of 7 per cent. on the capital stock.

LE ROI No. 2.

The following cable has been sent to London: "Josie mine report for July: Shipped 2,350 tons of ore and 136 tons of concentrates. The receipts from smelter are $25,87 (£5,334)), being payment for 2,226 tons shipped, and $3,126 (£654), being payment for 136 tons concentrates shipped. In all, $28,999 (£5,979). Estimater cost for corresponding period: Development, $3,000; ore production, $10,000; milling, $1,300—$1[illegible] (£3,979). Hamilton west drift, 300 ft. level—Advance 7[illegible] ft. Holywell drift, 300 ft. level—Advance 120 ft. Poorman [illegible] ft. 500 ft. level—Advance 104 feet. The first 30 feet cr[illegible] cut east of fault; vein intersected. The first 20 feet alon[illegible] or averaged 1 oz. 11 dwts. gold and 1¼ per cent. copper [illegible] 11 inches."

COPPER EXPORTS SMALLER.

New York exports of copper for the week ended Augu[illegible] were 7,372 tons; since August 1st, 15,908 tons; same time [illegible] year, 17,748 tons.

STATISTICS AND RETURNS

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending August 25, and those from Jan. 1 1911, to date:

	Aug. 25. Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger	.....	55,200
Bailey	.....	40,000
Barber	.....	6,000
Beaver	125,495	1,278,473
Buffalo	.....	1,800,254
Chambers-Ferland	.....	895,000
City of Cobalt	.....	557,980
Cobalt Lake	127,570	2,698,170
Cobalt Townsite	64,520	719,380
Colonial	.....	135,410
Coniagas	64,250	2,660,354
Crown Reserve	145,940	1,733,529
Drummond	110,000	290,000
Hargreaves	.....	161,100
Hudson Bay	60,000	941,990
Kerr Lake	60,795	1,805,585
King Edward	.....	40,000
La Rose	159,550	4,677,278
McKinley-Darragh	189,700	4,027,864
Nipissing	177,540	4,208,378
O'Brien	.....	938,358
O'Brien, M. J.,	.....	47,000
Peterson Lake, Little Nip	.....	58,430
Provincial	.....	101,670
Right of Way	60,570	830,115
Silver Cliff	.....	106,680
Standard	.....	102,813
Temiskaming	140,520	1,181,892
Trethewey	.....	834,420
Wettlaufer	.....	117,232

The shipments for the week were 1,486,450 pounds, or 743 tons.

The shipments from Jan. 1 to Aug. 25 were 32,539,191 pounds, or 16,269 tons.

In 1910 the shipments amounted to 34,420 tons.

COBALT ORE SHIPMENTS.

Folowing are the shipments from the Cobalt camp for the week ending Aug. 4, and those from Jan. 1, 1911, to date:

	Aug. 11. Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger	.....	55,200
Bailey	.....	40,000
Barber	.....	6,000
Beaver	62,000	1,029,678
Buffalo	65,120	1,734,104
Chambers-Ferland	64,000	895,000
City of Cobalt	.....	557,980
Cobalt Lake	60,000	2,507,600
Cobalt Townsite	76,760	654,760
Colonial	47,410	135,410
Coniagas	120,390	2,533,34[illegible]
Crown Reserve	47,750	1,587,58[illegible]
Drummond	60,000	60,000
Hargraves	.....	161,10[illegible]
Hudson Bay	65,710	816,70[illegible]
Kerr Lake	61,020	1,684,05[illegible]
King Edward	.....	40,000
La Rose	127,800	4,114,16[illegible]
McKin.-Dar.-Sav.	53,290	3,718,57[illegible]
Nipissing	00,000	3,966,83[illegible]
O'Brien	.....	864,31[illegible]
O'Brien, M. J.,	.....	47,000
Peterson Lake, Little Nip.	.....	58,43[illegible]
Provincial	.....	101,67[illegible]
Right of Way	.....	708,99[illegible]
Silver Cliff	.....	106,68[illegible]
Standard	.....	102,81[illegible]
Temiskaming	.....	1,041,37[illegible]
Trethewey	.....	785,52[illegible]
Wettlaufer	.....	117,23[illegible]

The shipments for the week were 975,210 pounds, or 487 [illegible]
Teh shipments from Jan. 1 to Aug. 11 were 30,332,26[illegible] lbs.
The Boyd-Gordon also shipped 2,590 pounds last wee[illegible]

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp fo[illegible] the week ending Aug. 19, and those from Jan. 1, 1911, to date:

	Aug. 19. Ore in lbs.	Since Jan. Ore in l[illegible]
Badger	.....	55,20[illegible]
Bailey	.....	40,00[illegible]
Barber	.....	6,00[illegible]
Beaver	123,300	1,152,97[illegible]
Buffalo	66,150	1800,25[illegible]
City of Cobalt	.....	557,98[illegible]
Chambers-Ferland	.....	895,00[illegible]
Hargraves	.....	161,10[illegible]
Cobalt Lake	61,000	2,568,60[illegible]
Cobalt Townsite	.....	654,76[illegible]
Colonial	.....	135,41[illegible]
Coniagas	62,760	2,596,10[illegible]
Crown Reserve	.....	1,587,58[illegible]
Drummond	120,000	180,00[illegible]
Hargreaves	.....	161,10[illegible]
Shipments 7 months, 1911	.....	146,08[illegible]
Hudson Bay	65,290	881,99[illegible]
Kerr Lake	60,740	1,744,79[illegible]
King Edward	.....	40,00[illegible]

La Rose	403,560	4,517,728
McKinley	119,590	3,838,164
Nipissing	64,000	938,358
O'Brien	64,040	938,358
O'Brien, M. J.,	.....	47,000
Peterson Lake, Little Nip.	.....	58,430
Provincial	.....	101,670
Right of Way	60,550	769,545
Silver Cliff	.....	106,680
Standard	.....	102,813
Temiskaming	.....	1,041,372
Trethewey	48,900	834,420
Wettlaufer	.....	117,232

The shipments for the week were 1,320,480 pounds, or 660 tons.

The shipments from Jan. 1 to Aug. 19 were 31,652,741 lbs., or 15,826 tons.

B. C. ORE SHIPMENTS.

The ore shipments from the Slocan-Kootenay Boundary and Rossland districts for the week ending August 12th totalled 2,209 tons, and for the year to date 1,219,923 tons. The smelter receipts for the week and year to date were respectively 30,961 tons and 1,054,640 tons. The figures in detail were:

I. X. L.	9	70
Centre Star	5,481	123,786
Le Roi No. 2	712	17,318
Le Roi No. 2, milled	300	9,600
Le Roi	423	8,767
Other mines	.....	388
Total	6,925	159,929

Boundary Shipments.

Granby	13,165	590,413
Mother Lode	4,494	194,215
Rawhide	4,010	126,998
Athelstan	100	4,587
Napoleon	1,000	5,560
Unnamed	214	1,836
Other mines	.....	51,749
Total	22,983	977,358

Slocan-Kootenay Shipments.

Sullivan	561	10,838
St. Eugene, milled	420	18,096
Richmond-Eureka	50	1,550
Ferguson	28	321
Rambler-Cariboo	64	1,050
Queen, milled	420	13,230
Granite-Poorman, milled	250	8,000
Nugget, milled	110	3,520
Emerald	86	1,212
Society Girl	23	354
Eastmont	32	185
Knob Hill	77	2,495
Molly Gibson	70	636
Van Roi, milled	800	16,249
Other mines	.....	4,900
Totals	2,991	82,636

Granby Smelter Receipts.
Grand Forks, B.C.

Granby	13,165	590,413

B. C. Copper Co.'s Receipts.
Greenwood, B.C.

Mother Lode	4,494	194,215
Rawhide	4,010	126,998
Athelstan	100	4,587
Napoleon	1,000	5,560
Unnamed	214	1,836
Other mines	.....	21,982
Total	9,818	355,178

Consolidated Co.'s Receipts.
Trail, B. C.

I. X. L.	9	70
Centre Star	5,481	123,786
Ferguson	28	321
Sullivan	561	10,838
Le Roi No. 2	712	17,318
St. Eugene	160	4,137
Le Roi	423	8,767
Molly Gibson	70	636
Granite-Poorman	32	273
Queen	42	270
Knob Hill	77	2,495
Richmond-Eureka	50	1,550
Van Roi	128	708
Emerald	86	1,212
Eastmont	32	185
Society Girl	23	354
Rambler-Cariboo	64	1,050
Other mines	.....	35,079
Total	7,978	109,049

NOVA SCOTIA COAL SHIPMENTS FOR JULY, 1911.

Dominion Coal Company, Ltd.

Output and Shipments for July, 1911.	
Shipments, July, 1911	375,147
Shipments, July, 1910	322,186
Increase, 1911	52,961
Shipments 7 months, 1911	1,929,360
Shipments 7 months, 1910	1,618,311
Increase	311,049

Nova Scotia Steel & Coal Co., Ltd.

Shipments, July, 1911	71,750
Shipments, July, 1910	83,549
Decrease, 1911	11,799
Shipments, 7 months, 1911	340,451
Shipments 7 months, 1910	414,051
Decrease, 1911	73,600

Acadia Coal Co.

Shipments, July, 1911	30,425
Shipments, July, 1910	20,390
Increase, 1911	10,025
Shipments 7 months, 1911	220,617
Shipments 7 months, 1910	143,185
Increase, 1911	77,432

Intercolonial Coal Co.

Shipments, July, 1911	21,886
Shipments, July, 1910	19,304
Increase, 1911	2,582
Shipments 7 months, 1910	142,658
Increase, 1911	3,428

Inverness Ry. & Coal Co.

Shipments, July, 1911	21,130
Shipments, July, 1910	24,212
Decrease, 1911	3,082
Shipments 7 months, 1911	152,122
Shipments 7 months, 1910	145,905
Increase, 1911	6,217

SILVER PRICES.

	New York cents.	London. pence.
Aug. 8	52⅛	24 1/16
" 9	52⅛	24 1/16
" 10	52⅛	24 1/16
" 11	52⅛	24 1/16
" 12	52	24
" 14	52	24
" 15	52	24
" 16	52⅛	24 1/16
" 17	52	24
" 18	52	24
" 19	52⅛	24 1/16
" 21	52¼	24⅛
" 22	52¼	24⅛
" 23	52¼	24⅛
" 24	52¼	24⅛
" 25	52⅛	24 1/16

NEW YORK METAL MARKETS.

August 23—

Tin, Straits, 44 cents.
Copper, Prime Lake, 12.70 cents.
Electrolytic copper, 12.50 to 12.60 cents.
Copper wire, 13.75 cents.
Lead, 4.60 cents.
Spelter, 6.15 cents.
Sheet zinc (f.o.b. smelter), 8.00 cents.
Antimony, Cookson's, 8.37½ cents.
Aluminium, 19.75 to 20.25 cents.
Nickel, 40 to 45 cents.
Platinum, ordinary, $43 per ounce.
Platinum, hard 1, $45.50 per ounce.
Bismuth, $1.80 to $2 per pound.
Quicksilver, $48 per 75 pound flask.

COBALT STOCKS.

Amalgamated	...	...
Bailey	.03½	.03⅞
Beaver Consolidated	.45½	.46
Buffalo	1.75	1.90
Chambers-Ferland	.10½	.11
City of Cobalt	.09	.11
Cobalt Lake	.24¾	.24⅞
Coniagas	6.60 bid	
Crown Reserve	307.	309.
Foster	.03 bid	
Gifford	.01½	.02
Great Northern	.10	.10
Hargraves	.09 bid	
Kerr Lake	4.60	4.75
La Rose	33.70 sellers	
Little Nipissing	.03¾	.03
McKinley	1.52	1.54
Nancy Helen	.01 bid	
Nipissing	8.10	8.15
Nova Scotia	.10½	.12
Ophir	.06 bid	
Otisse	.01	.01
Peterson Lake	.06½	.08
Right of Way	.06½	.07
Rochester	.03¼	.03
Silver Leaf	.02¾	.03
Temiskaming	.40	.40
Trethewey	.70	.75
Wettlaufer	.85	.86

NEW YORK CURB.

Braden Copper	.04⅝	.04
B. C. Copper	.03¾	.04
Butte Coal	.15¾	.17
Ely Central	.01	.03
Ely Cons.	7/16	
First National Cop.	.01	.01
Giroux	.05	.05
Green-Can.	.06⅜	.06
Inspiration	.06¾	.06
Nevada Hills	.03 7/16	.03
Ohio Copper	.01⅜	.01
Ray Central	.01⅜	.01
Union Mines	¼	
Yukon Gold	.03⅝	.03
Goldfields Con.	.05½	.05
Nevada Con.	.17	.17
Miami	.19½	.19
Granby	.60 off	
Con. Min. & Smelt.	.42	.44
Davis-Daly	¾	
Con. Arizona	11/16	
Rawhide Coal.	...	...
Ray Con.	.15	.15
Chino	.19	.19

PORCUPINE STOCKS.

Crown Chartered	.31	.32
Amer. Gold	1.50	1.80
Apex	.13	.16
Com.	.18¾	.20
North. Exploration	3.75 bid	
Dobie	.95 bid	
Dome Exten.	.54½	.55
Eldorado	.11	.15
Foley	1.02 bid	
Gold Reef	.14	.20
Hollinger	9.85	9.95
Pearl Lake	.40 bid	
Pore. Can.	.90	.95
Pore. Central	.73	.74
Pore. Imperial	.09½ sellers	
Pore. Northern	.58½	.59
Pore. Tisdale	.05½ sellers	
Preston	.29	.29
Rea	3.03	3.05
Standard	.04	.07
Swastika	.43	.43
Pore. Gold	.44½	.44
West Dome	1.75	2.00

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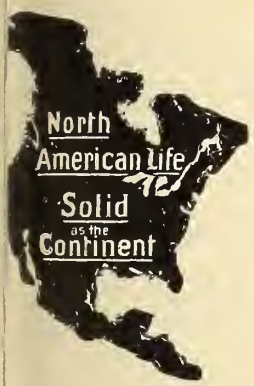

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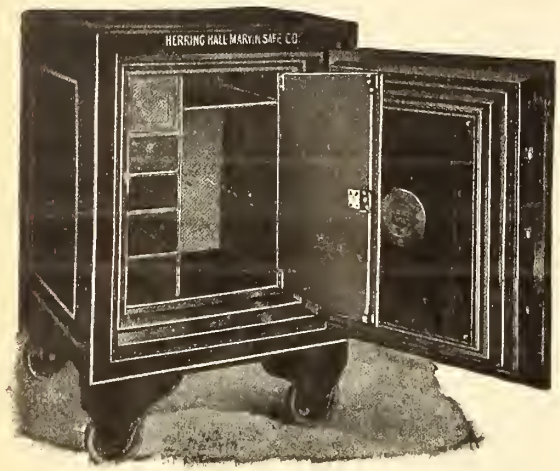

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Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map of Canada, by G. A. Young and R. W. Brock.
1170. Summary Report of the Geological Survey for 1910.

NEW BRUNSWICK and NOVA SCOTIA

1113. Memoir No. 16. The Clay and Shale Deposits of Nova Scotia and portions of New Brunswick, by H. Ries and J. Keele.

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1110. Memoir No. 4. Geological reconnaissance along the line of the National Transcontinental Railway in Western Quebec, by W. J. Wilson, accompanied by a map.
1064. Geology of an area adjoining the east side of Lake Timiskaming, by Morley E. Wilson.

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1091. Memoir No. 1, Geology of the Nipigon Basin, Ontario, by A. W. G. Wilson.
1137. Memoir No. 10. An instrumental survey of the shore-lines of the extinct lakes Algonquin and Nipissing in South-western Ontario, by J. W. Goldthwaite.

NORTH WEST PROVINCES

1115. Memoir No. 8. The Edmonton Coal Field, Alberta, with maps, by D. B. Dowling.

BRITISH COLUMBIA

1139. Memoir 11-T Triangulation and Spirit Levelling of Vancouver Island, 1909, by R. H. Chapman.

YUKON and NORTH WEST TERRITORIES

1080. Report on a part of the North West Territories drained by the Winisk and Attawapiskat Rivers, by Wm. McInnes.
1006. Report on a traverse through the southern part of the North West Territories from Lac Seul to Cat Lake in 19, by A. W. G. Wilson.
1130. Memoir No. 9. Bighorn Coal Basin, Alberta, by G. S. Malloch, accompanied by a map.

MAPS RECENTLY ISSUED:

CANADA

1042. Mineral Map of Canada. Scale 100 miles to 1 inch.
1084. Geological Map of Canada. Scale 100 miles to 1 inch.

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1133. Map 13 A. Kingsport sheet, Nova Scotia, No. 84. Scale 1 mile to 1 inch.

NEW BRUNSWICK

1155. Map 24A. Millstream Iron Deposit, Gloucester County, N.B., geological and topographical. Scale 400 ft. to 1 inch.
1156. Map 25 A. Nipissiguit Iron Deposit, Gloucester County, N. B. Geology and topography, scale 400 feet to 1 inch.

QUEBEC

1066. Map 18 A, Lake Timiskaming Mining Region. Scale 1 mile to 1 inch.
1112. Map 12 A. Vicinity of the Transcontinental Railway, Abitibi District, Quebec. Scale 4 miles to 1 inch.
1154. Map 23 A. Thetford-Black Lake Mining District. Scale 1 mile to 1 inch.

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1091. Map 8 A, Lake Nipigon, Thunder Bay District, Ontario. Scale 4 miles to 1 inch.

ALBERTA

1132. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.

BRITISH COLUMBIA

1135. Map 15A. Phoenix, British Columbia, topographical. Scale 400 ft. to 1 inch.
1148. Map 20A. Victoria sheet, Vancouver Island, B.C., topographical. Scale 1 mile to 1 inch.
1149. Map 21A. Saanich sheet, Vancouver Island, B.C., topographical. Scale 1 mile to 1 inch.
1164. Map 28 A. Sketch map of Portland Canal Mining District.

YUKON and NORTH WEST TERRITORIES

1089. Map 9A. Explored Routes on Parts of the Albany, Severn and Winisk Rivers. Scale 8 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 10 cents is made for maps on linen.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon. Letters and samples that are of a Departmental nature, addressed to the Director may be mailed O.H.M.S. free of postage.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.

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Aggregate Value of $374,197,650.

In 1910 the quantity of Ore mined was 2,216,428 tons, and of coal 3,139,235 long tons. The value of Minerals produced that year was: Placer Gold, $540,000; Lode Gold, $5,533,386; Silver, $1,245,016; Lead, $1,386,350; Copper, $4,871,512; Coal and Coke, $11,108,335; Other Minerals, $1,692,473, making the

Total Value for 1910, $26,377,066.

Lode mining has only been in progress for about eighteen years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

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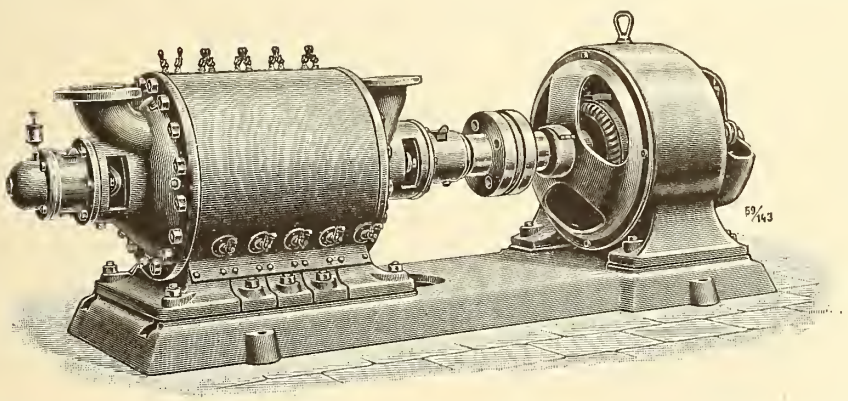

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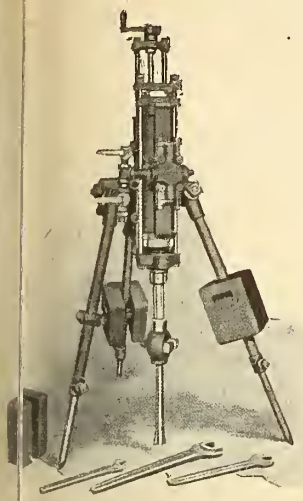

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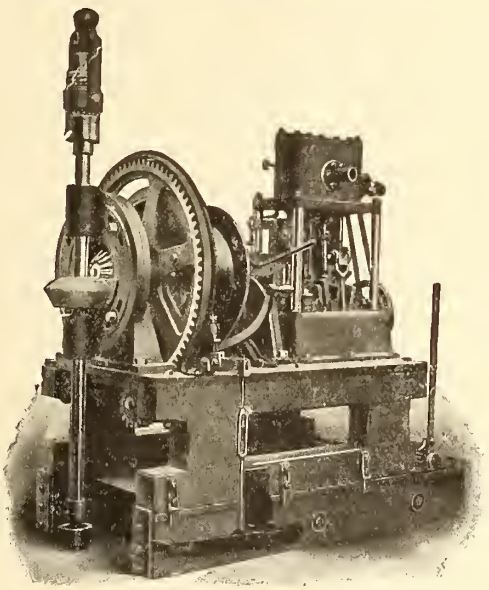

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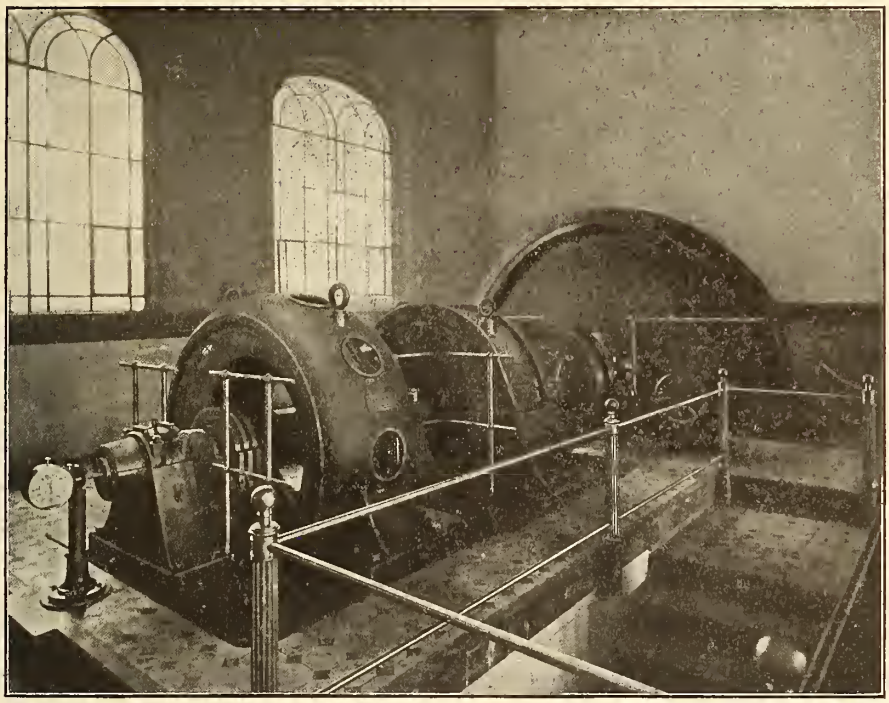

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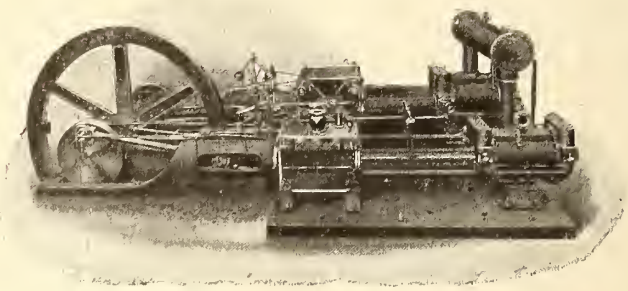

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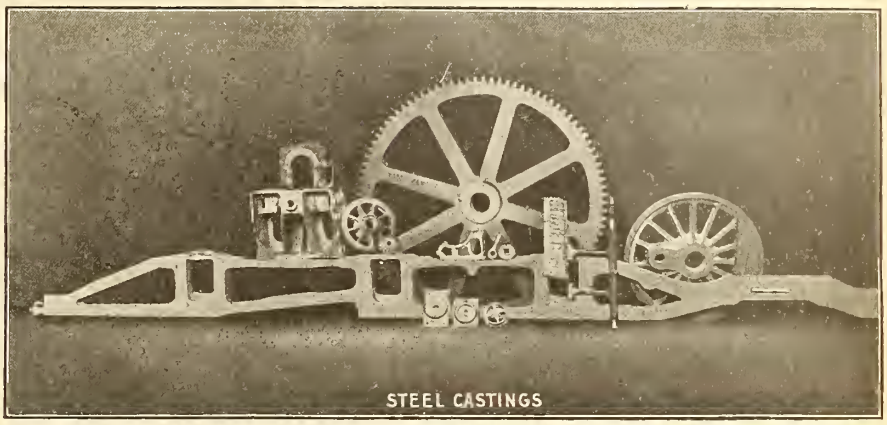
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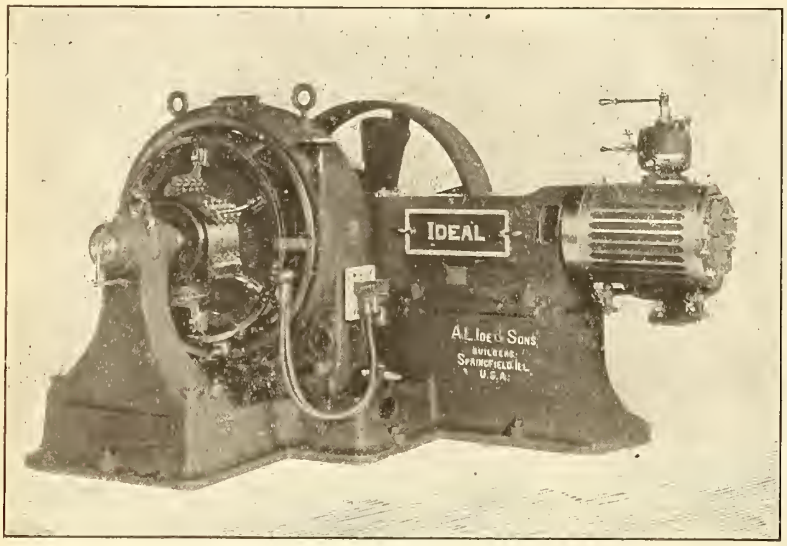

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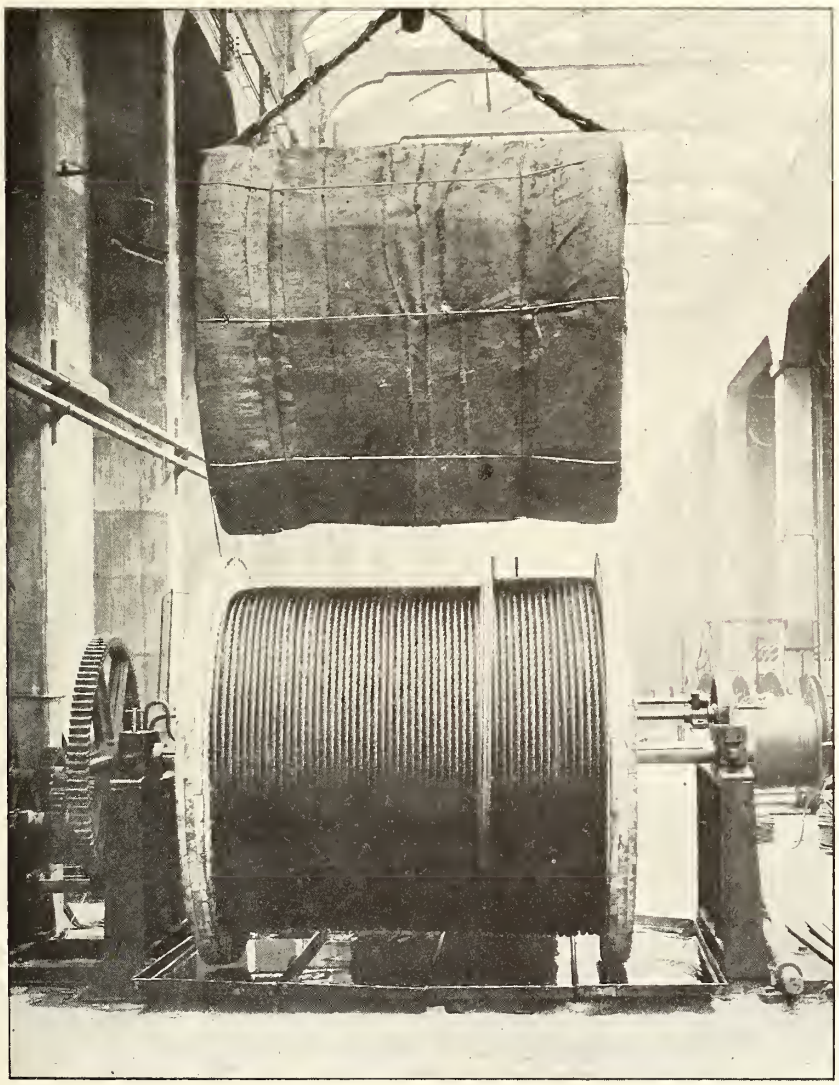

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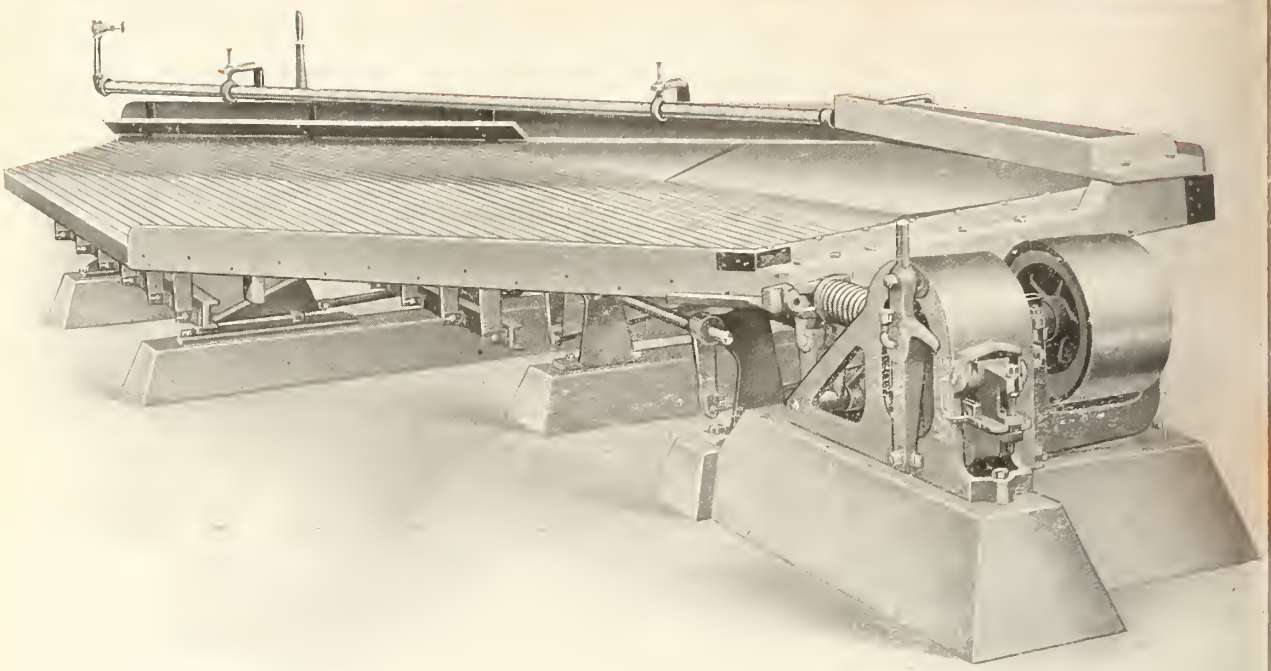

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VOL. 32 TORONTO No.

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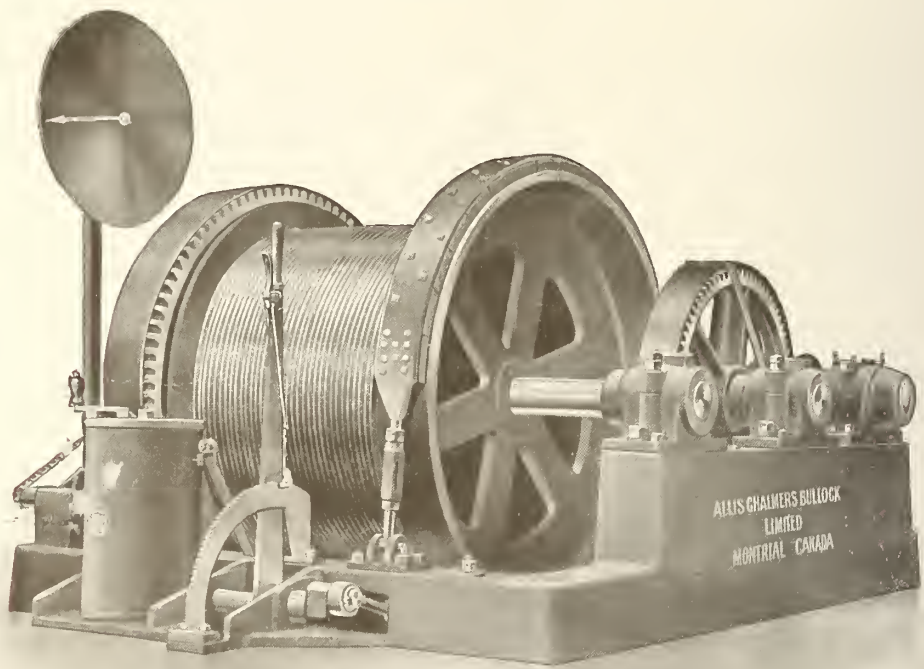

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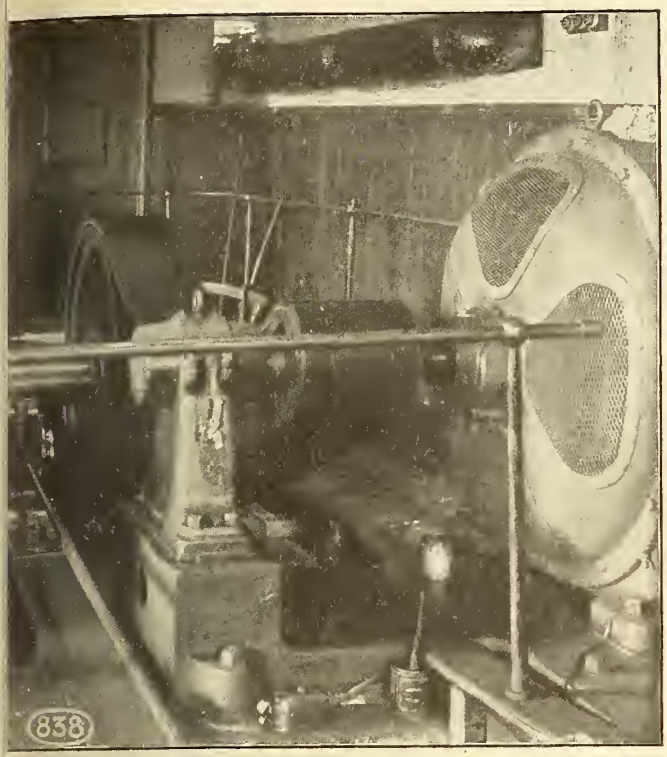

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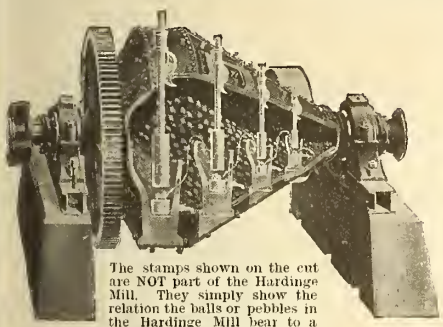

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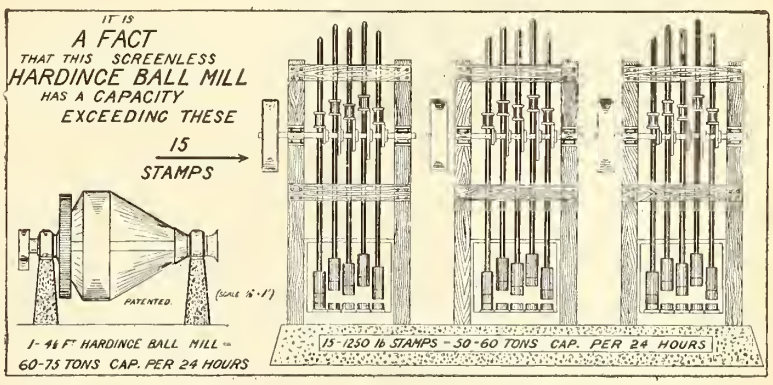

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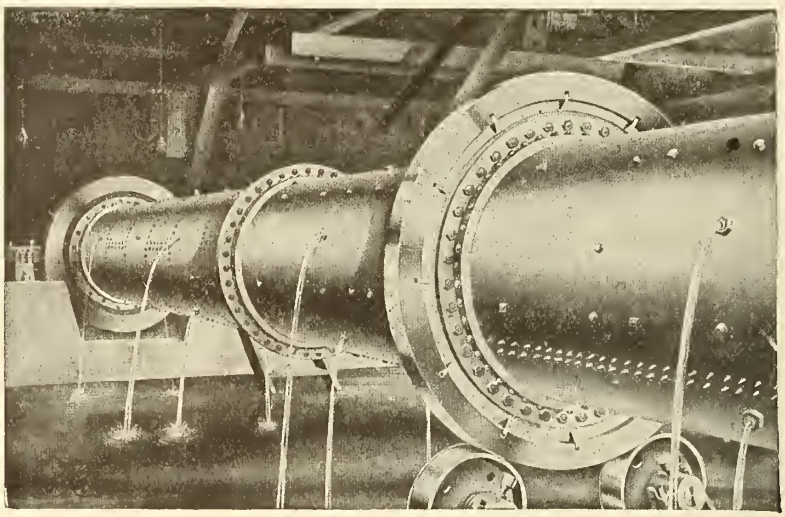

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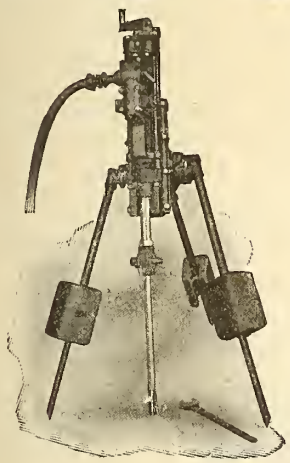

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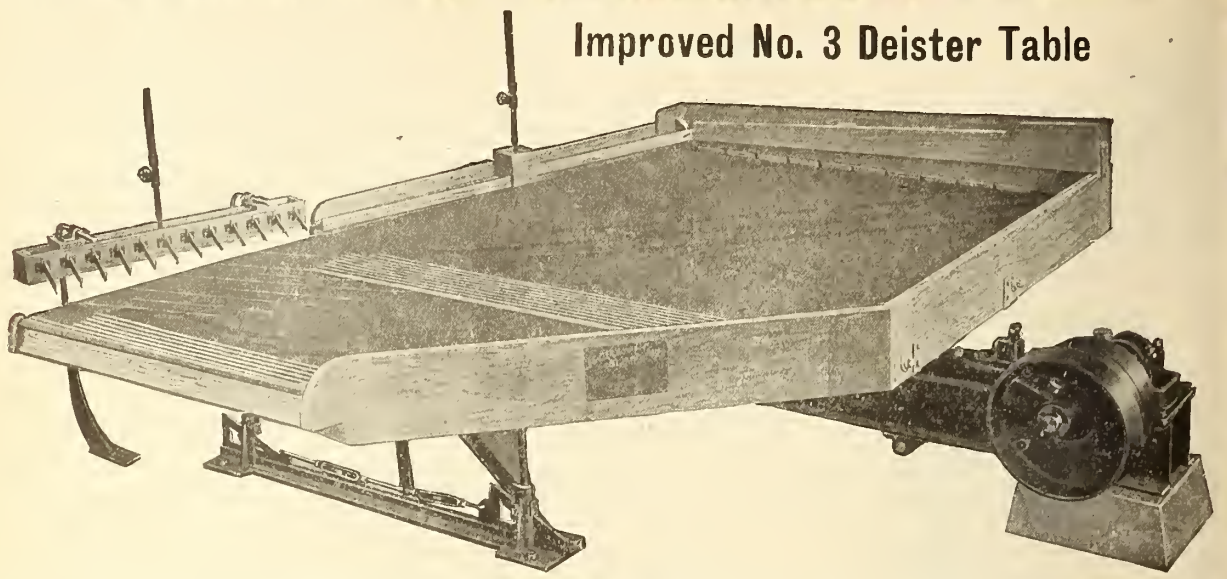

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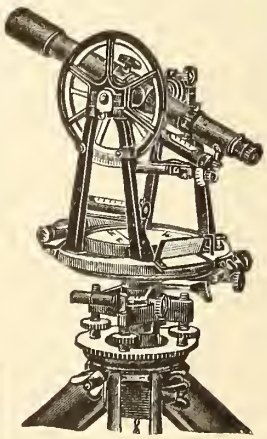

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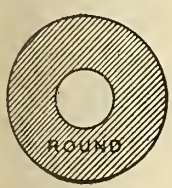

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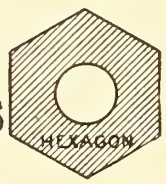

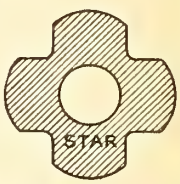

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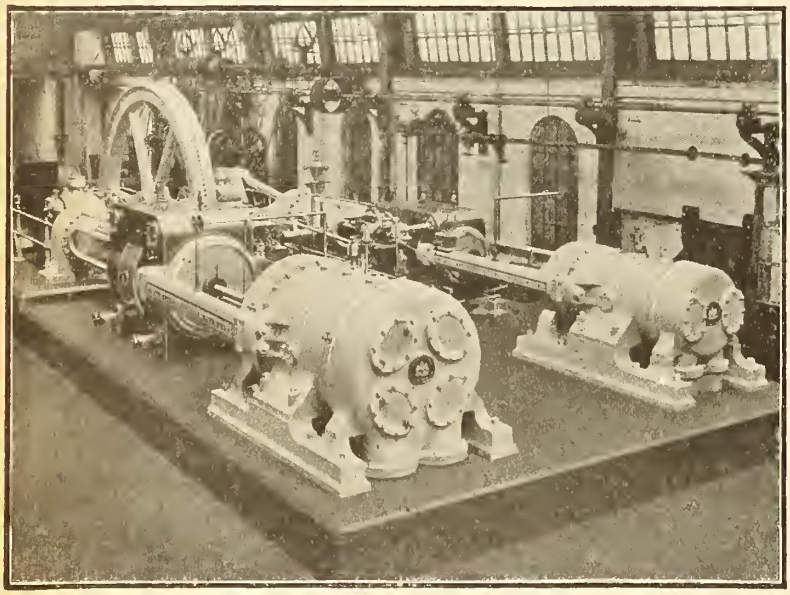

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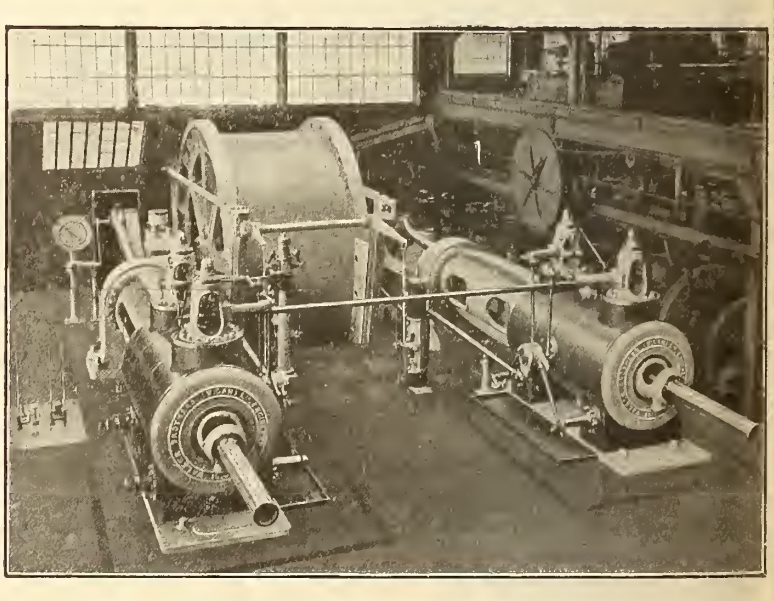

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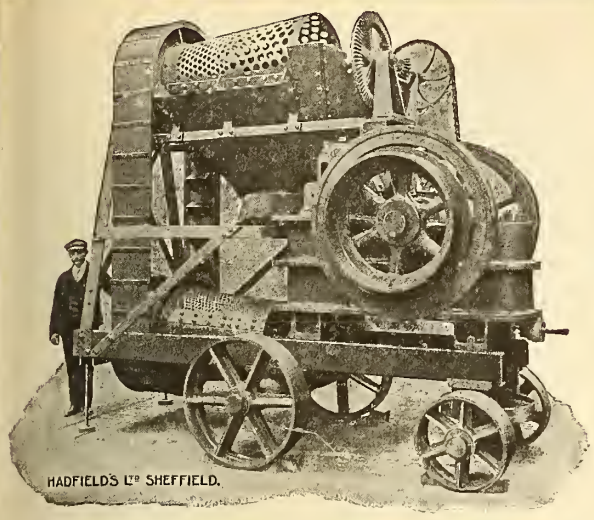

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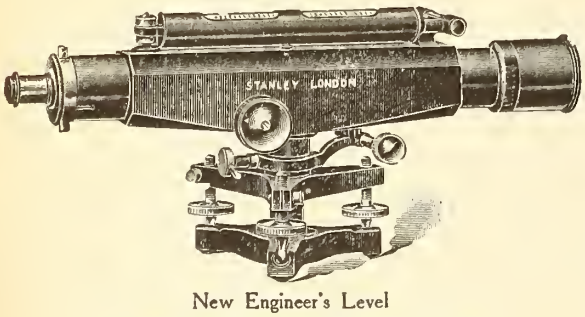

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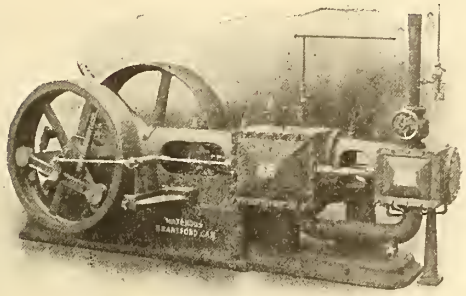

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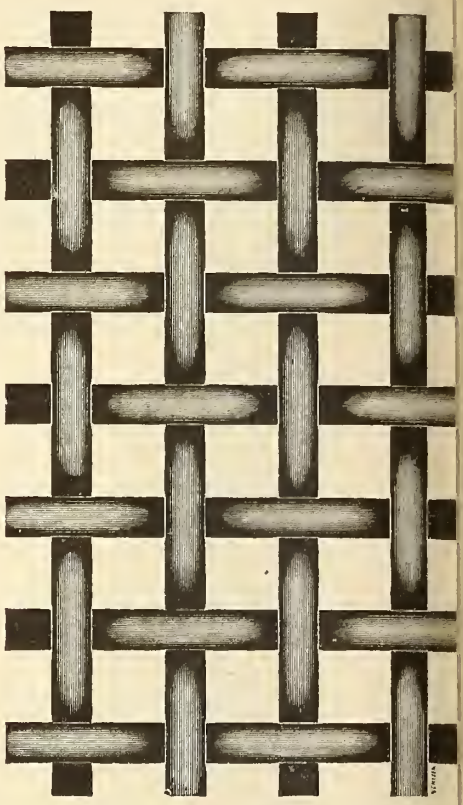

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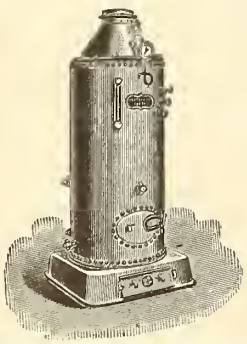

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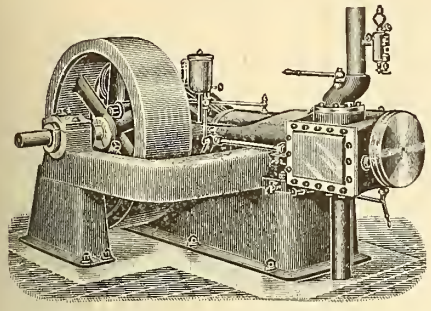

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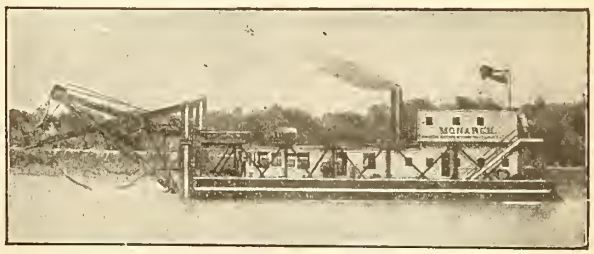

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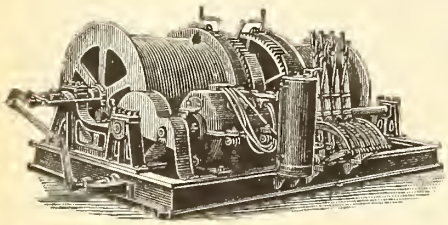

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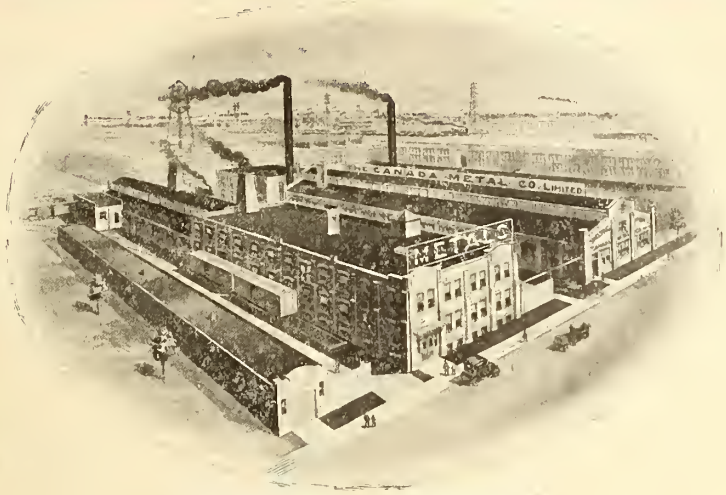

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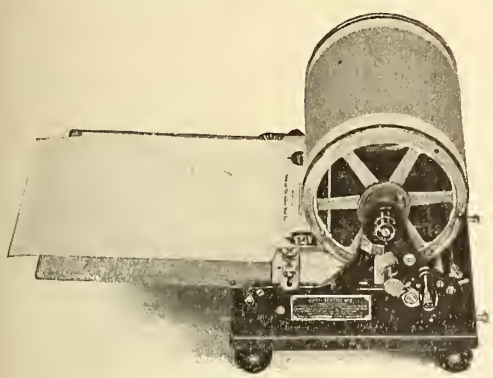

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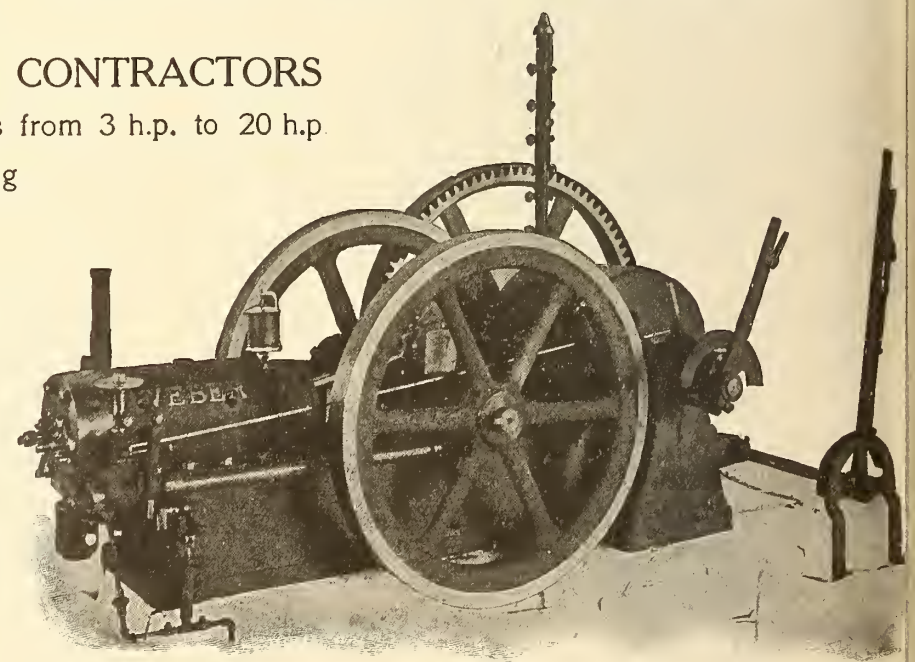

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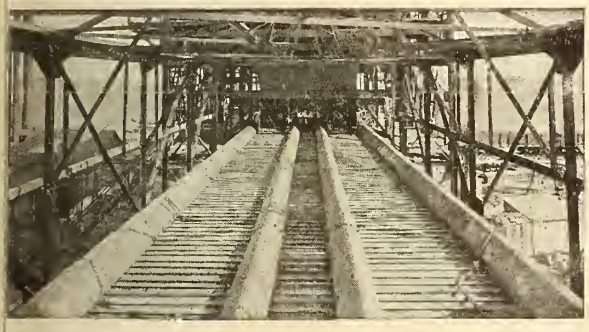

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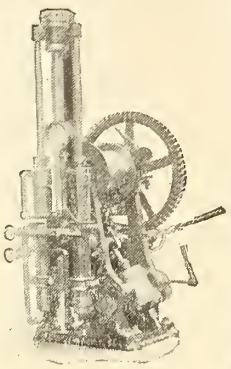

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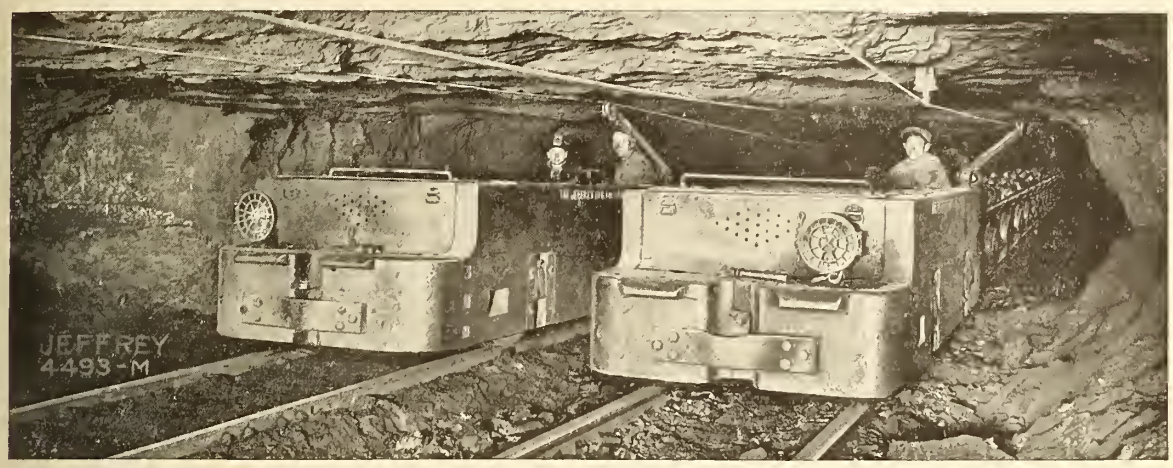

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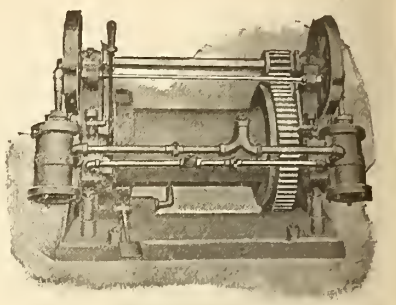

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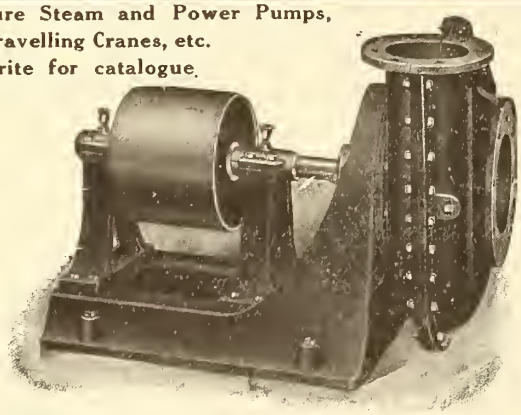

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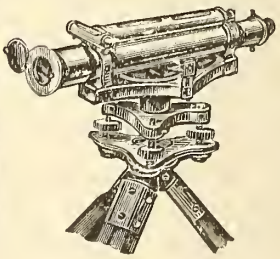

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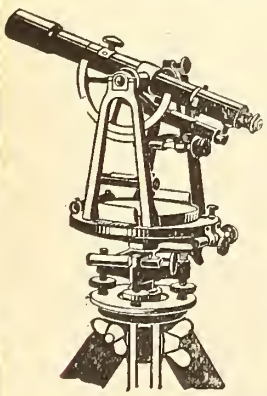

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THE CANADIAN MINING JOURNAL

XXXII. TORONTO, Sept. 15, 1911 No. 18

The Canadian Mining Journal

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THE ALCHEMIST.

The alchemist is not dead. He crops up ever and anon, filled with dreams of things every whit as beautiful as the elixir of life or the fountain of youth. When he butts into the domain of metallurgy his visions are weird. As they appear in the public press, touched up by the reprehensible reporter, they suggest to us the possible joint offerings of Peruna and Mrs. Eddy.

Some years ago, an enterprising Toronto dentist, yclept Dr. J. S. Island, gave up his profession and turned his resourceful mind towards metallurgical experiments. We do not know how deeply Dr. Island studied the metallurgical literature and practice of to-day. From internal evidence we are inclined to believe that he relied upon his own God-given ability, and not upon the records of work already done. He looked upon himself as truly an intellectual island, isolated, intact, unteachable.

Be this as it may, Dr. Island won ready recognition. Stirring newspaper paragraphs have appeared occasionally, until, as climax, the Canadian Courier (a National Weekly!) gave him a full page of journalese on September 9th, 1911.

Our readers are earnestly requested to consider these glittering extracts from the Courier's pages:

"For years Dr. Island has been trying to solve one "problem—the reduction of low grade ores. In Co- "balt, Porcupine, California, and Alasaka [Editor's "Note.—This applies equally well to the whole ter- "restrial sphere.] tons of mineral wealth are going to "waste. Only a fraction of the precious metals stored "there by nature has been utilized. Mining methods "to-date are inadequate. [Editor's Note.—We are "glad to learn this. It is news of the first water. We "had not suspected that our mining engineers were "not doing their duty. Shame on them!] The miner "digs out rich veins and sends these ores, containing "from 5,000 ounces of gold, silver, or copper to the "ton, to be smelted. Lower grade ores, which run "about fifteen ounces to the ton, [Editor's Note.— "Mark, pray you, the nice distinction between high "and low grade ores.] he throws on the dump, because "the cost of reduction is too great. Now Dr. Island "aims at making it worth while to salvage these low- "grade ores. Seventy per cent. of low-grade ores are "composed of insolubles. Dr. Island's method is to "make soluble salts out of them. . . . He runs them "through an ore crusher. Then he places them into "specially constructed tanks. Mixed with water they "are stirred by a propeller until a creamy lather

"arises. [Editor's Note.—The creamy lather, no doubt, " is ingeniously devised to assist in shaving profits.] "Then the mass is permeated by chlorine and sulphur "dioxide gas, prepared in generators of Dr. Island's "own design. The hard ores have now become solu- "ble salts and it is no longer a difficult job to extract "the principal metals from the baser in the salt for- "mation."

So far the technical side of things. Next the Courier touches on matters financial to this effect:—"One "day a promoter hit upon the Island building, and "saw the dentist's operations. He had insomnia for "a few days, and spent the time dogging the footsteps "of Sir Donald Mann, with whom he had a bowing "acquaintance. Sir Donald ran out to Island's place. ". . . . Now Sir Donald has formed a ten-million- "dollar company to boost Island's invention." Thus the Courier.

From all available facts it may be fairly deduced that Dr. Island is treading the road that the first-year youth travels when he is initiated into the mysteries of qualitative analysis. The "horror of odours," we quote the Courier's phrase, is one of the perquisites of the adolescent investigator.

Yet we do not wish to scoff at Dr. Island. He may be a genius, and he may be merely a misguided and mistaken inventor. The chances are largely in favour of the latter alternative. But the most serious phase of the whole business is the fact that Dr. Island permits the public press to exploit him and his process before he has given one iota of tangible proof that he can get commercial results. If Dr. Island were a professional metallurgist he would have lost caste at once. As matters stand, it is only possible to say that, whatever the improbable merits of his process, he is countenancing the worst kind of wild-catting in connection with the flotation of his company.

The Courier's statement that Sir Donald Mann "has formed a ten-million-dollar company to boost Island's invention," we disregard entirely. Sir Donald is too wise a bird to be caught with chaff. He has made a conditional offer. The condition is that Dr. Island perform up to the limit of his promises. The fulfilment of that condition would bring more than ten million dollars from any magnate.

* * * *

A commission of technical men is shortly to investigate the Island process. We do not know that the report, if unfavourable, will be made public. But, whether that report be favourable or unfavourable, the self-respect of the inventor and of those associated with him should preclude the publication of such fatuous nonsense as the Courier has spread abroad, and common honesty should prevent the promoters from selling any shares.

A COMMISSION FOR NOVA SCOTIA'S GOL MINES.

Seven years ago the Government of Nova Scotia gaged Mr. T. A. Rickard (who as mining enginee editor, and as author needs no introduction to readers) to make a cursory examination of the mines of the province. Mr. Rickard came and w and no one was the wiser. His report was never lished. According to the Government, the report unpublishable. According to Mr. Rickard, the ernment should have published his report. With question, however, we have nothing to do. It is n sary only to mention that the non-publication of Rickard's report has had a most mischievous e upon Nova Scotian gold mining. The colour of report is not known to the public. Yet it is taken granted that Mr. Rickard expressed a strongly verse opinion in regard to the future of gold minin the Province. That there is absolutely no ground this belief, does not modify the current misconcep

As there is no probability of Mr. Rickard's nouncement being made public, the only pos course is to disregard it altogether. It is unprofita at this late date, to attempt to allocate the resp bility for the fiasco. The urgent duty of the Gov ment is to make a strong effort to appraise the pre value and the future prospects of each gold produ district in the Province.

An appropriately selected commission compose mining men whose names carry weight and w judgment may be thoroughly relied upon. Such a mission, amply supplied with funds, and provided every facility for examining the representative mines, would be in a position to learn much conc ing the industry.

We believe sincerely that the report of a prop constituted commission would place Nova Sco gold mining in a very favourable light. Of co everything will depend upon the personnel of the mission, and upon the authority with which i clothed.

In selecting the members of the commission it is perative that men of world-wide experience in mining be selected. It is equally necessary tha Nova Scotian mining man be chosen. Everybody terested will also agree that the inclusion of Mr. F banlt, whose knowledge of the whole subject fro geological standpoint is at once complete and ac ate, is necessary.

The duties of the commission should consist in m ing an abstract of the history of each district, in scribing the present condition of every mine, in d nosing the whole industry, and in formulating a whereby Government assistance can be best app

The open publication of the report of this com sion would rouse world-wide interest. The mi fraternity is waiting for it. It is the obvious dut the Provincial authorities to act at once. The Rick

dent itself has committed the Government so completely that continued silence is as impossible as it undignified.

THE EVANS-STANSFIELD DIRECT STEEL PROCESS.

At the Canadian National Exhibition, the annual function that gives fame to Toronto, there was given an unusually interesting metallurgical demonstration. On the evening of Friday, September 8th, and during the morning and afternoon of Saturday, September 9th, Mr. J. W. Evans exhibited his electric furnace in actual operation.

Under the most adverse conditions, and handicaped by an almost total absence of facilities, Mr. Evans succeeded in reducing small quantities of titaniferous iron ore to steel of the best quality. The Friday test was begun with a cold furnace and with an uncontrolled current. Nevertheless, after five hours, the small charge of ore, amounting to less than 100 pounds, was reduced and clean ingots of steel were produced. The Saturday run was much more successful.

Mr. Evans has attacked manfully the problem of making steel direct from titanium-bearing iron ores. Ever since 1904, his time and energy have been unreservedly devoted to the development of a suitable furnace. With the aid of Dr. Stansfield he has evolved a plant that is, apparently, a commercial success.

This means much for Canada. There are many known deposits of titaniferous iron ore. No serious attempt has been made to utilize these. It is known that most of these ore bodies carry a small percentage of vanadium. Sometimes, also, nickel is one of the associated elements. As the electric furnace designed by Mr. Evans is strictly controllable, the desired proportions of titanium in the alloy can always be obtained. The steel inherits nearly all the vanadium and nickel.

Physically, the steel turned out from Mr. Evans' furnace is free from defect. Occluded gases are absent. There are no flaws, neither are there signs of segregation. The product appears to be thoroughly homogeneous. In effect it is a valuable steel alloy possessing all the attributes that are required for a high-speed tool steel.

Credit is due the Canadian National Exhibition and the Ontario Bureau of Mines for assisting Mr. Evans in making his public demonstration. Credit also is due to Mr. Evans for the plucky manner in which he has stuck to the discouraging task of making people believe that there is something in his invention. For more than seven years he has been engaged in perfecting his furnace. He has reached the stage at which he is ready to submit his claims to the most rigorous examination. Unlike the average inventor, he has made no appeal to the investing public, although his process has met the approval of all who have looked into it.

That the Canadian National Exhibition should have been the first Canadian corporation to enable the inventor to exhibit his process is gratifying. It is, incidentally, a sign that the directors will succeed in their aim. Sooner or later they will make the Exhibition an international event.

The example set by Mr. Evans should be followed by others. Among the vast crowds that throng the Exhibition annually are many who are interested in mining. A "process" exhibit is always instructive. No description can carry the same meaning to the reader. The person who once sees ore being crushed and treated has always a peg upon which to hang further information. The manufacturer of machinery who does not realize this is losing a supreme opportunity.

To return to our subject, if Mr. Evans has solved the riddle of cheap direct steel, and we believe that he has, he has placed a premium upon numerous hitherto worthless ore bodies in Ontario and Quebec.

MINING IN QUEBEC DURING 1910.

A distinct improvement upon all its predecessors is the Annual Report of the Mines Branch of the Province of Quebec. Although the date of distribution has been very much delayed owing to causes beyond the control of the Department, yet it contains much material the timeliness of which is not impaired.

The total value of Quebec's mineral production during 1910 was $7,323,281, as compared with $5,552,062 during 1909 — an increase of $1,671,219. Mr. Denis attributes this increase in part to the more complete collection of data. Nevertheless, the greater part of it may be assigned to larger outputs. For instance, the value of asbestos produced during 1910 was $2,667,829, as against $2,296,584 in the year 1909. The figure for cement was $1,954,646, as compared with $1,314,551; for brick, $906,375, as compared with $584,371; and for limestone $503,173, as compared with $457,143. Granite, marble, mica, and a few other minerals show gains. The grand total is by far the highest yet reached by the Province.

Asbestos mining was carried on very actively during the first seven months of the year. Slackening demand caused the production to fall during the remainder of the year. Mr. Denis explains that this condition is only temporary.

Titaniferous iron ore was mined for the first time since the year 1872. From the large bodies of this ore at St. Urbain, 3,596 tons were shipped. A quantity of this was used by the General Electric Company, at Lynn, Massachusetts, in connection with the manufacture of electrodes for arc lights. The titanic acid content is reported to have been from 45 per cent. to 50 per cent. The remainder of the St. Urbain shipments

were consigned to the Titanium Alloy Co., Niagara Falls, N.Y. Mr. Denis devotes considerable space to the subject of titanium-bearing ores.

The cupriferous iron pyrites deposits of the Eastern Townships are the principal sources of copper. Only 24,040 tons were mined in 1910, a fall of 10,000 tons from the output of 1909. The present year will see much larger production as the McDonald mine, near Weedon, is shipping steadily. Last year the bulk of the ore came from the Eustis mine.

Gold is being won this year from the alluvial deposits on the Rigaud-Vaudreil Seigniory, Beauce County. The operators, under the name of the Dominion Gold Fields, Limited, possess mining rights over 70,000 acres, including much rich territory from which most of the gold extracted in the sixties and seventies was obtained.

Shipments of graphite amounting to 309,400 pounds, valued at $15,896, were made from two mines in the township of Buckingham—the Buckingham Graphite Co., and the Bell Graphite Co. This is the largest yearly production on record.

Mica mining, also, became much stronger. The value of the shipments, mainly from the townships of Templeton and Portland in Ottawa county, was $58,668. This recovery is needed. In the year 1907, the value was $223,878.

The mining of chromite in the Eastern Townships was practically dead throughout the year, only 299 tons being shipped from old stock-piles.

The output of building materials and clay products was much larger than ever before. Brick increased 55 per cent. as compared with 1909; lime, more than 100 per cent.; granite, 90 per cent.; marble, 16 per cent.; limestone, 10 per cent.; and cement, 48 per cent. As mentioned above, a part of these increases must be set down to more complete collection of data.

7,923 men were employed during the year in the mines and quarries of the province. The number of fatalities was 14—a death rate of 1.76 per thousand men employed. This is a most creditable showing.

The report includes notes on the Opasatica District, a geological reconnaisance in Gaspe, and a chapter on the handling of explosives. It is well illustrated, and carefully printed. The CANADIAN MINING JOURNAL congratulates Superintendent Denis and his staff upon setting a higher standard.

THE MAGPIE MINE.

Dr. W. L. Goodwin's article in this number of the CANADIAN MINING JOURNAL should attract immediate attention. The utilization of enormous deposits of siderite, which in its natural condition carries only 40 per cent. of iron and is contaminated with nearly 4 per cent. of sulphur, is a bold stroke.

Long experimenting, conducted under the direction of Mr. R. W. Seelye, for the Lake Superior Corporation, has demonstrated that this ore can be roasted sweet. The calcined product is a strong porous lump ore, carrying more than 50 per cent. of iron, practically free from sulphur, and of Bessemer quality.

The plant that is to be erected is fully described by Dr. Goodwin. Some millions of tons of ore have been developed by diamond drilling. The conversion of this ore into a high-grade product will be accomplished at the rate of 15 tons per hour, and at a cost not to exceed 40 cents per ton. This will be a truly notable addition to the available ore supplies of Canada.

The calcining of siderite was performed on a small scale, a considerable number of years ago, at Londonderry, Nova Scotia, near which place there are large bodies of the mixed carbonates. But the two calciners were of hardly more than experimental size, and the cost of operation was too high.

The enterprise of Mr. Seelye has made possible a revolutionary step in advance, a step that will go far towards securing the future of the Lake Superior Corporation.

KILDONAN.

One more blasted hope is on record. His Grace the Duke of Sutherland, who owns large estates in Sutherlandshire, Scotland, consented to have his Kildonan property exploited for alluvial gold. The contract was given to a man named Heath, a former Klondike prospector. Heath succeeded in stirring things up a bit. But that was the only result. No gold of any importance was found, despite the windy hopes of Heath.

The crofters and shepherds who, for the nonce, had become transmogrified into miners, have now returned to their more peaceful vocations. Kildonan is no longer a name wherewith to conjure.

ONTARIO METALLIFEROUS MINES.

Returns to the Ontario Bureau of Mines for the first six months of the current year are more than usually gratifying. Whilst the production of copper and nickel has fallen off, the output of silver is greater by 2,417,142 ounces than it was during the corresponding period last year. The amount of iron ore mined was 94,803 tons, or 55,306 tons in excess of the quantity mined during the former half of 1910. Gold once more appears on the list, 2,276 ounces having been extracted up to June 30th, 1911.

EDITORIAL NOTES.

The net profits of the International Coal & Coke Company, Coleman, Alberta, for the calendar year 1910, amounted to $300,097. The company pays four quarterly dividends at the rate of 1½ per cent., or 6 per cent. per annum.

CORRESPONDENCE

A WARNING.

Toronto, September 11th, 1911.

The Editor,
CANADIAN MINING JOURNAL,
17-23 Manning Arcade Annex, Toronto.

Sir,—My attention has been called to a statement in the publicity section of the Swastika number of "The Mining Investor," refrering to me as having examined the claims of the Porcupine Swastika Mining Company, Limited, and reported favourably upon them; also referring to me as the Managing Director of that Company. I write to say that the statement that I have reported favourably upon the claims of the company is contrary to fact; and I am not, and have not, at any time, been Managing Director ,or otherwise officially associated with the company; or a shareholder therein, or otherwise interested in the stock of the company. If further reference is made to me in any of these connections, I shall be compelled to place the matter in the hands of my legal adviser, and take such proceedings against parties responsible therefor as may be necessary to protect my interest. Kindly interest. Kindly insert in your next issue, and oblige,

Yours truly,

R. B. LAMB.

Personal and General

Mr. J. W. Evans was in personal charge of the Evans-Stansfield electric smelter at the Canadian National Exhibition, and superintended the public demonstrations, of which an account will be found in another page.

Mr. Stanley N. Graham has resigned his position as superintendent of the Canada Sulphur Ore Company, Queensboro, Ont., and has accepted an appointment in connection with the Geological Survey, Ottawa.

Dr. Milton L. Hersey has been nominated as Liberal candidate to oppose Mr. H. B. Ames in St. Antoine division of Montreal.

Mr Francis H. Shepherd, of Nanaimo, B.C., has resigned the position of Chief Inspector of Mines for British Columbia to accept the nomination as Conservative candidate to oppose Mr. Ralph Smith, a supporter of the Liberal Government, in the constituency of Nanaimo, Vancouver Island.

Hon. Wm. Templeman, Dominion Minister of Mines, who at the last Federal election was defeated in Victoria by Mr. G. H. Barnard, and was afterwards elected for Comox-Atlin, also in British Columbia, is again opposing Mr. Barnard as candidate for Victoria.

Mr. A. D. Clabon, formerly of Quebec, but now of Vancouver, B.C., recently took to Princess Royal Island, B.C., a party of mining men to see a gold property he and associates are developing on that island.

Dr. R. W. Brock, of the Geological Survey of Canada, went to British Columbia about the middle of August. Late in the month he visited the Skeena district, where, in the vicinity of Hazelton, silver-lead ores have been found.

Mr. G. G. S. Lindsey went to British Columbia last month with Mr. L. Reyersbach, managing director of the Central Mining and Investment Corporation, London, England, and Mr. Hugh F. Marriott, the company's consulting engineer. Dr. R. W. Brock, Director of the Geological Survey of Canada, accompanied the party west. Messrs. Lindsey and Marriott paid a short visit to the Skeena country, and afterwards went to Sheep Creek camp, Nelson mining division.

Dr. Heinrich Ries, Professor of Economic Geology, Cornell University, Ithaca, N.Y., has been examining clay deposits in British Columbia, to obtain information for inclusion in a report on the clays of western Canada he is to make to the Canada Department of Mines. He went thence to San Francisco, on his homeward journey.

Mr. Anthony J. McMillan, liquidator of the Le Roi Mining Company, Limited, was in Chicago last month on his return trip from London to Rossland, B.C.

Mr. Byron N. White, owner of the Pueblo copper mine, near Whitehorse, southern Yukon, has returned to Spokane, Washington, from a visit to the mine, which, however, he will not again work until he shall be granted lowed freight rates on ore from mine to an outside smeltery.

Mr. J. W. Astley, mining engineer, formerly manager of several important mines in British Columbia, including Le Roi, has taken an office in one of the rooms occupied by the CANADIAN MINING JOURNAL, 17-23 Manning Arcade Annex, Toronto.

Mr. Clifford E. Smith, mining engineer, Brockville, Ont., has recovered from a severe attack of throat trouble. Mr. Smith was a patient at the Toronto General Hospital for ten days.

Mr. J. W. Rawlins, chief chemist to the Canadian Copper Company, was in Toronto on September 5.

Mr. W. J. Woolsey, consulting mining engineer, Thetford Mines, P.Q., left on August 26th for a two months' professional visit to Great Britain and Europe. His address while away will be 98 Leadenhill Street, London, E.C.

Mr. John Redington has been appointed manager of the Swastika mine in place of Mr. M. W. Summerhayes, who has resigned to take up private practice.

Mr. R. S. Lamb, mining engineer, Toronto, is making an extended series of examinations in Porcupine.

Mr. M. W. Summerhayes has resigned from the management of the Swastika mine, and will take up private practice again. Temporary address will be 76 Home Life Building, Toronto.

TOPAZ, TIN, AND GRANITES IN ONTARIO

By Willet G. Miller.*

Mr. R. W. Broek, in his interesting paper, "Tin and Topaz in New Brunswick," published in the September 1st issue of the JOURNAL, says that the recent discovery of topaz in New Brunswick is the second to be made of this mineral in Canada. It may be of interest to refer to another occurrence of this, insofar as Canada is eoneerned, rare mineral.

Last summer, 1910, Dr. E. S. Moore was engaged by the Ontario Bureau of Mines to make an examination of the Sturgeon Lake gold field in northwestern Ontario. In his report, now being published in the 20th annual volume of the Bureau of Mines, he has the folfowing to say eoncerning the oeeurrenee of topaz in that field. Apparently Dr. Moore did not recognize the mineral in hand specimens but only on examination of a thin section under the microscope. If topaz does oeeur in a form in which it can be reeognized in hand specimens at Sturgeon Lake or elsewhere, it may easily be passed over. Unless it oecurs in distinct erystals it is apt to be mistaken for quartz or other light-coloured mineral.

Topaz and Other Minerals in Hornblende Syenite.

"Lying along the eastern shore of the upper portion of the narows on the lake, there is a large mass of rock which in appearanee much resembles a light coloured gabbro and has been mapped as gabbro on the Canadian Geologieal Survey's map. It appears much darker in some parts than in others, but in all the speeimens examined the feldspars appear to be of the potash species, and one seetion showed a very little quartz, so that the rock is a syenite. It has much the appearance of some nephelite syenites, though mieroscopic observations failed to show the presenee of any nephelite.

"The megaseopie characters of the roek are a grey colour, phanerocrystalline texture, crystals of pyrite, hornblende and good eleavage faces of feldspar resembling plagioclase but laeking any sign of striations dne to twinning.

"Under the mieroseope one seetion is eomposed of the following minerals: orthoclase, mieroeline, green hornblende, a little biotite, and a small qnantity of miea the pleoehroism of whieh would identify it as zinnwaldite. The relation of this miea to the other minerals suggests that it has been introdueed into the rock from an external sonrce. Titanite in prismatie form and in acute rhombie sections in fairly eommon, and small erystals of it are frequently enelosed in the erystals of hornblende. A eonsiderable amount of topaz is present and it shows as a eolourless, slightly higher bi-refringent mineral than quartz, filling spaces between the feldspars and in places it appears to have replaeed portions of these minerals. Fluorite varying in colour from blue, violet, to eolourless is quite eommon. It is found in some eases as irregular streaks, but also as little eubes. It oecurs as small crystals in orthoelase, fills holes in topaz, and occupies eraeks in the other minerals or the interstiees between various erystals. Apatite is found in small erystals and pyrite and magnetite in small quantity. Other thin sections show orthoelase, mieroeline, green hornblende, a little albite, small erystals of augite, apatite, a little tourmaline, eonsiderable titanite, caleite, flnorite, topaz, and a small proportion of quartz.

"As mentioned in a previous section a pit in syenite reveals a calcite vein with which are associated apatite, tourmaline, hornblende, zireon, pyrite, chalcopyrite.

"In the presence of so many fluorine, boron, titanium minerals we have good evidenee of rather extensive fumarole aetion. On the eooling of the magma fraeturing on a small seale must have oeeurred which permitted the boron and fluorine gases to rise through the roek and replace some of the other minerals by new minerals. The quartz and calcite veins would be due to solntions filling some of these eraeks.

"On aeeount of eertain petrographie similarities between them it seems probable that these syenites belong to the same petrographie provinee as the granites a little farther north, but represent a basie phase of the parent magma."

The New Brnnswiek topaz deseribed by Mr. Broek is found in assoeiation with granite dikes (greiss) near the border of a granite intrusive mass. The British Columbia oeeurrence referred to by him exhibits topaz in a rock whieh he ealls granodiorite; while, as has just been said, the Sturgeon Lake topaz occurs in syenite. The prospeetor, however, need not bother with fine distinctions as regards the names of rocks. Granite, granodiorite and syenite are elosely related.

In so far as the writer knows, tin has been found only in two localities in Ontario, viz.: Sudbury and the township of Lyndoch in Renfrew County. At Sudbury about four per eent. of oxide of tin has been found in the rare mineral sperrylite. Fourteen years ago, in Lyndoch, the writer discovered a mineral of the rare eolnmbite group assoeiated with beryl, anorthozonite or green feldspar, tourmaline, garnets and other minerals. The eolumbite and assoeiated minerals occur in a coarse-grained granite, or pegmatite, dike. The pereentage of oxide of tin in the mineral, found in the analysis, was 0.92, or nearly one per eent.*

Varieties and Ages of Ontario Granites.

Since tin occurs in association with granites or related roeks, it would be of economie importance to have a more eomplete knowledge of the eharacter and age relations of the granites of the province. Such knowledge would also be useful in eonneetion with other ore deposits. For instanee, in the reports and annotated maps which the Bureau has published on the Porcupine area, Mr. A. G. Burrows and the writer have expressed the view that the gold-bearing quartz veins are in all likelihood genetieally assoeiated with granite intrusions. It is not neeessary to reeite the various reasons which led to this theory of origin. It may be said that as field work in that area progresses, eonfirmatory data as to the theory of the origin of the ores are being obtained. During the present summer Mr. Burrows, who is in eharge of the field work for the Bureau, has found that there are two series of eonglomerates, one of whieh is older than the surrounding intrusive granites and the other young.

*Provineial Geologist, Bureau of Mines, Ontario.

*7th Report Ont. Bureau of Mines, p. 236.

r. Burrows' first year's work he observed that conglomerate, in the belt extending from near Dome mine northeastward to the vicinity of Three ns Lake and beyond, was much more disturbed, ng at high angles, and more highly metamor-ed than the conglomerate in which the rich silver , at Cobalt occur. Moreover, gold-bearing veins found in this series of conglomerate and asso-d sedimentary rocks not only at the Dome mine also near Three Nations Lake. The problem then —if the quartz veins are genetically connected a granite intrusive, of what age is the intrusive? Burrows has, however, found conglomerate in the thern part of the township of Langmuir which is ved by erosion from the granite in that vicinity. conglomerate has been little disturbed, lying al-horizontally, and is much less highly metamor-sed than that in the Dome mine — Three Nations e belt. He therefore concludes that the granite h gave rise to the gold-quartz veins is younger the latter conglomerate and that it is older than Langmuir conglomerate. There may, however, be ites of two or three ages in the area.

n the shores of Lake Temiskaming and to the hward there are conglomerates which have the earance of those at Porcupine. One series dips at angles and shows other evidence of much greater urbance than does a second series such as that in ch the productive veins occur at Cobalt.

n the region surrounding Lake Superior, where the pre-Cambrian rocks have been closely studied in numerous localities, granites of various ages are known which intrude even the youngest of the pre-Cambrian sedimentary rocks.

At Cobalt, Elk Lake, and Gowganda there are certain types of granites, which occur as dikes and are commonly known as aplites or granophyres, which are genetically related to the quartz diabase that is associated with the cobalt-silver deposits. These rocks of the granite family are believed to represent the end product of the diabase eruption. Similarly at Sudbury granites or granophyres are closely associated in origin with the norite of the nickel-copper deposits. Those who have closely studied the Sudbury area believe that these granite-like rocks are simply a differentiation from the magma or molten mass which gave rise to the norite and the nickel-copper ores. From what has been said it will be seen that the character and age relations of our granites have an economic bearing.

Knowing that topaz and other minerals had been found at the New Brunswick locality and that these minerals are characteristic of deposits in which tinstone occurs, Mr. Brock made a search for this ore and found it. A similar search should be made in the Sturgeon Lake area. Since there are granites and related rocks of so many characters and ages in Ontario the prospector for tin may some day be rewarded.

Sizing for Plate Amalgamation.

By P. N. Nissen.

While sizing for concentration is a recognized necessity, have not possibilities in amalgamation been overlooked? There is one difficulty in saving the coarser gold or minerals, but efforts to recover the finer particles of gold are attended with but indifferent results. In many cases these finer particles are not liberated from the gangue, while in other cases, though liberated, they are of such microscopic fineness that the utmost delicacy is required in the manipulation of the process used. Over-refinement of the plant, however, can easily be the outcome of an honest desire to accomplish the best economic results; but it must always be borne in mind that enterprise in this direction should be limited by commercial considerations.

In many cases a large percentage of the gold occurs in a finely divided state, so that the losses are extreme by the methods of amalgamation now most commonly practised. But, on the other hand, the tendency to get away from amalgamation entirely is to be regretted. Should we not rather try to improve our methods by working along logical lines than entirely disregard the affinity of quicksilver for gold and the simple and easy means for their subsequent separation? While the expansion of the cyanide process has been extremely rapid it has been changed and improved only in physical details, the basic principle being unchanged in its simplicity. Similar development is possible in amalgamation; for, while the development of the cyanide process has been the most important phase of metallurgy in our generation, it has its manifest limitations.

Gold amalgamation is closely associated with stamp milling because this method of crushing is the almost universal means of reducing gold bearing ores. The tendency, however, has been to increase the duty of the stamps without providing larger plate area for the pulp. When we were crushing smaller tonnages per stamp our recoveries by amalgamation were higher. A smaller volume of pulp was run over the plates, necessitating the use of less water. Thus, the liberated gold was given more opportunity to settle to the surface of the plate and become amalgamated. With the increased volume of pulp, due to the increased duty of the stamps, the finer particles of liberated gold pass more rapidly over the plate, the larger percentage of coarser particles of sand being underneath and next to the surface. The finer sand and gold, being carried along on the surface of the stream, do not come in contact with the quicksilver. Scouring of plates, loss of amalgam, and loss of fine float gold are thus brought about.

The placer miner has long recognized that he can make no satisfactory recovery of finely divided gold without first getting rid of the larger boulders and gravel, then treating the finer sands separately. If this principle applies to the operation of the sluice-box and dredge, the same principle must necessarily be followed in the treatment of all sizes of sand and gold particles down to the most minute atoms.

Of late years the erroneous practice of merely lengthening battery plates has obtained. It is evident that no improvement in amalgamation can arise from this expedient, since, if the pulp still travels at the same speed, the conditions remain the same; or, if the

velocity be lessened, a blanket of coarse sand will form on the plate. On the other hand, the evident need is for a reduction of velocity by means of wider plates.

In some of the gold mills in the western United States it is the practice to divert all the pulp from a five-stamp battery to one side of the already insufficient apron plate, while the other portion is being dressed. This is done to avoid hanging up the stamps. A high amalgamation recovery is expected, and the management prides itself on avoiding loss. But, as a matter of fact, loss is inevitable. It is much saner to hang up all the stamps for a sufficient length of time to permit of dressing the plates properly. rather than crowd a small section of plate with more than it can handle. Indeed, this is merely equivalent to sluicing so much gold and amalgam onto the dump.

To retard the flow of the pulp in some way is necessary. The management of the great Homestake mine has attempted this by adding plates of greater width, so that they now have forty feet of plates before each five-stamp battery; but each succeeding ten feet from the battery downwards is about a foot wider than the preceding one. Thus the pulp is thinned out to a great extent, and the results have more than justified their installation and the necessary labour to care for them.

It seems reasonable, therefore, that we separate or size our pulp into several ranges of sizes, then flow each size over plates arranged with regard to area, slope, and proper amount of water to the amount of pulp of that size being made by the stamp. The accompanying table will give a fair average of the pulp from a stamp battery crushing through a 0.024 or 30-mesh screen.

Percentage of battery pulp remaining on given screens

Screen	On 50,	80,	100,	150,	200	pass 200.
Per cent. of pulp	8.5,	10.5,	7.0,	8.0,	3.0,	63.0.

It will be observed that only 8.5 per cent. of this pulp is coarser than 50 mesh. The movement of 91.5 per cent. over the ordinary plate as used is dependent entirely on the few coarser particles 8.5.

Our coarser pulp will contain our coarser gold, and will, therefore, be more easily caught on a plate having a fair grade, while each succeeding smaller size can be put over plates of greater width and less grade, thus giving the finer gold particles a better opportunity to come in contact with the mercury and be amalgamated. It is important that the grade of plates should be as slight as possible, especially for the finer sands, to allow sufficient contact with the plate to insure amalgamation. Moreover, plates set at a low angle hold the mercury much better than those set at a higher angle. It must also be borne in mind that the constant flow of sand and water downwards causes the mercury to be forced along and finally over the bottom of the plate. The numerous varieties of amalgam traps in use is justification for this statement. The steeper the plate and the larger the volume of pulp of mixed sizes flowing over it, the greater will be tendency. Where we have loss of mercury we must have loss of gold.

While the number of amalgamating machines of sorts is legion, and the efficiency of most of them ni will be observed that in a large number of these ap ances any amalgamating plates used are arranged tically. The inventors have overlooked the fact t mercury is liquid and requires a more or less h zontal plate to rest upon. The result is that most the mercury intended to adhere to these plates will found in the bottom of the apparatus in a foul c dition.

One of the most essential features in amalgamat is clean mercury, therefore it is necessary to have surface over which the gold is run clean and bri at all times. Copper amalgamating plates are sim and accessible for dressing and they are always un direct observation. No mechanical motion need given them. They can be situated in a separate ro or building, accessible only to the direct attenda This fact is a consideration of no small importa It is upon the returns from these plates that the r enue of the mine is dependent, so that the fewer dividuals on which the responsibility is placed of curing all the gold that is recovered, the less liabil there will be for losses. Any investment made in s ficient plates for the proper equipment is in no w extravagant, for they are always worth as much more than they originally cost. Every ounce of g run over them leaves a certain small portion in plate. They do not wear out nor have to be "scr ped" as would occur with mechanical appliances.

Few small mines can afford cyanide plants wh depend upon skilful, therefore high priced chemi for satisfactory extraction. The returns from th small plants in most cases represent less than the erating cost, owing to the small tonnage handled. cyanide plant to be operated must be complete. T same number of tanks, fittings, etc., being greatly t of proportion in a small installation than in a la one. It, therefore, seems apparent that improvem in simple amalgamation is most urgently needed. a the possibilities will well warrant our most care consideration and efforts. Since sizing has done much for concentration the possibilities offered in application to amalgamation seem many and most viting.

The plates should be arranged in pairs to allow being dressed or cleaned while the pulp is being r over the other, and thus not interfere with the pro flow of pulp. By this arrangement the plates can kept in perfect condition by constant dressing, th being ample time for this work to be thoroughly d instead of the usual rush common in present practi where it is seldom properly performed.

On the Slate Industry in Southern Quebec.*

By John A. Dresser, Ottawa.
(Annual Meeting, Quebec, 1911.)

The slate deposits of commercial importance in southern Quebec as far as known are all of sedimentary origin. The black slate are of Ordovician, and the coloured of Cambrian age. In a number of pla quarries were opened between thirty and fifty ye ago; but most of them were soon closed from one ca or another, principally, it would appear, from an sufficient market at the time they were worked. present the market conditions have apparen

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aged greatly for the better and the slate deposits ght properly receive renewed attention.

General Geology.

hree anticlinal ridges of crystalline rocks, prob- of Pre-Cambrian age and mainly of volcanic or- extend in a north-easterly direction through hern Quebec, and form the Sutton Mountain, Stoke ntain, and Lake Megantic hills. The basins be- en these ranges of hills, are each about 25 miles in th and are in general underlain by rocks of Cam- n age around their borders, while Ordovician stra- ccupy the central and greater part of the bearings. the east side of the Sutton range a belt of serpen- and related intrusive rocks occur along or near contact of the Cambrian and Ordovician sediments. the Ordovician, near the contact with the serpen- , several of the most important slate deposits of district are found. There are other deposits in Ordovician and in the Cambrian that are not situ- near intrusive rocks; but hitherto all the produc- of commercial importance has been from those osits near the serpentine.

are the New Rockland quarry in Melbourne, range IV., lot 23; the Melbourne or Walton quarry, Melbourne, range VI., lot 22; the Steele or Bedard quarry in Cleveland, range XV., lot 6, and the Danville quarry in Shipton, range IV., lot 7. The distance between New Rockland and Danville (the extreme points) is about fifteen miles, but the slate-bearing formation continues for a much greater distance.

These quarries were most actively operated in 1889, in which year they were described by Dr. R. W. Ells,† as follows: "The largest slate quarry at present in operation in Quebec is that of the New Rockland company. This was first opened in 1868 and has been worked almost continuously ever since. It is situated on a rise with an elevation of about 500 feet above the St. Francis River, which is four miles distant to the north, and has at present a working bench 200 feet deep. The slate cleaves readily, is very free from pyrites, impervious to water and equal in every respect to the celebrated Welsh slates. . . . To the northeast of this is situated the old Melbourne or Walton quarry, on lot 22, range VI., Melbourne, about two miles distant from the St. Francis River. This quarry was

ig. 1.—New Rockland Slate Quarry, Looking Northeast. This quarry is some 799 feet in length, 75 feet wide, and nearly 200 feet deep. The cleavage of the slate dips at a high angle to the Southeast.

Black Slates — Ordovician.—The "black" slates e all of Ordovician age, being the argillaceous part the lower Trenton (Farnham) formation. They are dark or bluish grey colour and generally have an cellent cleavage which dips nearly vertically and y be at any angle to the bedding planes. In gen- al character and geological position they correspond the slates of Montpelier and Northfield in Vermont. ey have hitherto been the principal source of pro- ction in Canada, and are the only slates quarried Quebec for several years past.

Details of Some Deposits — Four of the best known posits of slates of this type occur near the contact th serpentine in the County of Richmond. These opened by the late Mr. Walton in 1860 and was worked for about eighteen years, when it was closed. A very large quantity of slate was extracted of a quality similar to that of the New Rockland quarry, and the workings were of very considerable size, being stated, in the catalogue of the Paris Exhibition to be 150 feet deep, 300 feet long and 100 feet broad.

"The failure of the industry at this place was to a large extent due to the depression of the market at that time and a lack of capital necessary to carry out the work with modern equipment. Both these quar-

†An. Rept. Geol. Survey of Canada, 1889. Part K, pp. 128, et seq.

ries are in contact on the west side with large masses of serpentine. The slates here found are continuous across the River St. Francis into Cleveland and Shipton. The oldest quarry in this belt is that on lot 6, range XV. (Cleveland) formerly known as the Steele quarry, which was opened in 1854. No returns are to hand from this quarry under its new management, but the quality of the slate extracted is excellent in so far as yet tested. The output of the Danville quarry is as yet almost entirely confined to school slates, for which a ready market is obtained.

"Of all these slates it may be generally said that their quality is unsurpassed. Their chemical composition is very similar to that of the slates from Angers in France which have been in use in buildings in Montreal for considerably more than one hundred years."

The New Rockland, Melbourne, and Steele quarries are so close to the contact of the serpentine intrusion that the slate is probably altered in some measure thereby. (Fig. 2). The Danville quarry, which appears to be in slate of the same original composition, is sufficiently distant from the contact to be probably unaffected by it.

The slate of Danville, judging from evidences now available, is softer and not so strong as that from the other quarries. The original bedding planes may be detected (Fig. 3) in places and in trimming the slate often "scallops" along them. On the other hand it Rockland only has been in operation for the last fifteen years. The major part of the production quoted on a subsequent page is to be credited to this quarry, which has been in operation since 1868.

The production at present is wholly confined to the roofing slate. The quality is well proven by its satisfactory use for the past forty years.

The following chemical analyses give a comparative view of the composition of several roofing slates of this series and one from Germany. The analyses are quoted from various reports of the Geological Survey:

	New Rockland.	Melbourne	Danville	Westbury	Lehesten, Germany
SiO	65.39	64.20	61.80	65.85	67.5
Al_2O_3..	15.97	16.80	13.48	16.65	17.3
FeO	4.66	4.23	10.10	5.31	7.4
MnO	.39	.....	.74	.....	....
CaO	.67	.73	1.06	.59	1.1
MgO	2.99	3.94	4.52	2.95	2.6
K_2O	3.60	3.26	1.71	3.74	1.9
Na_2O..	3.33	3.07	1.46	1.31	....
H_2O	3.26	3.40	4.86	3.10	4.6
	100.26	99.63		99.50	99.7

Slate has been worked unsuccessfully in Orford, range V., lot 2, in the County of Sherbrooke, where the

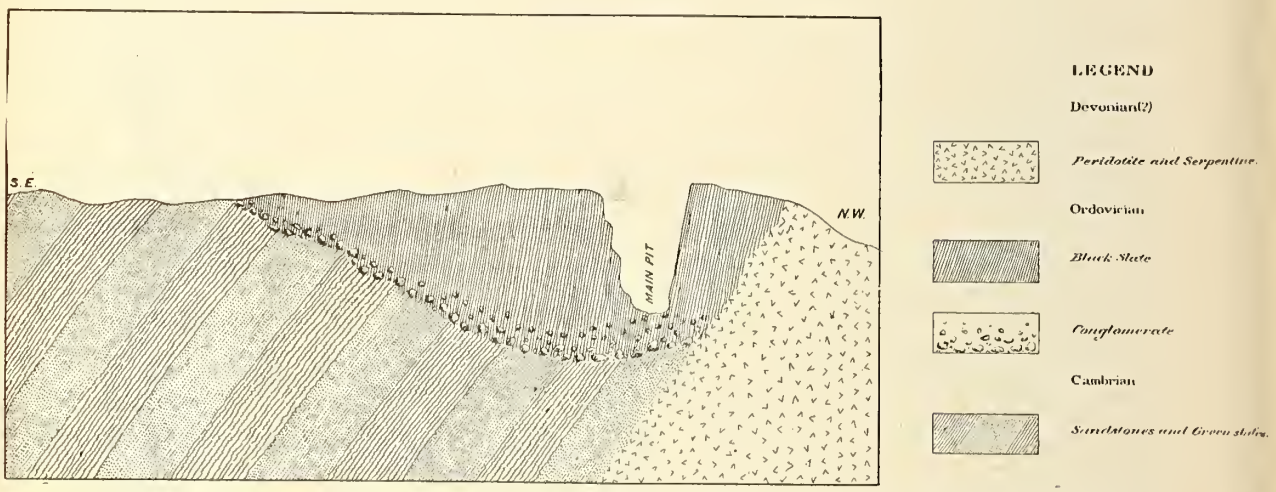


Fig. 2—Diagrammatic section across the New Rockland slate quarry. The pit is about 200 feet deep.

seems to be an excellent material for school slates and other manufactures on account of its greater softness. Also the quarry itself is freer from quartz veins, which latter in the other quarries are more numerous near the contact with the serpentine than at a short distance from it.

Nearness to the contact is thus both a favourable and an unfavourable feature. Dykes and quartz veins are more numerous near it and where the alteration has been too great, the slate becomes "sharp" or is nearly a hornstone. On the other hand, slates beyond the effects of the contact have less hardness and strength. The most favourable location for slate seems to be in the outer part of the contact zone, near enough the intrusion to secure strong slate and far enough away from it that the spaces between the "flints" are sufficiently large to be advantageously worked.

The Melbourne, New Rockland, and Danville quarries have been importantly productive; but the New slate appears to be very similar to that at Danville. The cause of the closing of the quarry some four years ago has not been learned; but at that time the market demand was doubtless insufficient. As has been pointed out by Sir W. E. Logan, in a report of the Geological Survey on this district, published in 1863, a similar slate is well exposed in Brompton, range V., lot 29, near the village of Bromptonville. Both of these properties, though containing a soft slate, probably warrant investigation at the present time.

Other localities in which slates of this character occur are reported in range I., lot 14, the Township of Halifax, County of Megantic, in Westbury, near the St. Francis River, and near St. Victor de Tring, in the County of Beauce.

On the south side of Lang Lake, in the County of Temiscouata,* slate was exposed by a cutting on the

*Summary Report of the Geological Survey, 1908, p.

ional Transcontinental Railway which promises to of excellent quality and in ample quantity. Holds have been purchased in the locality by Messrs. Fizer and Davies, the operators of the New Rockland sle quarry, and development operations, it is expected will be inaugurated early during the present year. This locality is about 200 miles east northeast of the Danville slate quarry. It is not certainly known whether this slate is of Ordovician or of Silurian age.

Coloured Slates — Cambrian. — The slates usually referred to as "coloured" are red, green, mottled, or purple, and are prevailingly coarser in texture and do not split as finely as the black slates. Coloured slates have never been extensively quarried in Canada; but in the United States a considerable production is maintained. Almost the entire production of the State of Vermont at the present time is obtained from the coloured slates of Cambrian age.

Details of Some Deposits.

Coloured slates are known to occur in several localities in the Province of Quebec and between 25 and 50 years ago, some of these quarries were productive to a small extent.

	Kingsey	Peach Bottom, Penn.
SiO_2	54.80	55.88
Al_2O_3	23.15	21.85
FeO	9.58	9.03
CaO	1.06	.16
MgO	2.16	1.49
K_2O	3.37	3.64
Na_2O	2.22	.46
H_2O	3.90	3.39
	100.24	

On lot 26, range V., in the Township of Acton, County of Bagot, the Rankin quarry was operated in 1875-6, and produced some quantity of red and green slate.

Coloured slates have also been opened on lot 18, range X., of Brompton and on the IVth range of Melbourne about half a mile, southeast of the New Rockland quarry in the County of Richmond, on the 2nd lot of the Xth range of Brampton in the County of Dorchester, on the XVth range of Garthby, lots 8 and 9, County of Wolfe, at Mawcook, near Granby, in Shefford County, and at other places in the Cambrian rocks.

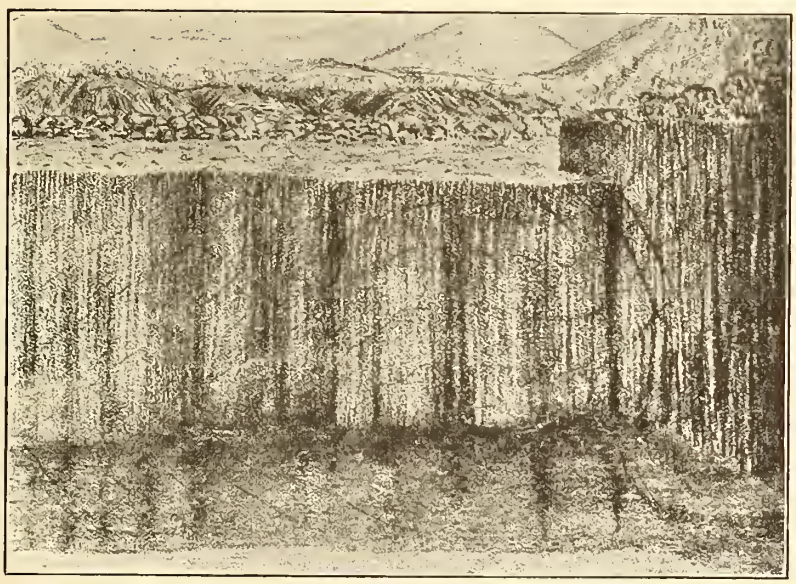


Fig. 3—Sketch of the Southwest Wall of the Danville Slate Quarry. The cleavage is nearly vertical; while the original bedding planes can be seen dipping in folds towards the Southeast.

In Kingsey, range I., lot 4, County of Drummond, a quarry was opened in 1857 and closed two years later. The slate is principally purple, although some green and mottled varieties appear. The colour is well preserved on slates split at about that time showing that they belong to the "unfading" class. The deposit is large and apparently the working conditions are favourable. A railway has been graded to the Grand Trunk Railway at a point two miles from Richmond station, and four miles from the quarry.

The following analysis of slate from this locality was made by T. Sterry Hunt in 1852 and the accompanying analysis of the Peach Bottom roofing slate of Pennsylvania, is added for comparison. These analyses are quoted from Kemp's "Handbook of Rocks."

Quarrying and Dressing.

The rock is quarried and cut down in benches in open pits, and after being assorted in the pit, material suitable for splitting is hoisted and sent to the splitting sheds. Here it is cut, split, and trimmed to the sizes required or to which it is best adapted. Slate is bought and sold by the "square," that is in quantity sufficient to cover 100 square feet after allowance has been made for all overlapping. The usual thickness in Quebec is 3-16 inch. The sizes vary from 12 inches x 24 inches to 6 inches x 12 inches.

In the coloured slate quarries of Vermont much of the roofing slate is split to a greater thickness—from

¼ inch to 1¼ inches. The price varies with the thickness, an increase of about $2 per square being allowed for each additional ¼ inch. Thus slates ¼ inch thick might be sold for $6 per square, whereas one inch slate would be worth as much as $12 per square. These thicker slates must be bored and countersunk to carry nails or bolts, while thin slates merely require to be punched.

Quarrying and dressing of slate involve handling a large percentage of rock waste. Even in the best deposits only slate that will split in a definite direction and may be cut to definite sizes can be utilized. In addition to the loss in trimming and splitting, breakage from the blasting of rock, which falls from the high benches to lower levels, must also be considered.

Again, slate once frozen, if not split while frozen, is valueless and necessitates the removal of a covering of sap rock every spring. The waste from these sources added to the large quantity of defective rock remaining to be removed reduces the percentage of slate recovered of the total rock handled to a very small proportion — probably between 5 per cent. and 10 per cent.

Review of the Industry.

Canada. — The only slate produced in Canada for some years has been obtained from the Eastern Townships of Quebec, where it has been continuously quarried since 1860. Nova Scotia, New Brunswick, and Ontario have yielded slate at different times and promising developments are reported from British Columbia; but as far as can be learned there is no production from these provinces at the present time.

The following statements of the values of the production and imports of slate into Canada during the past twenty-one years are obtained from the annual reports on the Mineral Production of Canada by Mr. John McLeish, Chief of the Division of Mineral Resources and Statistics, Department of Mines, Ottawa.

Slate Industry in Southern Quebec—Dresser.

Year	Production.	Imports.
1889	$119,161	$ 41,370
1890	100,250	22,871
1891	65,000	46,104
1892	69,070	50,441
1893	90,825	51,179
1894	75,550	29,267
1895	58,900	19,471
1896	53,370	24,176
1897	42,800	21,615
1898	40,791	24,907
1899	33,406	33,101
1900	12,100	53,707
1901	9,980	72,187
1902	19,200	72,601
1903	22,040	84,437
1904	23,247	86,057
1905	21,568	93,228
1906	24,446	112,941
1907	20,056 –9 mths	95,520
1908	13,496	131,069
1909	19,000	135,221

Some slate has been exported during the above period; but the amounts have been comparatively small and so irregular that they may be neglected in considering the industry as a whole.

The year 1889 shows the greatest production also the largest consumption in the history of slate industry in Canada. The exports of that year amounted to $3,303 in value. In 1909, a year of small production the imports reached the highest, and consumption the second highest place. The value of exports in that year was $612.

Broadly speaking, production declined from 1889 to 1901, followed by a small and somewhat irregular advance. The imports decreased somewhat irregularly from 1889 to 1895, and since that date have steadily increased to the highest figures yet reached. At present, therefore, the production is scarcely more than 14 per cent. of the consumption.

Concerning the supply and demand Mr. McLeish remarks* "That there is a more extensive market in Canada than is supplied by slate from Canadian sources is shown by the following statistics of imports. The total value of the imports of slate in 1909 was $135,221, of which $71,914 was roofing slate and $34,085 school writing slate. The imports of roofing slate, school writing slates, and manufactures of slate are chiefly from the United States. Some roofing slate is also imported from Great Britain, while slate pencils come principally from Germany and the United States."

During the past twenty years the prices of slate have advanced about in proportion to the increased cost of labour.

The duty on slate entering Canada is: 25 per cent. on roofing slate—not to exceed 75 cents per square; and 30 per cent. on manufactured slate.

In the schedule of the proposed Reciprocity Agreement, the duty on roofing slate is 55 cents per square.

All the Canadian output at present is used for roofing purposes.

The United States. — In the United States official returns for the year 1908 show a production valued at $6,316,817. Of this value, $5,186,167 is in roofing slate and $1,130,650 in mill stock for various manufactures. Of this amount Pennsylvania produced nearly 62 per cent., or a value of $3,902,958; Vermont, 27 per cent. or $1,710,491; Maines, 3⅓ per cent., or $213,707. Almost the entire production comes from the eastern Atlantic States. Vermont and Maine are the States most suitably comparable to Quebec in their geological conditions; and slate producing formations of both extend into Canada.

Uses of Slate.

The principal uses of slate are for roof covering, writing slates, floors, electric switchboards, billiard tables, blackboards, mantels, wainscotting, laboratory tables, lavatories, sinks, and similar purposes. All the Canadian output and about 80 per cent. of the production of the United States are used for roofing. Slate was formerly manufactured for other purposes than roofing in Canada at the quarries of New Rockland and Danville; but this was discontinued some fifteen years ago. The consumption in Canada for 1909 was approximately as follows:

Roofing slate	$90,914
School slate	34,085
Slate pencils	6,154
Manufactures	23,068
	$154,221

*Op. cit.

Qualities of Slate.

In a recent and exhaustive report on the slate deposits and industry of the United States, T. Nelson Dale* gives the following classification of slates:

CLASSIFICATION OF SLATE.

A. Aqueous sedimentary.
(a) Clay slates; matrix without any or with faint aggregate polarization.
(b) Mica slates; matrix with marked aggregate polarization.
1) Fading: with sufficient Fe CO_3 to discolour.
(a) Carbonaceous or graphitic.
(b) Chloritic (greenish).
(c) Hematitic and chloritic (purplish).
2) Unffading: without sufficient Fe Co_3 to produce a but very slight discolouration on prolonged exposure.
(a) Graphitic.
(b) Hematite (reddish).
(c) Chloritic (greenish).
(d) Hematitic and chloritic (purplish).
B. Igneous.
(a) Ash slates.
(b) Dyke slates.

The slates of southern Quebec as far as known belong to the following divisions of the classification given above:

A. Aqueous sedimentary.
(b) Mica slates.
2) Unfading (a) Graphitic — black — Ordovician.
(b) Hematitic—red—Cambrian.
(c) Chloritic—green—Cambrian.
(d) Hematitic and Chloritic—purple—Cambrian.

The black slates are strictly speaking phyllites, that is slay slates with a small percentage of mica. But as the strength of the slate depends largely on the amount present, those slates which are strong enough to be useful are conveniently classed as mica slates, to distinguish them commercially from those so poor in mica as to be of little or no value.

The mica in these slates is not an original mineral but is developed chiefly from feldspar by alteration due to pressure perhaps accompanied by heat. It is in very minute scales, only a few thousandths of an inch in thickness; but the overlapping of these scales of mica is supposed to give to slates the elasticity that enable them to be split.

The above classification is based on certain general properties that effect the commercial value of slate; but it does not take into account all the features that determine its value. A degree of cleavage such that the may be easily split to the required thinness, strength, freedom from injurious constituents, and from excessive jointing are also important features.

Good cleavage is the first essential. Not only must there be a cleavage that will enable the slate to be readily split, but there must be an absence of cross or oblique cleavage generally called "slant" by the quarrymen, which not only interferes with the splitting, but still more lessens the strength of the slate.

Strength depends primarily on the degree of compression in a single direction with uniformity of composition and texture and in some cases on metamorphism by igneous contact. Recrystallization, especially the development of secondary mica, induced by pressure and heat, characterizes the strongest slates. Where the alteration has been insufficient, the slate trims unevenely or "scallops" often by breaking along original bedding planes.

Amongst injurious constituents carbonate of iron, or carbonate of iron, magnesium, and lime, cause discolouration when slates are exposed to the weather and so produce the "fading" slates. Iron pyrites rusts, causing spots and holes in slate. Magnetite makes slate less useful or even unsuitable for electric switchboards. Quartz veins have a similar effect even when small enough not to lessen the strength of the slate. Quartz veins, "flints" are a very common cause of poor quality in slate, and in any considerable quantity render it useless. Slates that are too siliceous (as from extreme metamorphism) even where no quartz veins are formed, become brittle and impossible to use. They are then known as "sharp" slates.

Porous slates of open texture, are unsuitable for uses that expose them to moisture, such as in making lavatories. They also shatter more readily if exposed to frost.

General Considerations and Conclusions.

Deposits of slate that may be profitably worked are comparatively few and small. The overburden of "sap" rock which must be removed before uncovering slate of real splitting qualities and strength is generally deep — fifteen to twenty feet, at least, and in places much more. Great care must, therefore, be taken in selecting a location for a quarry and a considerable outlay of capital is necessary to develop such a property. Transportation is also a very important factor to be considered in the establishment and operation of a slate quarry.

Nevertheless the extension of roads and railways, the increasing cost of lumber, the introduction of the modern class of large steel-frame fireproof buildings in cities and the consequent use of thick slates — conditions that even twenty years ago were not obtaining —afford commercial advantages to the slate industry to-day that it did not previously enjoy.

Hence, speaking generally, the steadily growing market and the successful development of a large industry in similar geological formations in the neighbouring States of Vermont and Maine, seem to warrant investigation by investors of the slate deposits of eastern Canada and especially those of southern Quebec.

Discussion.

Mr. Ferrier:—I have listened with peculiar interest to Mr. Dresser's interesting paper, and it has recalled many things I had almost forgotten since I was sent to make an examination of the New Rockland slate quarry in 1886. I notice that Mr. Dresser was exceedingly careful in his description of the peculiar terms employed by the quarrymen. I found that some of the terms used by the Welsh quarrymen were much more shocking.

I recognized after I had made my examination that much of the trouble in connection with the marketing of slate was due to a disregard to proper sorting, in consequence of which the material shipped was not always of an uniform and high grade character. I thoroughly agree that the zone from which the first-class material can be produced is a comparatively narrow one.

There is another feature to which Mr. Dresser did not especially direct attention, and a matter responsible for much trouble in the employment of slate for

*Dale, T. Nelson, and others.—"Slate deposits and slate industry of the United States;" Bull. U. S. Geological Survey, No. 275, 1906, pp. 5-6; also Annual Report U. S. G. S., Vol. XX., 1897-8.

roofing. After purchasing slate for roofing purposes, one is at the mercy of the roofer. A careless workman may be the means of causing even the finest slate to show a bad record. With a shingle roof a defect is easily remedied; but this is not the case with slate.

I fully agree with Mr. Dresser's view that a great deal can and will be done to develop the slate industry in Canada, and bring about the more general utilization of slate as a roofing material.

Dr. Porter: There was one point in Mr. Dresser's paper which seemed to be rather significant and that was the comparatively small size of the quarry which he described and apparently of the other quarries. Anyone who has visited the quarries in Wales or France, and some in Pennsylvania, will have noticed the enormous size of the workable areas, which eventually permit of installation and operation of large works. It would be interesting if Mr. Dresser could indicate whether in any parts of the Eastern Township there have been discovered slates of presumably good quality in such large masses to warant the establishment of big enterprises.

Mr. Dresser: The coloured slates occur in bodies great enough for large scale operations. The black slates of the best quality, however, are not as yet known in larger masses than those already worked.

Mr. Ferrier: As Mr. Dresser is much more conversant than myself with recent developments, I would ask him if he could bring out the point which I know was a serious one when I was connected with that investigation, namely, the difficulty experienced by local enterprises of competing with the cheaper grades of slate from some of the larger quarries abroad?

Mr. Dresser: I could not say what grades of slate are being imported in competition. They seem to find, however, a ready market and the work here is carried on at present in a rather small way. Meanwhile, the present duty on slate is 25 per cent., but not to exceed 75 cents per square. In the proposed Reciprocity agreement, this is amended to a flat rate of 55 cents per square. The importation comes largely from the United States, with the exception of a comparatively small quantity, valued at about $6,000, of slate pencils, imported, I understand, from Germany. Our people, I believe, at present are unable to meet our own market requirements.

An Appeal to the People of Ontario and all Interested in the Gowganda District.

[Editor's Note.—The following petition, a copy of which was forwarded to the JOURNAL by Mr. G. M. Colvocoresses, manager of the Millerett Silver Mining Company, Limited, sets forth what is considered to be a genuine grievance. We may say that we feel convinced that substantial justice has not been done to the Gowganda region. The region has a well-defined claim upon the people and the Government of Ontario, a claim that cannot reasonably be ignored.]

After repeated requests by the mine owners and residents of Gowganda the Minister of Public Works has finally written that the Ontario Government positively refuse to expend any money whatever on the Elk Lake-Gowganda wagon road which at the present time is in a deporable and practically impassable condition.

The Ontario Road Inspector in a report to the Minister stated that the road was in a wretched shape and that approximately $6,000 should be expended to complete it and make it reasonably passable.

Mr. A. A. Cole, mining engineer for the T. & N. O. Railroad, who has made a thorough study of the Gowganda district since the early days of the camp, recently made a report to the Minister of Lands, Forests and Mines, in which he showed by figures that Gowganda had been and continued to be one of the most valuable feeders for the T. & N. O. Railroad and in order to assist its development he recommended that a good road should be completed and kept in condition by the Provincial Government. It is believed that every person who has visited and inspected this camp is firmly convinced that in the interest of the whole province Gowganda should be assisted to the extent of providing it with proper transportation facilities usable alike during the winter and summer months.

We believe that the people of Ontario are not aware of the existing conditions at Gowganda and do not appreciate that all the activities of this district are being handicapped most severely by the lack of proper transportation. It might be of interest to call their attention to the fact that there is at present more silver ore being mined in the camp than at any time during its history and that at the present time it is not possible to ship a good part of this production out to the railroad. The mines of the camp are now turning out 50 tons per month of high grade ore and concentrates valued in the neighbourhood of $25,000, and during the past three months the shipments have been held down to approximately half of this quantity. A heavy team of draught horses now require four days to haul 1,500 pounds of ore to the railroad, while over a fair good road the same team would easily draw out 3,000 pounds in two days.

It might also be well to state that owing to the fact that we are in the Forest Reserve and in an unorganized territory, it is impossible to legally levy a tax for the improvement of the road, therefore in order that we should not be absolutely isolated it has become necessary for a few of the mines and citizens of the camp to voluntarily contribute funds which are being carefully expended in keeping the road in a barely passable condition. We feel that there are a great many people who would like to help in this work and we therefore make an appeal to all those interested in Gowganda and the neighbouring districts and to those who believe that these camps should be given a fair chance to develop and add their production to the mineral wealth of Canada. We ask you to give us what assistance you can by bringing this matter to the attention of your local members and requesting that they should use their influence to secure a grant from the Ontario Parliament for the completion of the government road, and in the meantime if you should feel like giving us financial help all subscriptions will be gratefully received by the Secretary of the "Gowganda Road Committee," care of Canadian Bank of Commerce, Gowganda, Ont.

Dated this 24th day of August, 1911.

igned—The operating mines, merchants, prospectors, property holders, and citizens of Gowganda and surrounding districts.

Committee:—
Fillerett Silver Mining Company, Ltd., G. M. Colvocoresses, Supt.
The Northern Mining Co., Ltd., Arm. De Buryne, Mgr.
Canadian Gowganda M. C. P. Gavan, Mgr.
Miller Lake-O'Brien Mine, W. A. Bonyun.
Henessy and Co., per W. W. Thomson, Mgr.
G. R. Crann, M.B.
The Hudson Bay Mines, Ltd., H. G. Young.

Titanium-Vanadium Tool Steel Direct from Titaniferous Iron Ore.

Written for the CANADIAN MINING JOURNAL.

In the year 1904, Mr. J. W. Evans, of Belleville, Ont., began a series of experiments with a view to finding a use for the titaniferous iron ores of Canada. Recognizing the impracticability of smelting these ores in the blast furnace, Mr. Evans devoted his efforts altogether to devising an electric furnace that would meet the rathe runusual requirements of the case. In less than a year, he succeeded in obtaining directly from these ores a high carbon, titanium tool steel, a steel markedly superior to ordinary tool steel.

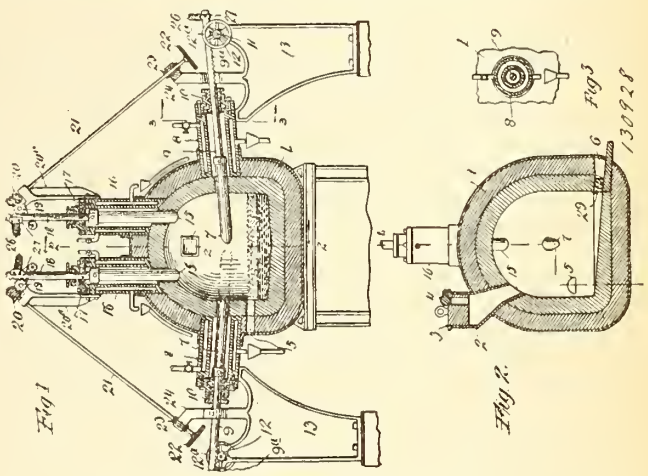
J. W. Evans

At the 1906 annual meeting of the Canadian Mining Institute, in the city of Quebec, Mr. Evans read a paper on the subject of making steel direct from iron ores. Here, also, he exhibited a few small tools made from steel of his own manufacture. At this time he was working with a small experimental electric furnace in his laboratory at Belleville The next step was to construct a larger furnace. This one proved so successful that it was found that molten steel could now be poured into moulds the size for lathe tools, and that the steel was easily superior to ordinary tool steel and approached the quality of high speed steel.

In 1909, Dr. Stansfield, professor of metallurgy, McGill University, visited Mr. Evans' plant in Belleville, and spent some time in looking into the process. During this visit several successful heats were run. The outcome was that Dr. Stansfield entered into a technical partnership with Mr. Evans, and added to the plant design a pre-heater of his own devising whereby the waste gases from the electric furnace are utilized to pre-heat and partly reduce the ores. The whole process was then re-christened the Evans-Stansfield Direct Electric Smelting Process.

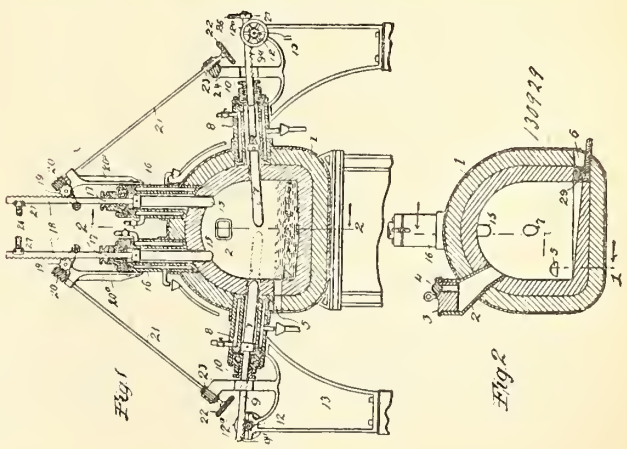
A furnace, with capacity of about one-half a ton of steel in 24 hours, was then built at McGill Univer-

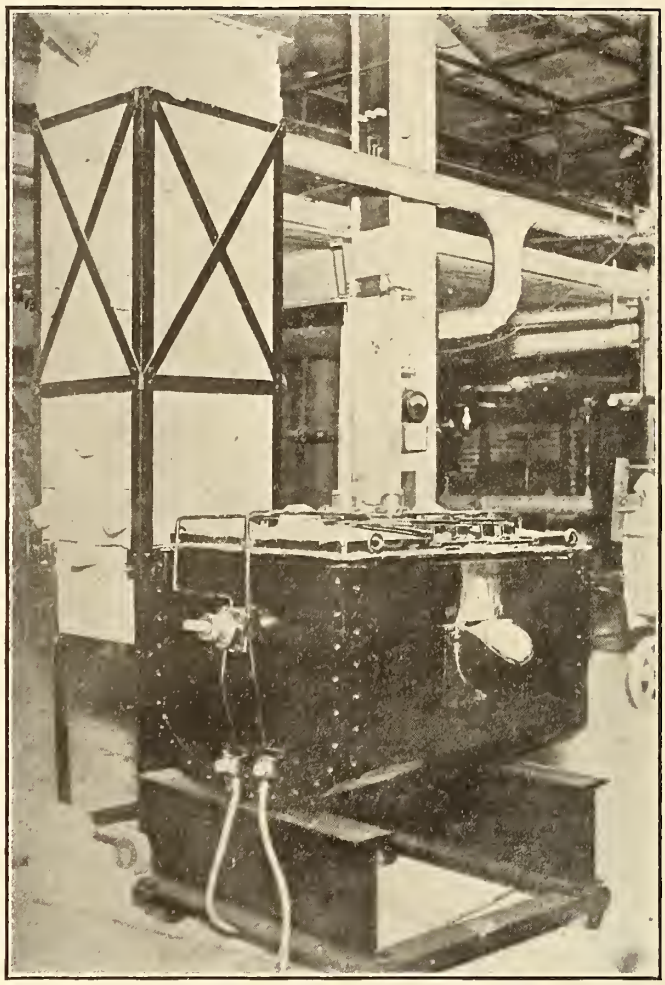
No. 130,928. Electric Furnace. *Four électrique.*



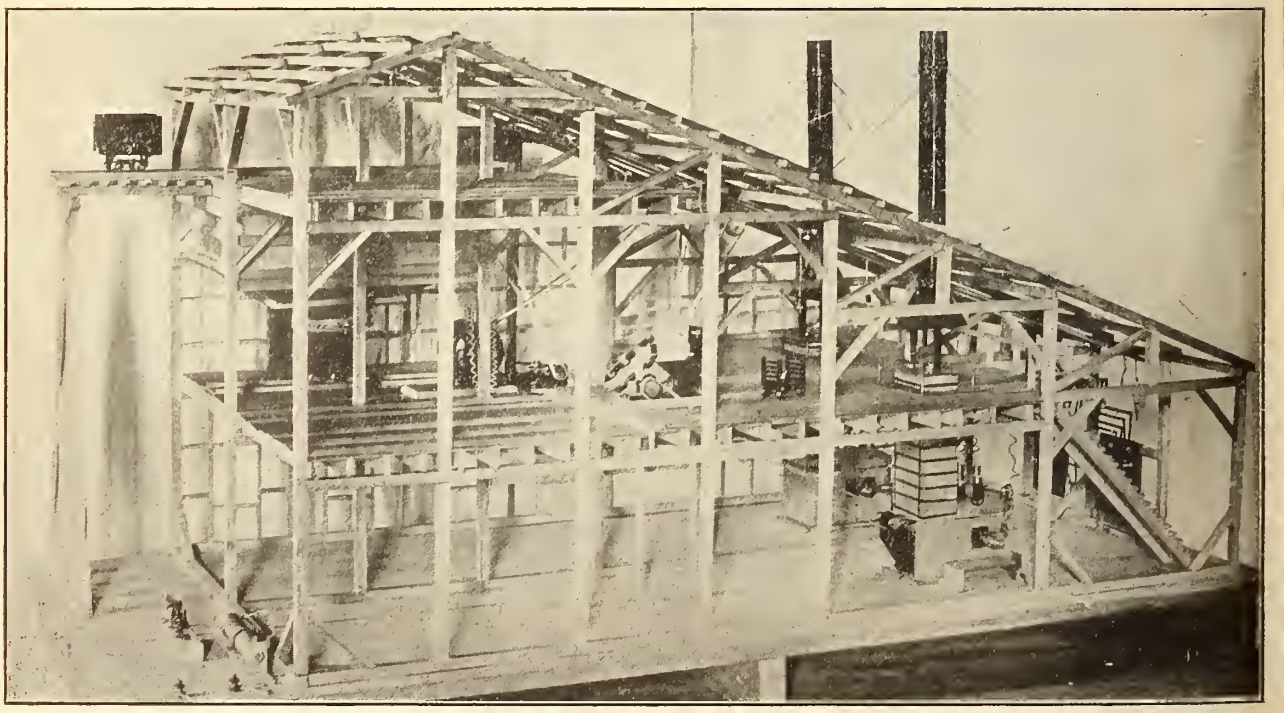
No. 130,929. Method of Reducing Refractory Materials.

Méthode de réduction de matériaux refractaires.

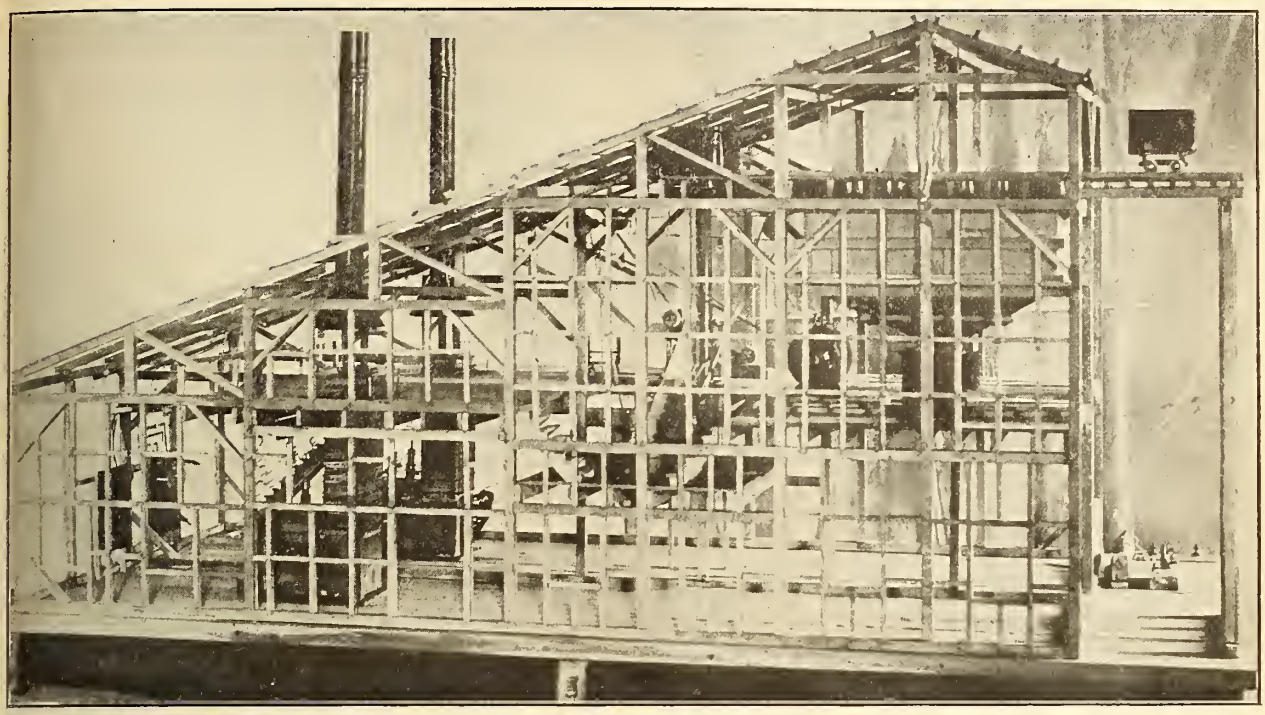




Evans-Stansfield furnace and pre-heater.



Model of Mill



Another View of Model

It is this furnace that was used in the public demonstration at the Toronto Canadian National Exhibition.

The accompanying cuts show the patent sketches (for patent specifications see CANADIAN MINING JOURNAL, August 1, 1911)), and the model of a mill designed by Mr. Evans.

In actual work, the titaniferous iron ore is ground, mixed with suitable proportions of lime and charcoal, briquetted, and fed into the pre-heater. From the preheater it goes into the hearth of the furnace. Here reduction is completed in a few hours. The furnace is continuous in operation. Almost the theoretical quantity of metal in the ore is obtained in the form of steel, the last drop of which can be poured from the furnace into the ladle and from the ladle into the molds.

There is reason to believe that this process will revolutionize the art of steel making. It renders feasible the manufacture of titanium-steel rails and structural steel direct from hitherto useless tianiferous iron ores. The items of cost are the strongest point. It is claimed, and apparently there is little room for doubt as to the accuracy of this claim, that the total cost per pound of steel, when the furnace is in continuous operation, will fall considerably under the present figure in existing large plants.

It is estimated that more than half the iron ores in Ontario and Quebec are titaniferous, and it has been proved that they make a better class of steel than the non-titaniferous ores. They cannot be used in the blast furnace. But they are wonderfully adapted to the electric furnace.

The Distribution and Uses of Titanium Ores.

(From the Bulletin of the Imperial Institute.)

Titanium has come into prominence largely owing to its application in the manufacture of steel, and since ores of this metal occur in many of the British colonies, a resume of the information available regarding the distribution of its ores and methods for their utilization is now given.

Titanium in the metallic form does not occur in nature, but in the form of titanic oxide (TiO_2) it is one of the most widely distributed elements of the earth's crust. Rutile, the commonest natural form of titanic oxide, is rarely found in large deposits, but enormous quantities of ilmenite or titaniferous iron ore carrying varying amounts of titanic oxide are known to occur in many localities, and these two minerals are those which have been utilized as sources of titanium.

Rutile is known to occur compact or massive in igneous, sedimentary, and metamorphic rocks: it varies in colour from yellow to reddish-brown and black, and gives a pale brown streak. The hardness is about 6.5 and specific gravity 4.2 to 4.3. The mineral usually contains 98 to 99 per cent. of titanic oxide and from 1 to 2 per cent. of ferric oxide.

Ilmenite or titaniferous iron ore is an iron-black mineral occurring massive or in the form of thin plates or grains. Its hardness is 5 to 6, specific gravity 4.5 to 5.0, and lustre submetallic. The fracture is conchoidal, and streag brownish-red to black. Its composition is represented by the formula FeO, TiO_2 which corresponds to 47.3 per cent. of ferrous oxide and 52.7 per cent. of titanic oxide.

Other minerals containing a large percentage of titanium are titanite or sphene, which is calcium titanium silicate, and brookite and octahedrite, crystalline forms of titanic oxide.

Distribution of Titanium Ores.

In view of the present very limited utilization of these ores only those deposits which are or have been worked to any extent will be described in this article.

Europe—The principal rutile-producing deposits in Europe are those of Kragero, to the northeast of Kristiansund in Norway. The annual production averages about 50 tons of nearly pure rutile besides a certain amount of lower grade material (Min. Industry, 1908, 17, 823).

America.—Rutile is obtained at Roseland, near Arrington, Nelson Co., Va., U.S.A., from pegmatite dykes, of which it constitutes about 4 per cent. The dykes consist chiefly of orthoclase and albite feldspars together with blue quartz. The soil covering the deposits also contains some rutile and is utilized as a source of the mineral. The plant in operation includes a 10-stamp mill, engines, pumps, concentrating tables, and a Wetherill magnetic separator. The final concentrate contains on the average about 98.4 per cent. of titanic oxide (Min. Res., U.S.A., 1908, Part I., p. 744). Several dykes yielding ilmeno-rutile (a mineral containing varying amounts of iron and titanic oxides) and apatite occur in this locality, one being about 30 feet thick and half a mile in length. These deposits may become of value as a source of titanium for purposes where the presence of small quantities of phosphorus is not objectionable.

Well-crystallized rutile is also obtained in Chester Co., Pa., but the amount is small and is usually sold to collectors.

Other important occurrences of rutile in the United States are situated in Lincoln and Habersham Counties (Georgia), Warwick County, New York), and Warren County (Maine).

Australia.—Rutile occurs, and has been worked in a desultory fashion for many years, in the hundred of Talunga, about 6 miles north of Blumberg, A. Australia (Rec. Mines, S. Australia, 1908, 4th edition, p. 356). The workings, which are about 150 yards in length, consist of small shafts and trenches in a kaolinized dyke formation from 10 to 12 feet wide, striking slightly east of south. Rutile crystals of varying size occur distributed throughout this matrix, and can be extracted by panning. On the surface for some distance on either side of this formation fine rutile can be obtained. The mineral also occurs in a small seam of gravel about 12 inches below the surface. The average yield from these workings amounts to about 1¼ per cent. of the material treated. The deposits appear to have been prospected only to a very limited extent. Nearly 2,000 pounds of rutile were produced at Para Wira in 1907 from 2,000 tons of gravel. Rutile occurs at a number of other localities in this State, but has not been worked.

Small quantities of rutile, which is stated to be almost entirely free from iron, are also produced from time to time in Queensland.

The Utilization of Titanium Ores.

At the present time the chief use of titanium ore is probably as a source of titanium-iron alloy to be used for the purification of steel and iron. The method employed for obtaining the alloy consists in the use of molten aluminium as a reducing agent (Rossi, Electrochem. Industry, 1903, 1, 523). The titanife iron ore is charged into a bath of molten alumin kept fused in an electric furnace. The iron is red first and in this the titanium, as it is reduced by aluminium, dissolves, yielding ferro-titanium. If tile is used, scrap iron is charged into the bath be the mineral.

By this means alloys containing from 10 to 75 cent. of titanium and only 0.12 to 0.75 per cent. of bon can be produced in quantity. Where the pres of carbon in the alloy is not objectionable, the ore be mixed with carbon and reduced in the electric nace. This process gives an alloy containing fro to 8 per cent. of carbon and suitable for treating iron.

Analyses of various samples of ferro-titanium given in the following table (Mineral Industry, 1 9, 720):

	No. 1.	No. 2.	No. 3.	No. 4.	N
	p.c.	p.c.	p.c.	p.c.	
Titanium	10.28	25.11	35.64	53.92	7
Carbon	0.284	0.59	0.75	0.291	
Phosphorus ..	0.09	0.06	0.06	0.059	
Sulphur	0.01	0.011	—	—	

A method of concentration to produce an alloy in titanium from low percentage titaniferous iron has been tried (Electrochem. Industry, 1903, 1, The ore, consisting of 15 per cent. titanic oxide, 8 cent. iron oxide and 5 per cent. gangue, was sm in an electric furnace with just sufficient carbon t duce the iron and leave all the titanic oxide unred in the slag. By this means a good quality pig was produced and a slag in which all the titanic was concentrated. This slag was utilized as a so of titanium for the production of ferro-titanium. alyses Nos. 4 and 5, given in the above table, ref alloys produced in this way.

Ferro-titanium alloys of German origin are us produced by the Goldschmidt process, which co in mixing the oxide to be reduced with finely po ed metallic aluminium and starting interactio means of a fuse. A rapid reaction occurs, and th anic oxide is reduced to the metallic state, the alu ium combining with the liberated oxygen to for umina.

The most important use of ferro-titanium is i purification of steel, particularly for rails. The ence of certain elements in minute quantities in has a far-reaching effect on its quality; and of elements nitrogen is one of the most important. cording to Braune (Stahl und Eisen, 1906, 26, 1431, 1496), the effect of nitrogen is at first slight increase the toughness and reduce the ductility. steel containing from 0.030 to 0.035 per cent. of gen becomes quite brittle, whilst soft steel lose ductility when the amount of nitrogen reaches 0. 0.06 per cent. The presence of nitrogen also fa segregation of the phosphorus and sulphur, ca "cold shortness." Dr. Thorlander (Stahl und E 1909, 29, 1594) found that a steel which normally tained 0.012 to 0.022 per cent. of nitrogen, on "overblown" in a converter, for three minutes, tained 0.032 per cent. of nitrogen.

The removal of the greater proportion of the gen normally found in steel is a matter of muc portance; and it is stated that this can be attain the use of titanium, which combines with nitrog

mperature of 800 deg. C. to form titanium nitrides. nium has a melting-point of 1,850 deg. C. and a ific gravity much less than that of iron; and these sical properties preclude the use of titanium itself, lead to the use of an alloy of titanium and iron ead of the pure metal, which would float on the d steel and be difficult to dissolve. Exhaustive eriments with titanium alloys have shown that the results are obtained with an alloy containing from o 15 per cent. of titanium. The numerous steel ks in the United States which employ ferro-titan- specify an alloy of this composition.

he alloy is added just as the steel runs into the e, i.e., after recarburization and the addition of the ssary ferro-manganese and ferro-silicon. An in- taneous reaction occurs, and after a short time the formed by the reaction (chiefly titanic oxide) s to the surface. According to the experience of on Maltitz, the addition of one-half per cent. of o-titanium, containing 10 to 15 per cent. of titan- , i.e., a maximum consumption of 1.7 pound of tit- um per ton of steel produced, is sufficient in most s to purify steel for rails to the desired extent. The ficial effect of titanium alloy in preventing segre- on of the sulphur, phosphorus, and carbon, and in entrating the blowholes in the pipe cavity, has n demonstrated by the experiments of many well wn metallurgists in America. Improvement was noticed in the working of the steel in the rolling- . The rails produced were found to give much bet- service than ordinary Bessemer steel rails (Ameri- Soc. for Testing Materials, 1910, 10, 201). Tests teel rails laid at a crossing at a New York railway ion showed that in six months the steel treated with o-titanium had lost by flange wear less than one- d of the amount lost by the Bessemer rails which eded them. Interesting comparative tests have n carried out by the Baltimore and Ohio Railway. plain Bessemer rails contained 0.55 and the titan- -treated rails 0.48 per cent. of carbon; each rail hed 90 pounds to the yard. After five months' r on a heavy curve, the plain Bessemer rails had 4.18 pounds per yard, while the titanium-treated s had only lost 1.45 pound per yard. The Besse- rails showed excessive wear and the usual indi- ons of segregation, whilst the treated rails were d and homogeneous (Times, Eng., Suppl., 1909, 26).

he following table, showing the quantities of "spe- " steel rails produced in the United States, indi- s the growing preference for the titanium-treated l rail (Met. and Chem. Eng., 1911, 9, 121):

	1909	1910
	Gro. tons	Gro. tons.
Titanium steel	35,945	195,940
Nichel-chrome steel	12,207	81
Nickel and electric steel	1,464	4,210
Manganese steel	1,028	390
	50,724	200,621

he above quantities, 70 per cent. in 1909 and 87 cent. in 1910 were made from Bessemer steel.

ecent information states that an order for 41,500 of titanium-treated steel rails has been given by New York Central lines, where rails of this type e been under trial for several years past. On these s the rails are subject to great variations in tem- ture, which often falls in winter to 30 degrees w zero. The results of tests on rails employed on ous sections of this line are given in the Journal of Industrial and Engineering Chemistry (1910, 2, 299).

The beneficial effects of using titanium allow for purifying basic open-hearth steel were demonstrated by experiments carried out in the Osnabruck Steel Works (Stahl und Eisen, 1910, 30, 651). In every case the bars treated with alloy showed increased strength, the fracture showing a fibrous structure similar to that of forged iron. In bending tests the titanium-treated steel also gave results superior to those obtained with untreated steel. Improvement was even seen with the addition of such a small quantity of titanium as 0.04 per cent.

In addition to the above-mentioned uses for ferro-titanium as a purifier for steel, it is stated that certain manufacturers of crucible steel in the United States are adding the alloy in sufficient quantity to retain 0.05 to 0.20 per cent. of titanium in the finished steel. This addition is said to increase the toughness and durability of the tool steel produced.

Titanium-iron alloy, containing 5.8 per cent. of carbon, is also used to some extent for improving the quality of iron by removing occluded gases and preventing segregation of subsidiary constituents. The quantity added varies from 1 to 3 pounds of 10 per cent. ferro-titanium to each 1,000 pounds of metal. It has been demonstrated by the experiments of Dr. Moldenke that the improvement is most noticeable in machinery pig (grey) iron (Trans. Amer. Mounds. Ass., 1908, 17, 57). These experiments showed that the average crushing strength of machinery pig iron was increased 52 per cent. by the use of 0.5 per cent. of the ferro-titanium alloy.

Results indicating similar improvements have been recorded when the alloy is added to metal for chilled car wheels, rolls, and to malleable iron. In the case of chilled car-wheel iron, the titanium treatment increases the crushing strength considerably.

The present price of ferro-titanium alloy containing from 10 to 14 per cent. of titanium is about £75 per ton, 150 marks per 100 kilograms (Stahl und Eisen, 1911, 31, 619).

An alloy of copper and titanium, containing from 5 to 12 per cent. of the latter element, is stated to be valuable for addition to copper castings (Min and Sci. Press, 1909, 99, 355). A. J. Rossi recommends the addition of 1 to 2 per cent. of this alloy to the molten copper, as it enables the copper to be cast in sand without difficulty, eliminates oxide and absorbed gases, and gives the metal a close-grained dense structure free from blowholes.

Another form in which titanium is used for purifying metals is that known as "titanium thermit." This consists of a finely powdered mixture of metallic aluminium, oxides of titanium and iron, enclosed in a tin, which is attached to an iron rod and introduced into the ladle immediately after the metal is run from the furnace. Its function is similar to that previously described for ferro-titanium, the oxides of titanium and iron being reduced to the metallic state by interaction with the metallic aluminium.

Alloys of titanium and silicon are also produced for use in the steel industry where it may be desirable to add both these elements. These alloys can be produced containing 5 to 70 per cent. of titanium and 20 to 75 per cent. of silicon by reduction in the electric furnace of suitable quantities of silver sand and pure titanic oxide (Journ. Soc. Chem. Ind., 1910, 29, 636).

Pure titanium, which has a melting point of about

1,850 deg. C. and a specific gravity of 5.17, does not appear to have been put to any industrial use as such.

Smelting of Titaniferous Iron Ores.

Closely connected with the general questions of the utilization of titanium ores is that of the use of iron ores containing small quantities of titanium. The objections made by iron smelters to the use of such material are not that it produces an inferior quality of iron, but that it gives pasty slag, and that the aggregations of titanium nitride and nitrocyanide in the furnaces render working difficult. It is also stated that more fuel is necessary than in the case of non-titaniferous iron ore. At the present time it is difficult to negotiate a sale in the United Kingdom of ore for iron smelting which contains even 2 per cent. of titanic oxide. In the past, highly titaniferous iron ores have been successfully smelted in various localities. An iron company which had works at Norton, near Stockton-on-Tees, many years ago smelted successfully an ore containing 39.2 per cent. of titanic oxide to yield forge iron (Trans. Amer. Inst. Min., Eng., 1882, 11, 159). The fuel and fluxes employed were about 17 cwt. of coke, 12 cwt. of limestone, and 3 to 4 cwt. of basalt, or similarly fusible silicate, per ton of ore. Owing to the uncertainty of the supplies and the small quantity of iron in the ore the work was abandoned.

The question of the smelting of titaniferous iron ore is thoroughly discussed, and the results of many important blast-furnace experiments quoted in an article by A. J. Rossi (Trans. Amer. Inst. Min., Eng., 1892, 21, 832), where he shows that it is possible to obtain a good pig iron and a fluid slag from ores containing 20 per cent. of titanic oxide. Iron ore fairly high in titanic oxide was formerly mined and smelted in Sweden, but the production is stated to have ceased in 1904. In the larger of the Swedish furnaces which smelted this ore, the consumption of fuel is stated to have averaged 275 bushels of charcoal to the ton of ore, a consumption considerably in excess of that required for non-titaniferous ore (Eng. Min. Journ., 1904, 78, 350). Ores carrying a high percentage of titanium were successfully smelted in blast furnaces during a period of 20 years in the Adirondack Mountains, New York State (Stahl und Eisen, 1909, 29, 1593). According to recent information ores from this latter locality rarely contain less than 8 per cent., and often 15 per cent., of titanic oxide (Min. Res.U.S.A., 1908, Pt. 1, 91). The iron ore smelted by the natives of the Salem district, India, by the Catalan process, is stated to carry a certain amount of titanic oxide (Rec. Geol. Sur. India, 1892, 25, 139).

From a review of the literature on this question it would appear that under suitable conditions the smelting of iron ores containing a moderate percentage of titanium should be a commercial possibility, especially as there are enormous quantities of such ore, which is usually very low in phosphorus, obtainable at a low price.

Other Uses of Titanium.

The employment of titanium carbide as an electrode for arc lighting is making progress. According to recent investigations (Trans. Amer. Electrochem. Soc., 1909, 16, 217) this substance gives a high candle-power efficiency. It has been found that the titanium carbide arcs are most satisfactory when operated on a constant current circuit. The electrodes are prepared by grinding the carbide to a fine powder, mixing with a suitable binder, and forcing the paste through a nozzle by means of a hydraulic press. The rods so produced are cut into suitable lengths and dried, first in the air, then in a gas oven, and finally in an electric furnace of the carbon-tube pattern. The electrodes are plated with copper to prevent oxidation during burning. The characteristics of the titanium carbide arc light are an extremely luminous inner path, very little light from the outer mantle, and none from the craters. The electrodes are used as the cathode, while the anode is a rod of copper or carbon. Electrodes of the sub-oxide of titanium prepared by the reduction of rutile have also been tried for arc lighting, but with no great success. At the present time, according to recent information (Mining World, 1910, 33, 2), the most extensively used electrode containing titanium is the so-called "magnetite" arc lamp. This electrode is composed of magnetite, 15 to 20 per cent. of rutile, and some chromite; the first-named giving conductivity to the electrode, the second being the light producer, and the last adding to the life of the electrode.

Titanium has been suggested and tried to a limited extent as a material for filaments for electric glow lamps, the processes of manufacture and use being covered by numerous patents. It is claimed that they give a high candle-power efficiency, and are less sensitive to variations in voltage than other filaments. A trial lot of about 1,000 of these lamps was produced in America in 1906 (Mining World, 1910, 33, 230). A suitable means for the production of such filaments is to force a colloidal solution of titanium hydroxide through a small nozzle, and after drying the thread thus produced to reduce it in hydrogen to the metallic state. It is interesting to note that should there be the slightest trace of carbon present in the filament, such as may get into it from the vaporized oil from the pump during exhaustion, the efficiency of the lamp will be so impaired as to be practically useless (Electrician, 1907, 58, 892).

A process for obtaining pigments from titaniferous iron ore, such as ilmenite, has been described (Journ. Soc. Chem. Ind., 1910, 29, 1023). The ore is roasted at a temperature below incipient fusion and crushed in water, yielding a finely divided product of a yellow to red colour.

Rutile is sometimes added to porcelain tiles to give a soft yellow underglaze colour, and it finds a similar use in the manufacture of artificial teeth. Only the purest varieties can be employed for the latter purpose (Min. Res. U.S.A., 1906, 530).

Pure titanium compounds, particularly the oxalate and the double ammonium oxalate, are used to a limited extent as mordants (Mining World, 1910, 33, 230). They are stated to give with tannin a yellow colour of great durability. Titanous chloride has been used as a mordant and the sulphate as a mordant and "stripper." The double pyrophosphates of titanium with the alkali metals are stated to be capable of application to textiles without damage to the latter.

It has been suggested that titanium nitride, which is produced during the smelting of titaniferous iron ore, should be utilized as a nitrogenous manure, but experiments do not seem to have been made to test the availability of this compound for agricultural purposes.

Commercial Value of Titanium Ores.

According to recent information one of the largest firms producing rutile concentrates in the United States is selling three grades of ore, viz.: grade A.,

taining over 95 per cent. of titanic oxide and practically free from iron, at $160 per ton (2,000 pounds). This grade is stated to be used principally for arc lamp electrodes. Grade B., containing 75 to 80 per cent. of titanic oxide, the balance being largely iron oxide, sells at $80 per ton (2,000 pounds). Grade C., (largely ilmenite), containing 55 to 60 per cent. of titanic oxide, the balance being chiefly iron oxide, sells at $40 per ton (2,000 pounds). Grades B. and C. are stated to be utilized in the production of ferro-titanium.

Manufacturers of ferro-titanium in the United States say that they are utilizing titaniferous iron ore from the Adirondack Mountains, New York State, containing from 14 to 45 per cent. of titanic oxide. The price of thi sore is nominal at $5 to $10 per ton (2,000 pounds) according to the amount of titanium present.

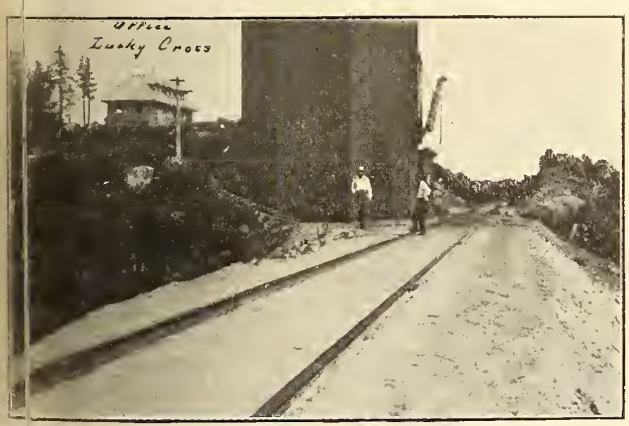
The Lucky Cross Mines, Swastika

Written for the CANADIAN MINING JOURNAL
by J. W. Vandergrift.*

The property now known as the Lucky Cross Mines of Swastika, Limited, was first staked in the year 1905, but the time of the first rush to Larder Lake. Little or nothing was done on it, except the necessary assessment work (which is usually practically nothing), till about two years later when it passed into the hands of the Crawford Mining Syndicate. Just here I would like to say a few things to the average prospector of this north country, and that is—that if he woud spend a greater part of his time, while supposed to be doing assessment work in the bush, doing some actual prospecting, instead of work that has no relation to mining, he would stand a better chance of finding something that would make his property of value. I think the story of what happened here on this property is ample proof of my statement.

* * * *

The Crawford Mining Company erected camps on the bank of Trout Creek and began mining operations at once. They either did not know, or else they ignored the necessity of doing any preliminary surface trenching, and at once began sinking shafts on some of the veins that outcropped, or had been exposed by the action of certain streams of water. In this manner they carried on operations for a part of two years, during which time they sank seven shafts, varying in depth from 6 to 50 feet, and reported having discover-



Office of Lucky Cross

ed say values of from six to twenty-three dollars. This may possibly have been true, if the samples from which the values were recovered were picked samples, but it is not true that they discovered any veins that gave or will give (in the shafts they sank) twenty-three, or even six dollars of an assay value across their entire width.

Throughout the time that they were doing this work they were daily walking over a vein of white quartz,

Part of Townsite Swastika

six feet wide, which did and will assay from $11.20 to $18.60 per ton, and as high as $58 per ton, and which shows visible gold. This was standing right in the path, altogether uncovered and worn by the bootmarks of the people who were looking for gold.

The inevitable result followed, the work was abandoned, and quiet again reigned supreme.

The history of the Swastika mine is practically the same. Operations were started there in exactly the same manner, and in exactly the same manner several thousands of dollars were wasted; the only difference being that in their case they changed their tactics before it was too late, or in other words, before it became impossible to raise any more money, and the finding of gold at the eleventh hour was the sole cause of the activity now going on here.

As has been stated, operations ceased on what is now known as the Lucky Cross property during the year 1908, and it has been altogether idle from that time till the beginning of June of the present year. About that time it began to be a desirable piece of property because of the valuable discoveries made on the property of the Swastika Mining Company during the latter part of 1910 and the early part of 1911. About this time, also, some gentlemen from Philadelphia secured control of this abandoned property, and the writer (who had made the discoveries on the Swastika property) was placed in charge of the work of prospecting, with the result that in a very short time two distinct veins, not before explored, were opened up and shown to carry good gold values. The first was

* Manager, The Lucky Cross Mines.

the one already referred to. It is located on Claim No. T. C. 58, and is quite close to the track of the T. & N. O. Railway. The second one is located about 400 feet in a southeasterly direction from the first find; this vein is smaller than the first but is much richer. Eleven samples taken from this one, taken by cutting a groove right across the vein and for a total length of about seventy feet, gave an average assay value of $112 to the ton.

Early in July the Lucky Cross Mines of Swastika, Limited, was formed to take over this property. Prospecting was continued under the same management, with a small crew of men, with the result that at the present time there have been uncovered and prospected to a small extent 34 separate and distinct veins; six of which show visible gold. A few others give fairly good assay values and indicate that they are well worth further prospecting and proving; while several others have simply been cut in the trenches. On these latter nothing has as yet been done in the way of ascertaining their values.

The results spoken of are the work of only two months with a small crew of men, but it easily places this property in the front rank among the properties in this district.

The track of the Temiskaming & Northern Ontario Railway passes through three of the claims of the Lucky Cross Mines, Limited, thus making this property the most easily accessible in the district. The necessary machinery for mining and milling can be delivered within one hundred yards of the site where the shaft will be sunk and which is also a nice mill site for future use.

The first surveyed townsite of Swastika is also a part of this property and will be a considerable source of revenue.

A few lines relating to the course to be followed in developing this property may not be out of place. A shaft will be sunk on Vein No. 16 to the 100-foot level, where a station will be cut and crosscuts driven either way. Eleven veins will be cut in about 400 feet; one of these is about 20 feet wide and shows some visible gold on the surface.

Compressed air will be used for drilling. A six-drill compressor will shortly be installed.

Smelting with Oil Fuel

In July Mr. Thomas Kiddie, metallurgist, of Vancouver, B.C., made a brief report to the Dominion Oil Smelting Co., Ltd., Vancouver, relative to a recent additional test of the use of oil as fuel in smelting copper ore, as follows

"In compliance with your request, I proceeded to Van Anda, Texada Island, accompanied by Mr. Carlsrud, general manager, for the purpose of making a further demonstration with the oil-burning furnace. Two days were there occupied in overhauling water pipes, machinery, furnace engine, blower, and water and oil pumps, all of which were tested before the demonstration was begun.

"The ore mixture smelted consisted of Boundary district ore, iron ore as a flux, and copper slag from a previous operation. The furnace was started at 11 o'clock, a.m., using two burners until it became sufficiently heated, when two more were started. Everything went along satisfactorily and slag began to flow at 12 o'clock, noon. The slag was hot and increased in quantity until it ran a pot of slag in one minute of time up to 2.30 o'clock, p.m., during which time it smelted without trouble or interruption.

"Allowing one hour for the heating up of the furnace—a very conservative allowance—we used 57 gallons of oil in 2.33 hours, and 60 gallons for heating up the furnace, or 217 gallons in all. This gives an average of 14.6 gallons of oil per ton of material smelted, equal to 43.8 cents per ton of ore. The rate of smelting was 110 tons per 24 hours, an increase of more than 100 per cent. over the results obtained during the best previous demonstration.

"I have no hesitation in saying that these conditions can, and will, be much improved upon after certain changes shall have been carried out, so that advantage may be taken of better and more complete combustion of the oil, when the cost of oil consumed per ton of material smelted should approximate 30 to 35 cents per ton of ore. The saving of labour cost at the furnace I estimate at nine cents per ton of ore.

"As a result of this and previous demonstrations I strongly recommend that the furnace be remodelled along the lines already submitted by me to your company, and endorsed by at least two metallurgists of the highest standing in British Columbia."

The company has decided to proceed at once with the remodelling of the furnace, as recommended by Mr. Kiddie.

Ontario's Mineral Production

Returns to the Ontario Bureau of Mines, Parliament Buildings, Toronto, show that the output of the metalliferous mines and works of Ontario for the six months ending June 30th, 1911, was as follows:

	Quantity.	Value.
Gold, ounces	2,276	$ 42,320
Silver, ounces	15,231,969	7,644,200
Copper, tons	4,418	631,827
Nickel, tons	8,418	1,809,759
Iron ore, tons	94,803	239,114
Pig iron, tons	255,303	3,923,593
Cobalt and nickel oxides, pounds	219,584	64,876

Compared with the corresponding period of 1910 the above figures show the following increases:

Gold, ounces	2,276	$ 42,320
Silver, ounces	2,417,142	1,378,670
Iron ore, tons	55,306	126,032
Pig iron, tons	33,585	382,905

and decreases as follows:

Copper, tons	216	28,670
Nickel, tons	921	195,901
Zinc ore, tons	576	5,000

In quantity the shipments from the silver mines amounted to 12,113 tons, of which 7,733 tons were ore and 4,380 tons concentrates. In addition, 1,302,699 oz bullion were sent out. For the first six months of 1910 there was shipped of ore 12,041 tons and 2,763 tons concentrates. There is, therefore, a considerable falling-off so far as shipments are concerned, in actual weight, but a decided gain in value. Taken in connection with the increase in shipments of concentrates, this would indicate that the mines are confining their ore shipments largely to high grade, and putting the

ower qualities through the stamping mills. Gowgan- a sent out 110 tons ore and 2 tons concentrates, and outh Lorrain 216 tons ore, the whole containing 430,- 40 ounces of silver.

The yield of gold is still small, production at Porcu- ine being delayed by the disastrous fires, which de- troyed the plants at the Hollinger and Dome mines.

Granby Company's Hidden Creek Mine

Mr. Jay P. Graves, vice-president and general mana- ger of the Granby Consolidated Minnig, Smelting, and Power Company, Ltd., has returned to Spokane, Wash- ington, from his second visit to the company's Hidden Creek mine at Goose Bay, Observatory Inlet, British Columbia. The Spokesman-Review quotes him as hav- ing said, in part: "The Cabin Bluff ore shoot, the small- er of the two main outcrops on our Hidden Creek pro- perty, contains a fine body of ore. We have drilled five or six holes in this ore shoot; some of these have been drilled 800 feet continuously in ore, and the cores from the lowest parts of the holes, which are about sea-level, give an average assay return of 3 per cent. copper. The last cross-cut through this ore shoot was in ore averaging 6 per cent. copper across 125 feet.

"The tunnel through the Cabin Bluff has been ex- tended to the Mammoth Bluff. It was within 15 or 20 feet of the beginning of the ore shoot in the latter when I left the mine. This is much the larger ore body, and its grade will shortly be demonstrated. So far our operations have indicated that it will average at least 3 to 4 per cent. in copper."

(Note—This property was examined in 1909 by Mr. Herbert Carmichael, Provincial Government Assayer. In his Bulletin No. 1, published in that year, he said, in the course of his description of the property: "Pros- pectors were first attracted by a round-topped hill, about 1,000 feet high, which was more or less covered by a typical 'gossan' or iron cap. Prospecting showed that this gossan was thicker and more strongly marked in some places than others, and attention was specially directed to these points. The first of this work was done on a large exposure of these oxidized ores, which proved to be 5 feet thick. This gossan was cut by a number of trenches which disclosed a body of mixed pyrite and chalcopyrite ore, and this was prospected by four tunnels, aggregating 200 feet. These tunnels developed a large body of ore carrying 4 to 6 per cent. copper, which was called the 'Cabin Bluff,' and is at an altitude of 700 feet.

"About 500 feet back round the hill and 200 feet higher than the 'Cabin Bluff,' another and larger ex- posure of ore was discovered and named the 'Mammoth Bluff.' This has been cleared off to a large extent by surface stripping and shows a height of 300 feet of mixed pyrite and chalcopyrite ore, containing 4.5 to 5 per cent. copper. This ore deposit has been pros- pected by several tunnels, in all 350 feet in length.

"There are several smaller showings on this hill, and these, with the 'Cabin' and 'Mammoth' Bluffs, have been prospected by 2,000 feet of open-cut, beside the tunnels. To tap these ore bodies at depth and form a main working tunnel, a long drift has been started on the hillside 200 feet vertically below the Cabin Bluff, and when the property was visited this drift was in 732 feet. At 480 feet in, the ore seen in the Cabin Bluff above was struck, the tunnel cutting through it, the strike of the ore being N. 10 deg. W., dip 65 deg. W. The thickness of the orebody is estimated at from 25 to 40 feet, running from 4 to 5 per cent. copper. Drifts 70 feet long have been run on either side of the tunnel in ore all the way, the direction of the tunnel being 90 deg. from the strike of the ore.

"Round the hill to the south 265 feet, and at an elevation of 100 feet above, the main tunnel, a drift known as the 'Pyrites tunnel' is being driven to con- nect with a raise from the main tunnel. For the first 100 feet this tunnel runs through loose granular py- rites, made up of small detached iron pyrites crystals similar to those found on the Ecstall pyrites deposit, near the Skeena River. At 100 feet in, solid mixed iron and copper pyrites ore was struck, containing 4 per cent. copper for 10 feet, when a lower-grade iron sulphide ore was met with, and the tunnel is still in this ore at 200 feet from the portal.

"The vertical height between the main tunnel and the top of the Mammoth Bluff deposit is 450 feet, and with the prospecting done it is reasonable to infer that the ore shoot is continuous for this vertical distance. The horizontal boundaries of this orebody have not been clearly defined, but it is probably some 600 feet in length by 20 to 25 feet in thickness, containing 3 to 4 per cent. copper.

"At the Cabin Bluff showing there is a considerable depression in the ground, which appears to have been caused by the oxidizing and dissolving out of the py- rites ore body, and there is a large deposite of hema- tite in a flat of 10 acres south of the ore showings, where this dissolved out ore has been redeposited. Samples of this deposit gave the following assay re- turns: Iron, 60 per cent.; gold, 0.10 oz.; copper, 0.2 per cent.

"The country rock in the vicinity of the ore body is made up of altered argillites or shales, traversed by felsite, diabase and porphyry dikes, these dikes being of later origin than the ore. In some parts of the de- posits there is a vein-filling of quartz, but the main body is composed of solid sulphide ores.")

It should be remembered that the report from which the foregoing extracts have been made was published before the Granby Company became interested in the Hidden Creek property, and consequently previous to the commencement of the large amount of under- ground exploration since done by that company. The information is here quoted, though, with the object of directing attention to the fact that particulars con- cerning the property, obtained by an official of the Provincial Department of Mines, and therefore quite disinterested, and published by the Government two years, indicated the occurrence on the Hidden Creek group of a large body of copper ore of commercial value. Since then the considerable exploration car- ried out by the Granby Company, both by ordinary underground mining and by diamond drill, has de- termined the occurrence here of an immensely larger quantity of ore than was previously known to exist.

Continuing the quotation from the Spokesman-Re- view representative's interview with Mr. Jay P. Graves, the following additional information is given:

"For the last month we have been employing 150 men, and the force is gradually being added to. All the engineering work in connection with the equip- ment of the property has been completed. The right of way for the tramway from the mine to the ore- bunkers on tidewater, a distance of a mile, has been

cleared, as, too, have the sites for the orebunkers and wharves. By September 1st we will have construction work well started on the 400-foot wharf, and on two orebunkers—one, of 4,000 tons capacity, at the mine, and another, of 6,000 tons, at the dock.

"A sawmill, having a capacity of 40,000 feet a day, is in operation, and an electric light plant is being installed in connection with the old water-power. The construction of a dam higher up the creek will shortly be commenced; this dam will give a head of 350 feet and will provide water for the development of 3,500 electrical horsepower for our new plant.

"The head employees of the company are still collecting data that will determine the company's policy with regard to the treatment of its ore. When all the necessary data shall have been obtained, we shall decide whether for the present we shall send the ore to a custom smeltery, or at once proceed to erect our own reduction works. It will also be decided where our plant shall be located, and whether we shall treat only our own ore or do a general custom smelting business as well. We expect to be able to reach a decision on these matters before October 1."

THE HELEN IRON DISTRICT

(Written for the CANADIAN MINING JOURNAL
by W. L. Goodwin.*)

Ontario's iron ore mining, like its gold mining, has had a somewhat chequered experience. From the early days when pig iron was made from the bog ore of Norfolk County down to the present there have been a good many iron deposit sopened up, particularly in eastern Ontario, but the Helen mine has been the only large steady producer. Other deposits have been found too small or too lean to work profitably, or they have run into too much sulphur. The Moose Mountain and Atikokan deposits are large, but it can hardly be said that they are yet on a solid basis as steady producers.

The writer can compare the present state of development of the Helen mine district with its condition in 1902. At that time the Helen was worked on a very large scale by the open pit method. The Josephine, about 10 miles to the northeast, was being prospected also. The output at the Helen was about 500 tons a day. In 1903, under the energetic management of Mr. R. W Seelye, with a much reduced working force, the output was pushed up to 1,000 tons, which has been maintained ever since. Since that date the work has been exclusively underground. The ore hoisted still consists largely of limonite and gothite, but there is a considerable proportion of hematite. The pipes of pyrite sand, so characteristic of the early stages of development of the mine, are still met with. Solid masses of pyrite are occasionally found. But both are so localized that it is comparatively easy to mine a product low in sulphur. These pipes of pyrite are very curious. When they are broken into the sand runs out like so much water. The Helen ore is easy to mine and it works well in the furnace. Mr. Haselbring, the present general superintendent, tells me that the output just now is about 1,100 tons a day, and that most of it is used in the furnaces at Sault Ste. Marie. The ore is hoisted by two skips, crushed with a gyratory crusher, loaded directly into the ore cars for transportation to Michipicoten Harbour (12 miles), where the cars are run out on the loading dock and dumped into the ore boats. The shaft has been sunk 750 feet, and drifting has been carried on down to the 700 foot level. Early in the summer the timbers began to show signs of a cave. The progress of this was carefully watched, and in July the men were all ordered up to the surface, soon after which the cave occurred, bringing down a mass estimated at 350,000 tons—a year's supply of ore, requiring only occasional block-holing to make it ready for mucking. At one place a solid block of ore came down, just filling the drift—so neatly that the rails seem to run into unbroken ore.

When the writer was there in 1902 Boyer Lake, just west of the workings, was being pumped out, to dispose of the water, which was becoming troublesome and to allow the bed of the lake to be prospected. Drifting under the bed of the lake has not revealed any large bodies of ofe. A launder has been run around the south side of the mine and continued along the shore of Boyer Lake to Sayers Lake just below. This takes care of the mine water and also of a large part of the drainage from the hills on that side. Since this was done, it has been found unnecessary to continue the pumping of Boyer Lake. The mine pump takes care of it all.

The mine buildings are noteworthy for the evident care taken to give the men comfortable, safe, and sanitary conditions. The writer accompanied Mr. Seelye, the general manager, throughout an inspection of the camp. The minute, unsparing character of that inspection accounts in part for the admirable discipline of the camp. In 1902 "blind pigs" and other undesirable camp features were much in evidence in the district. These have completely disappeared and one hears startling tales of the drastic measures used to abolish them. With these features have disappeared much dirt, waste, and general disorder, too evident. tion of sand, common sense, and study of the best interests of the mine, managers may rid themselves of a visitor in the earlier days. By a judicious combination such demoralizing influences, which so seriously interfere with discipline and efficiency.

Notable features of the Helen mine to-day are the brightness and comfort of the dining and sleeping camps. With a good water supply laid on from a lake on the top of the hill east of the mine, baths and wash hand-basins are supplied for the men. Instead of large dormitories with tiers of bunks, one sees separate rooms, securing something of the privacy of the home. Electric lights are used everywhere, both power and light being supplied by the water power developed at the falls of the Michipicoten River 11 miles away. There is also a good drainage system. The largely increased output with a much smaller force of men (now about 200), is in part explained by the general briskness of the camp which accompanies this careful attention to comfort and sanitation. Many of the mar-

*Director School of Mining, Kingston, Ont.

ed men, including English, Finns, and Italians, have ought in their families, and there are enough child- n of school age to keep one teacher busy. It was teresting to see the tow-headed Finns and dark Ital- n children playing together, and all talking good anadian English.

The Helen iron mine is then undoubtedly the largest ad most important iron ore producer in Canada at resent. There is still a very large known body of ore there to be taken out, and the mine has possibilities in depth. But a most interesting new development of the district is found at the Magpie mine.

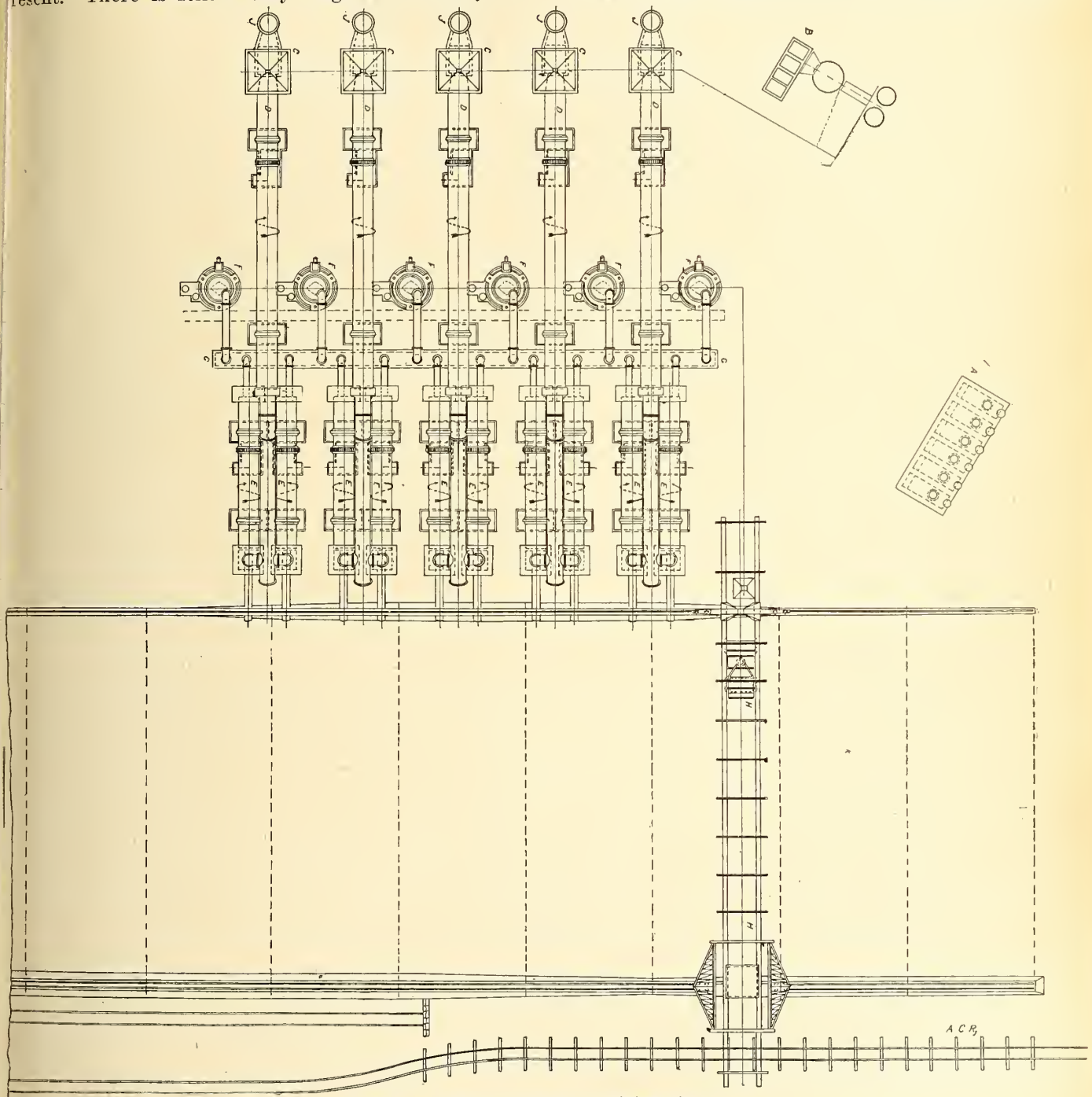


Fig. 1. Plan of Yard and Calcining Plant.

The Magpie Mine.

The character of the Helen iron formation has been made familiar by the reports of Dr. A. P. Coleman in the Ontario Bureau of Mines Reports.* (a) The most interesting feature of the Helen formation is the siderite, ankerite, etc., more or less banded with chert and sandstone, an deontaining more or less iron pyrite. It has been conjectured that the Helen mine had its origin by a process of leaching of the carbonate material and its concentration by precipitation to the bottom of a lake after ovidation to limonite. This process can be seen going on now in the remains of Boyer Lake. The plentiful occurrence of iron pyrite in these rocks suggests another possible origin. It is quite likely that both the carbonate and the pyrite have contributed to the process. (b) Those visiting the Helen mine can see the principal features of the formation beautifully shown in the rock cuts made by the railway as it passes along Sayers Lake and crosses the very narrow ridge which separates Sayers from Boyer Lake. (c)

*1899, pp. 254-5; 1901, p. 191; 1902, p. 155; 1904, p. 221.

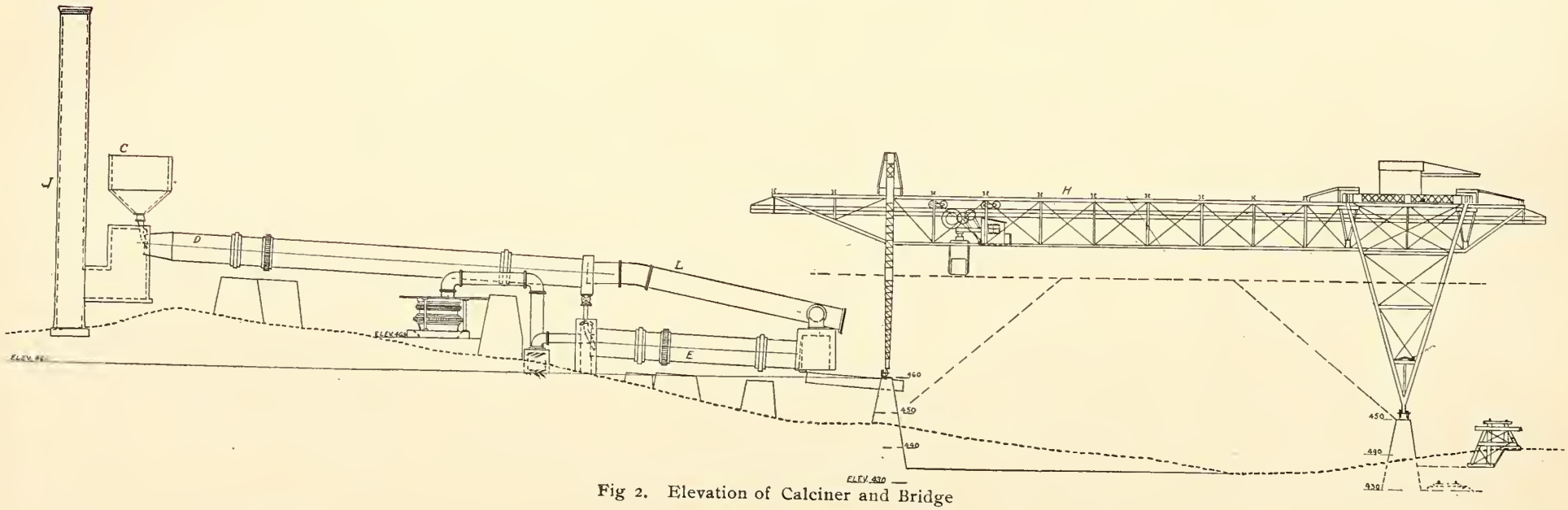


Fig 2. Elevation of Calciner and Bridge

A—Boilers.
B—Shaft, Hoist & Crushers.
C—Ore Hoppers.
D—Calciners.
E—Roasters.

F—Gas Producers.
G—Gas Main.
H—Bridge.
J—Flues.
K—Ore Bins.

L—Hood and Conduit for gas from roasters to calciners.

About twelve miles north of the Helen mine, at a point near the Magpie River, the siderite is so concentrated as to constitute a workable iron ore. Here the Mines Department of the Lake Superior Corporation have proved by diamond drilling an ore deposit 000 feet long, and at least 650 feet in depth. The width where a shaft is sunk and the deposit cross-cut, 59 feet. A conservative estimate made from the drill log puts the average width at 30 feet. Some 2,000 feet of drilling were done. In parts of this deposit the ore passes into magnetite.

The fresh siderite is compact and quite white, but when exposed to the air soon weathers to the characteristic rust colour of limonite. This is well seen at Iron Knob, a jagged peak very conspicuous towards the east end of the range. In composition the ore will average about as follows:

Iron, 40 per cent.
Carbon dioxide, 18 to 20 per cent.
Lime, 7 per cent.
Magnesia, 5 per cent.
Manganese, 2 per cent.
Alumina, 1 per cent.
Silica, 8 per cent.
Phosphorus, under 0.02 per cent.
Sulphur, under 4 per cent.

For comparison, the Helen ore analysis for 1910 is given herewith:

	Dried.
Iron	57.77
Lime	0.23
Magnesia	0.14
Manganese	0.165
Alumina	.880
Silica	4.40
Phos.	0.127
Sulph.	0.136
Loss by ignition	10.40

The probabilities are that the ore will carry about two per cent. of sulphur, which occurs in the form of iron pyrite more or less disseminated through the ore, in marked contrast with the segregated masses of pyrite at the Helen mine.

The high percentage of sulphur is, of course, prohibitive to the use of the raw ore, but fortunately it can be completely removed by roasting, leaving the ore of excellent Bessemer quality. The ore is distinctly basic in character, although the silica and alumina present will balance more than half of the lime and magnesia. The high percentage of manganese also increases the value of the ore.

By a long series of large scale experiments, using up some 200 tons of ore, it has been established that it can be roasted sweet, the sulphur being reduced as low as is desired, even down to a vanishing quantity. There is no difficulty in reducing it to 0.10 per cent., and it is not necessary to bring it down below this. The ore at the same time loses about 20 per cent. in weight, with a rise in the iron content to 50 per cent. or over, mostly in the ferrous condition. After a careful reading of the reports made on these experiments, which were carried out under the superintendence of Mr. Seelye, the writer is convinced that the feasibility of the roasting process has been established beyond a peradventure.

The roasting plant is now being constructed under the superintendence of Mr. Wm. Melville, metallurgist, Detroit, and Mr. R. E. Clisdale, mech. engineer, Toronto. Through the kindness of Mr. Seelye I am able to give a general plan of the roasting plant and accessories and a short description of the process. The ore is crushed to one and a half inch. On account of its compact nature it crushes with very little fines. From the crushers it is conveyed to hoppers, which feed it to the calcining furnaces, of which five are being installed at present. It has been found advantageous to drive off the carbon-dioxide by a preliminary calcination, for two reasons. The waste heat of the roasting furnaces can be utilized for this purpose, and the ore is left in a porous condition by the escape of the carbon-dioxide, so that the subsequent oxidation in the roasting furnaces is unusually effective. This arrangement has another advantage. It makes possible the maintenance of an even high temperature throughout the length of the roasting furnaces. The experimental work established this as the most favourable condition for the complete elimination of the sulphur.

The calciners are rotating tube furnaces, of the cement furnace type, 125 feet long and 8 feet in diameter. These are heated by the waste gases from the roasters, the gases being carried by pipes from the bottom of the roaster and entering at the bottom of the calciners. The gas therefore travels against the direction of movement of the ore. The temperature of the lower end of the furnace reaches about 800 degrees Centigrade. There is no considerable reduction of the sulphur contents.

The roasters are built in pairs, each one of a pair revolving in a contrary direction to the other. Each pair receives the ore from one calciner. They are 60 feet long and 5 feet in diameter. The temperature is maintained at 1,100 degrees Centigrade by producer gas, which is introduced with air at the upper end of the furnaces, so that the flame travels with the ore. In this way it is possible to maintain a long flame and very even temperature throughout the tube. The temperature must not rise above 1,100 degrees, as sintering will then take place. There are six of these producers, one for each pair of roasters and one in reserve. The fuel used is soft coal. The producers are of a special construction and are being made by the Chapman Engineering Works, Dundas. Each producer is in two sections joined by a water seal. The sections revolve at different rates so as to give constant stirring of the fuel. This prevents blow holes and insures a constant supply of gas of uniform composition, both points being essential to the success of the process. The output from these furnaces will depend, of course, on the rate at which they are revolved. This is determined by the percentage of sulphur, a higher percentage requiring a slower rate in order to secure the desired elimination of sulphur. On an average it is estimated that the output will be 15 tons an hour per unit. This will give a total production of about 1,500 tons a day for the five units at present being installed.

The plant is designed so as to give very perfect control of the movement of the ore, of the flow and composition of the producer gas, and of the draught. The latter is controlled by a fan which gives a pressure equal to 16 inches of water. In the experimental work the waste gases after leaving the calciners were found to contain 16 per cent. of oxygen. If the gases from the roasters do not give the required temperature in the calciners, this can be secured by the introduction of a little producer gas.

From the roasters the ore is passed into the storage bins, and is there handled by an electric crane, the bridge having more play than usual so as to reach several bins without being moved along the traek. The finished ore is in hard nodules, very easily handled by the elam-shell, hard enough to bear transportation and furnace burden, but so porous that it must work particularly well in the furnaee.

The Magpie mine is reached by a branch of the Algoma Central Railway built from the Josephine braneh at a point about 8 miles north of the Helen mine junetion. The whole distanee from the Magpie mine to Miehipieoten Harbour is 28 miles, with grades in favour of the loaded movement. In addition to this summer route there are, or will be, two possible winter routes, as the Algoma Central Railway is being built northward to connect with the main line of the C. P. R. at Hobon. The A. C. R. is now being eonstrueted from the "Soo" northward to the Helen mine distriet. The greater part of this line is already in operation.

The mine buildings for the Magpie are being erected with the same attention to solidity, comfort, and health as exemplified at the Helen. The water supply is being pumped from the Magpie River. The drainage will be piped into Camp Lake, which is a mile and a half below the intake of the supply station. Power will be obtained from Steep Hill fall on the Magpie River, which is 1½ mile from the mine. An auxiliary steam plant is being built at the mine.

As the amount of ore blocked out by the diamond drilling is calculated to be something like twenty million tons, it is quite evident that we have here an important addition to our known iron ore resourees. The estimated eost of the roasting proeess is between 35 eents and 40 eents a ton on the production, not a heavy addition to the eost eonsidering the charaeter of the ore turned out.

(a) Professor Coleman (Bureau of Mines Report, 1901, p. 155) proposed the following classification of the rocks.

Laurentian—Gneisses and Granites.

Upper Huronian—Acid eruptives, Basic eruptives, Dore conglomerates.

Lower Huronian—Eleanor slates, Helen iron formation, Wawa Tuffs, Gros Cap Greenstones.

This places the Helen Iron Formation in the Lower Huronian, which has been so productive of minerals in other parts of Ontario.

(b) That this is the case is perhaps shown by the occurrence, in and near the ore, of masses of losse silicious saud corresponding in structure to the bands of sandstone in the siderite, and also of quantities of loose pyrite sand. The silicious sand was doubtless formed by the disintegration of the siderite formation with the solution and removal of the carbonate, leaving the insoluble silica in place, or perhaps allowing it to be carried by the streams of water and deposited near the place of deposition of the ore. If, in addition to carbonic acid the eirculating waters carried oxygen, the pyrite would also be attacked and its iron carried away in solution as ferrous sulphate. The more perfect crystals and compact fragments of pyrite would resist this attack longest, and form the pyrite sand so characteristic of the Helen ore body.

(c) Analysis of surface specimens of the siderite formation and of drill cores from a depth of about 150 feet show up to 36 per cent. iron. It is obvious that if such a formation were found uniform enough, in sufficient quantity, and in other respects favourable in composition, it might constitute a workable iron ore. This was pointed out by Professor Coleman in the Report of the Bureau of Mines for 1901, p. 193:

"Analyses of specimens from the hilltop (east of the mine) and from the outlet of Boyer Lake have been made by myself, No. 1 being from the hill, and No. 2 from the west end of the lake, and the results are as follows:

	No. 1.	No. 2.
Insoluble	4.38	14.16
Carbonate of iron	78.57	74.17
Carbonate of magnesia	12.84	8.35
Carbonate of lime	4.09	0.99
Alumina	trace	trace
	99.88	98.67
Specific gravity	3.681	3.57
Iron	37.71	35.)

"The insoluble residue consists mainly of very fine particles of silica. . . . . No account was taken of the iron pyrite, which would have given a considerable amount of sulph, perhaps even one or two per cent. . . . But for the pyrit, the rock from the hill would be accounted a fair ore of ir in some parts of Europe; and if this siderite were roasted would yield a product having 56.57 per cent. if iron, not mo than 7 per cent. below the iron contents of the ore from t mine; and, if the sulphur were all roasted out, would form very fair ore, having 9.17 per cent. of magnesia and 3.14 p cent. of lime to serve as fluxes for 6.56 per cent. of insolub material, mainly silica."

It thus became a question of quantity of siderite, and of feasible proeess for roasting. The percentage of silica is course a factor, as the value of the ore is increased by an e cess of limo and magnesia over that required for slagging t silica and alumina. In another place Professor Coleman not the presence of something like 2 per cent. of manganese the siderite, and points out that it has not been carried dow in the precipitation of the limonite ore.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

The Geological Survey has recently issued a Memoir on the clay and shale deposits of Nova Scotia and a part of New Brunswick. The author is Heinrich Ries, who was assisted in his investigations by Joseph Keele. Particular attention was paid to the shales and clays which are so plentiful in the Carboniferous of Cape Breton Island, and the Memoir contains much interesting reading for these interested in local industries, and incidentally corrects some erroneous impressio which are abroad.

In view of the importance of the iron and steel industry i Nova Scotia it is unfortunate that there does not appear to b any deposit of true fireclay in the province, and there is ge erally a decided lack of refractory material. An examinatio was made of a so-called fireclay deposit on Coxheath Mountai near Sydney, which proved to be a light-coloured felsite. B crushing the felsite and usiug a bond of clay it would be po sible to make a hard brick, but not a firebrick. An interestin

Note—Memoir No. 16-E, Geological Survey Branch, 1911.

pocket of white residual clay was found in a depression near the ridge of the mountain, which the authors think may have caped glacial erosion, but the deposit is too small to be of onomic value.

There appears to be an abundance of suitable material in ape Breton for the manufacture of ordinary red and buff rick, particularly in the neighbourhood of Glace Bay and dney, and near the town of Inverness.

An interesting deposit was noted in the Shubenacadie and usquodoboit valleys, which is evideutly of pre-glacial origin, it underlies the drift. The authors tentatively class it as esozoic. This deposit contains material which is classed fireclay and could be used for the manufacture of pressed rick, terra cotta, and stove linings. This deposit the authors nsider could be profitably opened up.

There are clays in the Annapolis Valley which could be used r making cheap art pottery and terra cotta tiles, and some the smoother clays in the Anapolis Valley and near Inver-ss could be used for the manufacture of stoneware.

The authors believe that there is room for development in e Nova Scotia industry, but the product resulting from it will ave to be marketer mainly outside of the Province. There e few pressed brick works between Ontario and Nova Scotia, d this territory should afford a good field.

Although Nova Scotia appears to be lacking in deposits of e residual clays suitable for pottery manufacture, and there no great quantity of really refractory manufacture, yet it quite evident that there is no lack of material for the manu-cture of ordinary brick, and some of the better grades of e clay-workers' art, such as terra cotta tiles, stoneware, ain tiles and pipes, and coarse pottery. The Memoir is a ry valuable one, and should be obtained by those interested the clay industry.

It may be noted that a large business is now being done in dney in cement bricks made from the Dominion Iron & eel Compauy's slag.

ominion Coal Output.

The output of the Dominion Coal Company's Glace Bay col-eries for August exceeded any previous monthly production. he figures are as under:

No. 1	52,770
No. 2	71,400
No. 3	17,720
No. 4	38,740
No. 5	28,540
No. 6	26,680
No. 7	18,120
No. 8	17,430
No. 9	39,470
No. 10	18,100
No. 12	27,590
No. 14	24,380
No. 15	3,920
No. 16	1,170
No. 21	1,500
	387,530

This output is 17,000 tons larger than the best previous nonth in the company's history. No. 2 Colliery, No. 6, No. 10, nd all the Lingan mines from Nos. 12 to 16, established new ecords.

The output for the eight months ending August this year is pproximately 2,650,000 tons, comparing with 2,259,000 tons in he same period of last year. The best previous production for his period in any previous year was 2,610,000 tons, in 1908, so that the Coal Company's output to date is 40,000 tons larger than in any former year.

The output from the Springhill Collieries for August was 30,164 tons, which is the largest production for over two years.

The output of the Glace Bay mines during August was a really remarkable one, cousidering that the 12th was observed as a geueral holiday, being the annual picnic of the P. W. A. This occasioned a decrease of 20,000 tons in the production, so that the rate of output was easily 400,000 tons for the month. To those who know the large expenditure which has been made on these collieries during the past eight years it is not a matter for surprise that the property is uow showing of what it is capable. Since 1904 the Coal Company have developed No. 6 Colliery on the Phalen seam, and No. 10 Colliery on the Emery seam, on the Glace Bay side; and have on the Lingan side two new collieries in full operation, and two in course of developmeut. In additiou to this some of the older mines, such as No. 5 (Reserve), and No. 7 (Hub), have been practically remodelled. In this period also a large part of the mine machinery has beeu changed over from steam drive to electricity, and the large portion of the colliery pumping, ventilating, and screening plauts is now operated by electric power.

Extensive prospecting operations are being undertaken by the Dominion Coal Company in the Cumberland coal field with a view to the location of new winnings near the Springhill Collieries. Diamond drill-holes are being put down to test the measures. The correlation of the coutorted seams of the Cumberland basin is not by any means so simple a matter as the correlation of the seams in the less disturbed areas at Glace Bay, and the prospecting at Springhill will afford some interesting work.

ONTARIO.

COBALT, GOWGANDA, AND SOUTH LORRAIN.

Ore shipments from Cobalt for the week ending August 25 established a record for 1911, 748.22 tons being sent out, including 15 cars of high grade and 7 cars of low, from thirteen mines. During the week ending September 1, three cars less than in the precediug week were shipped, 15 of high grade and 4 of low, from eleven mines. The shipments totalled 1,167,029 pounds, or 583.51 tons. During this period of two weeks, two mines shipped bullion. The Crowu Reserve sent 11 bars, worth $8,000, to London, England, and three shipments were made by the Nipissing inside five days. These consignments were of 15 bars, worth $8,738.60, and the other two, totalling 114 bars, valued at $63,483, which, for a week, is a record for the camp.

Dividend No. 19 of the Crown Reserve has been declared for August payable on September 15. It is at the regular monthly rate of 2 per cent. with a bonus of 3 per cent. Since 1908 the Crown Reserve has paid back to shareholdedrs 195 per cent., representiug disbursements totalling well over the $3,000,000 mark. On August 22 this mine shipped a car of 30 tons to the government of Saxony. The ore was over 5,000-ounce stuff. Nine large machines are working undergrouud and preparations are practically completed for further sinking on the Carson, or main, vein. The winze is uow down over 160 feet below the 300-foot level and a head frame and cage are being placed in position. This winze will be sunk 150 feet, making the deepest working on the property 610 feet.

Frank L. Culver, president of the Beaver, when iu Cobalt recently, said it was the compauy's intention to sink the main shaft another 100 feet below the 400-foot level. Shortly before the president's visit the No. 5 veiu was struck at the 400-foot level of the shaft, and drifting has been started northward along the ore body.

This week saw the openiug of the concentrator at the Cobalt Lake mine. It has a capacity of 75 tons a day at present but it is expected that this will be increased to 100

tons daily before long. Mining operations are being carried on in shafts Nos. 4 and 6. The former is being worked at the 170-foot level where the old vein is being opened by drifting. At No. 6 shaft work is progressing at the 285-foot level. Crosscuts will be run from a certain point at this depth and raises cut to the shaft, to connect at the 195-foot level. A new vein carrying some native silver was discovered a few days ago and a drift has been started to open it up and determine the values.

At the 200-foot level of the Coniagas a spectacular slab of silver 34 inches by 18½ inches and over an inch thick was taken out last week. The find was made in the drift on vein No. 12, one that is carrying high silver values. The vein is little more than 3 inches wide, but it is a steady producer of high grade.

Operations on "H" vein at the Trethewey on the first level between Nos. 1 and 2 shafts disclosed some high grade ore that had been overlooked when the vein was originally worked. To date over 60 feet of good ore has been opened up and in the wall rock there is plenty of milling ore. The mill is running steadily at a capacity of 100 tons a day, and nothing but high grade is being shipped.

At the 100-foot level of the Cobalt Townsite mine another vein has been encountered which gives promise of producing much good ore. This vein was found in a crosscut about 300 feet west of the shaft. Five drills are working underground. A contract with the Northern Customs Concentrator calls for 50 tons of ore daily. This ore is being trammed to the concentrator and comes from underground work only.

Developments at the Belleville, in South Lorrain, have been of the most satisfactory nature during the past few weeks, and some spectacular ore bodies have been opened up. The force of working men is being increased and shipments of high grade ore are being made regularly.

In crosscutting westward at the 575-foot level of the Temiskaming to make connections with the main shaft, a large vein of high grade ore was cut. Unless it has faulted from an upper level this is an entirely new ore body. The vein is from one foot to 2½ feet wide and in places the values are exceptionally high.

Work at the Millerett and the O'Brien mines in Gowganda is going on quietly but effectively. The latter mine recently shipped a 19-ton car of ore that netted the company over $38,000.

Porcupine, Swastika, and Cripple Creek.

Nothing has so increased interest in the Cripple Creek district as the recent transfer of the Jowsey-Wood claims in Carscallen township to A. D. Miles, consulting engineer for the Canadian Copper Company. The Jowsey-Wood claims are situated on the 3-mile post on the base line of Carscallen, two of them on the boundary line between that township and Denton. A big quartz dyke holding rich values with spectacular free gold showings runs through the entire group of claims. This deal, following so closely the transfer of the McAulay-Brydge claims for half a million dollars gives great prominence to the district west of the Mattagami.

West Shining Tree, 40 miles north of Gowganda, is the latest goal of gold seekers, and a rush of no small proportions resulted from the finds of Alfred Gosselin, who, so far, has staked the best claims yet prospected. The formation in the new district resembles greatly that found in the Porcupine area and veins uncovered run from mere stringers to 15 and 20 feet in width. On Gosselin's main discovery free gold shows in several places and assays taken from a number of veins go as high as $25.

A gang of about 20 men is busy at the Homestead m[ine], Swastika, stripping, trenching, and at other surface work. A shaft has been started on No. 3 vein, and it will be made [the] main working shaft, the first station to be at 100 feet. A [new] vein at least 10 feet in width was found a few days a[go], carrying excellent values.

A new shot drill has been taken out to the Porcupine [and] Hudson's Bay gold mines. It is a Rand-Davis-Calyx drill w[ith] a 6¼-inch core, the largest in operation in the camp. M[uch] surface work is being done and a report of two promin[ent] English engineers, whose names are withheld, will be iss[ued] shortly. All buildings destroyed in the fire have been rebu[ilt].

What is considered by some engineers to be one of the m[ost] spectacular showings ever found in any camp is the rich v[ein] uncovered on the eastern portion of the big Dome prope[rty] recently. While trenching north and south a beautiful f[ree] gold showing was uncovered on a vein running east and w[est]. This vein was then uncovered east and west for 72 feet a[nd] eight distinct spectacular showings were disclosed. Offici[als] of the company refused to express any opinion of the val[ues] carried. The show spot of the vein is a patch of almost s[olid] gold 2½ inches by 15 inches. In each case the gold appea[rs] in slabs of schist in the quartz vein which is 18 feet to [20] feet in width.

Work at the West Dome is as yet confined entirely to [the] reconstruction of camp buildings and the replacing of equ[ip]ment. A model town is being laid out with substantial str[uc]tures, a modern system of sanitation and every protect[ion] against fire. Pure water is procured from an artesian well [to] a depth of 170 feet.

Motors and transformers have been ordered for the Pl[a]aurum Mines, and a 10-drill compressor will be delivered in [the] course of a few weeks. A 6 x 8 hoist is now on the grou[nd]. A shaft is being sunk on the Jupiter vein, 200 feet from the li[ne] and another shaft on one of the four veins opened up in [the] corner between the Bewick-Moreing, Platt Vet, and Pe[arl] Lake properties.

A new strike at 90 feet was made on the Pearl Lake p[ro]perty last week, in "A" shaft, free gold appearing in seve[ral] places. In the other shaft some free gold was found at 1[00] feet. At 400 feet a core drill brought up good looking st[uff] that assayed $18.25. Machinery ordered and shipped about [the] end of July has not yet arrived, but is expected at any da[y]. It includes a 12-drill compressor and two stamps which will [be] used for testing purposes.

Two new veins have been found on the north Holling[er] lot, on of them, from 2 to 9 feet wide, being uncovered f[or] 350 feet. Delay in the arrival of machinery has hindered d[e]velopment work and it will be three months yet before t[he] motor ordered can be procured.

Somewhat less spectacular than the Dome showing was th[at] of the North Dome uncovered about the same time. At seve[ral] points on the property rich surface showings were found a[nd] at a depth of 20 feet at one point values were found to [be] most consistent, running entirely across the vein, which was [20] feet wide there. Mr. P. Kirkegaard said there was no pa[y] streak in the vein, it was all paystreak.

It is reported on the best of authority that the Internation[al] Nickel Company has acquired the Porcupine Imperial proper[ty] consisting of three claims near the Dome. The price cannot [be] learned. Several rich finds have been made on the Imperia[l] the latest being last week, when a free gold showing was di[s]covered on the northwest corner of the property. It is co[n]sidered the fourth best showing in the camp. As no deni[al] of the report of this transaction has yet been made, it is bein[g]

ccepted as fact. The deal is an important one and work n the Imperial, it is nnderstood, will be pushed at once to the 00-foot level.

[Editor's Note.—Onr correspondent's last item has been uthoritatively denied.]

BRITISH COLUMBIA.

A matter that is being seriously disenssed by a number of well-wishers of the mining industry of British Colnmbia, is the gross exaggeration and misrepresentation freqnently characterizing both promotion advertisements, in connection with so-called mining companies, and newspaper descriptions of mining properties. The earnest desire to prevent the continued publication of misleading and nntrue statements by reckless or unprincipled company promoters and by other parasites on the miniug industry, whose chief effort appears to be to induce the public to put money into their schemes, is finding expression in enquiry as to the best means to adopt to bring about the punishment of those guilty of trading on the gullibility or ignorance of their victims, and it is not nnlikely that some action will be taken ere long, even if it be only to urge the provincial government to ask the local legislature to enact a law to meet the case if it be found that existing laws do not provide for the effective punishment of those whose nefarions operations are felt to be both harmful to the legitimate promotion of companies to engage in mining, and to the mining industry itself. The attention of the provincial Attorney-General's Department has been called to two or three glaring cases, so it is hoped some means may soon be adopted to check the reprehensible practice of pnblishing grossly untrue statements relative to mining properties.

General.—Among the items of mining news published lately are the following, which are given without attempt to classify nder district headings: It is stated that a contract has been et for hauling 1,000 tons of ore from the Utica mine to the Kaslo & Slocan Railway. Work is to be resumed at the Deep Nine, Whitewater, at which important deep-level development has already been done. A spur is being constructed dfrom the Canadian Pacific Railway at Three Forks, Slocan, to near Bear Lake, to provide railway transportation facilities for the Lucky Jim, Rambler-Cariboo, and other mines. A provisional liquidator has been appointed for the Yankee Girl Mining Company, which for two or three years was operating in Ymir camp, Nelson mining division, and which shipped to the smeltery at Trail a considerable qnantity of ore containing low value, chiefly in gold. There continues to be much activity in Sheep Creek camp; good reports are being pnblished from time to time concerning several gold mines, namely, the Queen, Mother Lode, Nugget, Kootenay Belle, Summit, and others. Rossland mines are maintaining their ontpnt of ore, in largest measnre from the Centre Star group and next from the Le Roi No. 2; the Blue Bird, in the south belt of this camp, is stated to be about to regularly ship galena ore. The excitement so foolishly worked up at Nelson concerning the finding of small quantities of metals of the platinum group in gold-quartz ore from the Granite-Poorman mines, fortunately has been squelched before much harm could be done. The Granby Company has closed its copper mines at Phoenix and smelting works at Grand Forks, pending a resumption of coke-making at the Crow's Nest Pass Coal Company's ovens; the British Columbia Copper Company continues to import coke from Pennsylvania, so as to keep its copper furnaces in blast. The latter company has resumed work at the Emma mine, in Boundary district, an arrangement having been made with the other co-owners that will admit of the mine being worked, which was not practicable during several years while the joint owners failed to agree in regard to terms and conditions under which work should be carried on. It is reported that New York capitalists largely interested in the B. C. Coper Company, have arranged to prospect the Voigt gronp of claims, in Similkameen district (a description of which large property was printed in the Canadian Mining Journal of August 1), under a bond with right to purchase. The Princeton Coal and Land Company is stated to be mining about 100 tons of coal daily; the putting in of necessary coal-cleaning plant is reported to have been authorized by the directors in England, so the outlook for the mine is thereby much improved. Development of coal properties in Nicola Valley district is being actively prosecuted. The Nicola Valley Coal and Coke Company is adding plant and machinery and doing underground work, both adit-driving and diamond drilling, the whole involving a total outlay of $95,000 to $100,000. The Big Copper mine, in Boundary district, which had been idle several years, is being worked under a lease. The concentrating mill, aerial tramway, compressor plant, air line, and water flume for the Standard mine, Slocan Lake, are all about completed.

Slocan.—Much more interest is taken in Slocan district mines by residents in the city of Spokane, Washington, than in the coast cities of British Columbia. The headquarters of the respective managements of several of the more prominent mines are in the former city, and, too, less time is occupied in travelling between Spokanes and the mines than between the coast cities and Slocan. It follows, therefore, that more recent information concerning Slocan mines is obtainable in Spokane than is usually the case in Vancouver or Victoria. Accordingly, the Spokesman-Review, a widely circulated daily newspaper printed in Spokane, publishes more particulars of mining operations at some of the Slocan mines than do the British Columbia coast daily newspapers. Occasionally acknowledgment is made of the fact that Kootenay mining districts contribute substantially to the prosperity of Spokane, as was done on Angust 27, on which date the following was included in the Spokesman-Review's periodical survey of mining, written by Mr. H. W. C. Jackson, who several years ago was editor of the Rossland Miner, aud secretary of the Associated Boards of Trade of Eastern British Columbia.

"There has been a notable increase in public interest both in mining investment and development enterprises during the last month in this city. This has been reflected to some extent by the transactions on the Spokane Stock Exchange, where material advances in price have been recorded in Lucky Jim, Rambler-Cariboo, and other mining stocks. On the curb dealings have been quite heavy in the shares of the Rambler-Cariboo Extension, and McAllister Mines Company, both of which are new development enterprises. . . . Old citizens of Spokane will remember that at various times in the city's history, when business was dull and things apparently at a standstill, new life was injected into the community by the activities of tributary mining camps. The Coeur d'Alenes three different times have contributed largely to a return or increase in the prosperity of the city. The Slocan, Rossland, and Boundary districts of British Columbia and the camp of Republic each has helped in the same way on at least one notable occasion. At none of these crises in the city's history, when mining rescued the community from business depression, were conditions so good in tributary mining camps as they are at present. Never before had so much new wealth been put into sight and rendered available for the employment of labour and remuneration of capital, yet little benefit has so far been derived from recent developments because capital has been indifferent and failed to take advantage of the opportunities offered. . . . The Slocan country has come to the front with a class of producers of much larger calibre than that district has heretofore been credited with. The Standard and Rambler-Cariboo silver-lead mines, and the Lucky Jim zinc mine, are

admitted to be very large tonnage propositions, at the same time that their product is recognized as being of unusually high grade. The Van-Roi is already producing on a large scale, and the Slocan Star, Utica, and other properties soon will be.''

Mr. Jackson did not exhaust the list by any means, but he wrote sufficient to direct attention to the fact that the outlook for mining in the Slocan district is distinctly satisfactory so far as concerns the producing capacity of a number of mines. The chief encouraging feature is that there is now more activity in mining in the district than in several past years, and that it is gradually extending. There does not appear to be room for doubt that there will be a substantial increase in the quantities of commercial metals—silver, lead, zinc, and a little lode gold—that will be taken from Slocan mines in the near future, in some measure this year and to a greater degree in following years.

Coast.—Seldom has mention been made in coast newspapers during recent months of the operations of the Britannia Company, which is employing a comparatively large number of men at its copper mines, situated near Howe Sound, in New Westminster mining division. It is understood, nevertheless, that the prospects of this large property are better now than for several years and that, consequently, further development on a large scale may be looked for. Metal mining in Texada Island is not as important just now as it was some time since, yet work is being continued in several mines. On Vancouver Island there is practically no productive metal mining at present; on the other hand, coal mining is flourishing, with operations expanding and production giving promise of proving larger than ever before. In Portland Canal district, two mines shipping, namely the Portland Canal, which is sending concentrates, containing value in gold, silver, and lead, and the Red Cliff, in which a body of copper-gold ore is being developed. Both mines are shipping to the Tyee Copper Company's smeltery at Ladysmith, Vancouver Island. The operations of the Granby Company at the Hidden Creek mine, Observatory Inlet, are narrated in a separate contribution the Canadian Mining Journal. Prospecting mineral claims the Skeena country—both silver-lead in the vicinity of Hazton, and coal in other parts of the district—is in progress. Queen Charlotte Islands some metalliferous claims are being developed, and drilling for oil is also being done, but the chief interest in that part of the province is in prospecting coal measures occurring on Graham Island of the group. Little information comes from Atlin, but on several comparatively large hydarulic placer-gold mines, full advantage is being taken of the open season, and the expectation is the quantity of gold recovered this year will compare favourably with the yield of any of several recent years. In various other parts of the Coast district prospecting is being done, but as a rule there is not any production on a commercial scale.

GENERAL MINING NEWS.

NOVA SCOTIA.

Sydney, Sept. 1.—President Plummer, General Manager Butler, and Assistant General Manager McDougall, of the Dominion Coal Company, left last night for Wallace, N.S. The company proposes building shipping piers at Wallace or Pugwash for their output from the Springhill mines, which is now shipped from Parrsboro.

Mr. Plummer said last night that a choice between the two ports had not been made as yet. The adoption of a new port, said Mr. Plummer, would be a sequel to an increased output of coal from Springhill.

This is a striking indication that the Coal Company is not very much afraid of reciprocity decreasing its market.

Dominion Steel plant had a good month in all its departments, open hearth turned out over 27,000 tons. Its record was 28,000tons until two months ago, when a mark of 31,000 tons was reached. The Rail plant turned out 15,000 tons during August.

Yesterday the Dominion Coal Company hoisted 16,689 tons of coal. This is the biggest day's outpnt in the history of the company. The output for the month of August, which closed to-day, will be approximately 387,000 tons. This also is a new record, the biggest previous month's output being that of July, which was 16,000 tons less.

The company has also a third record to announce to-dday, the output for the eight months to the last of August being 2,649,000 tons, or 40,000 tons better than the output for the same period in 1908, the best previous year.

Had the month not been broken with an idle day the output would have reached the 40,000; as it was the month's production was at that rate.

The month's output at the company's mines at Springhill was 30,000 tons, the best month's production in two years. If the Springhill output is included the company's total for the month will amount to 417,000 tons.

ONTARIO.

Cobalt.—While cross-cutting west to make connections with the main shaft at the 575-foot level of the Temiskaming mine the drills cut a large vein, which recent developments improve to be one of the best on the property. The vein was located only ten feet from the shaft, and from all appearances is an entirely new ore body unless it has maulted from the of ohe upper levels. It shows a width of from one foot to two and a half feet, and in places carries exceptionally high-grade ore. However, it is very patchy, and in places will run as high as 5,000 ounces to the ton, while in other places it will be much lower. As only 15 feet of drifting has been accomplished on the vein it is hard to estimate just what possibilities the vein offers, but should a persistent ore shoot be encountered it will be one of the largest producers on the property.

With the addition of ten more stamps about a month ago, the concentrator is now treating between 125 and 130 tons of ore daily. This, with high-grade being bagged underground, brings the Temiskaming shipments well up to two and three cars of high-grade a month. Fifteen large drills are working underground, while there is a force of 175 to 200 men on the payroll.

Cobalt, Sept. 6.—More bullion left the camp yesterday afternoon, this time the O'Brien and Drummond being the shipper. The O'Brien sent out 18 bars of the refined silver, containing 16,553 ounces, and valued at $8,773, to Mocatta & Goldsmid, London, England. The Drummond shipment consisted of two bars sent out by Campbell & Deyell's sampling works. It was consigned across the water and leaves with the O'Brien consignment on the Empress of Britain on the 8th. The two

bars were worth $681 and contained 1,288 ounces of silver. To-day a one-bar consignment from Campbell & Deyell sent out for the Wettlaufer mine of South Lorrain, goes to Bridgeport, Conn.

Porcupine, Sept. 5.—The Messrs. Drummond, of Montreal, who recently acquired control of the Jupiter property, have been in the camp inspecting the property, and have placed an order for a compressor. Two shafts on the Jupiter are down 100 feet, and cross-cutting for the veins has begun. At the 50-foot level considerable development has been done, with satisfactory results.

Porcupine, Sept. 5.—The directors of Crown Charter Mining Company have decided to go ahead with active development work on Davidson claim. They recently acquired this property, and, under advice of Engineer Lamb, they determined to push development work.

BRITISH COLUMBIA.

Ymir, B.C.—The operators of the Sterling mine have just encountered over four feet of high grade ore, showing some galena, having got in under the rich showing exposed on the surface. The vein on the Jennie Bell has been found in place and rich ore encountered, containing some galeua. A recent assay gave $119.50 over all, $57 of which was in gold.

Joe. Kileen, J. B. Bremuer and wife have kept the development work going along ever since the rich discovery was made and they say that ore will be sent down Wild Horse Creek as soon as the winter sets in from the Jennie Bell.

A. E. Rand, C. W. Riley, E. Nelson Fell, M.E., and other mining men of note paid the Dundee mine a visit of inspection last week and expressed themselves as well pleased.

The formations of this camp are attracting the attention of mining men and all agree that it is only a matter of time before the locality will be dotted with producing mines.

Nelson, Sept. 4.—At midnight Saturday night the huge plant of the Hill Mines Smelter, covering thirteen acres of ground, worth $750,000, and one of the largest plants of its kind in Canada, was a mass of blazing, crackling ruins. Nothing is saved except the seven miles of rail running from the smelter to the Silver King mine on Lode Mountain, the tall, blackened chimneys, and one storey buildings used as an office. Everything else, the huge smelters, the tramway terminal and dump, the assay office, the bridge house and numerous smaller buildings, are a tangle of blacking timber and twisted iron.

The disaster is the work of an incendiary, who for the past two weeks has started a dozen fires, three of which have entailedd enormous loss. On Friday night Nelson Brewery was burned to the ground with a loss of $50,000.

At noon a watchman discovered a fire in the smelter, which he thoroughly quenched, and had arranged for extra guards. At nine o'clock, just after he had hade his rounds of the buildings, fire broke out, and within a few minutes the plant was a blazing furnace, by midnight the entire plant was practically consumed. Nothing could be doue to save the building.

From the assay office a few valuable chemicals were saved. The furniture in the buildings used as residences and stored in other buildings, was carried out by hundreds of willing hands, and saved. All else weut up in smoke.

The Hill Mines Smelter was formerly used to treat the ores of the Silver King and other famous properties on Lake Mountain, Morning Mountain, and adjacent territory, and employed hundreds of men. It had been operated for the past five years, but a Vancouver syndicate, promoted by R. S. Lunnof, Vancouver, has lately effected a consolidation of the Lake Mountain properties, acquiring the mines and smelter. The last payment on the properties was made only last week. The smelter was insured for $50,000. There is no clue to the incendiary.

Vancouver.—The Granville Mining Company, capitalized at $8,000,000, is a new merger of Klondike properties just organized by A. N. C. Treadgold. Mr. Treadgold has just spent six months in London and New York in connection with the flotation of the big enterprise of which he is head. He says all the capital required for placing it on a sound basis is secured. The holdings have been transferred to the new corporation, which will operate on a large scale as soon as the equipment of dredges and hydraulic plants can be got on the ground and long ditches built. Included in the power plant on the north fork of the Klondike River, supplying electric power to operate dredges and plants on various creeks, also the large area of claims owned by the Domiuion Mining Company, Limited, and the Treadgold holdings of placer claims on Dominion, Quartz, Flat, Hunker, and Sulphur Creeks, whence millions of dollars worth of placer gold were extracted in the early days. The claims of the Klondike Mining Company, known as the Boyle concession and embracing over ten miles of the richest dredging ground, may be included in the big merger. The total area transferred to the new company will approximate several hundred square miles. Both dredging and hydraulicking methods will be employed. Mr. Treadgold has sailed for Skagway, accompanied by H. Orr-Ewing, a London capitalist, who was associated with him in the ownership of the original Treadgold concession.

YUKON.

Dawson City.—Mining activity is general in the districts tributary to Dawson, and favourable reports are being returned from all bona fide operators. This is the substance of a lengthy report just received at the offices of the White Pass & Yukon route from their accredited agents in the north. It is rumoured in mining circles, the report states, that the properties at present controlled by the Treadgold interests are to be acquired for a wealthy South Africau mining company. This report can uot be confirmed at this time, but material is on the ground for the coustruction of an electric power liue to the properties from the Granville Power Company plant, and plans are under way for the renewal of mining activity in that district.

The Granville Power Company has material at haud for the installation of a second unit of power, a work that will be completed at once. The company is at present supplying power to the Canadian-Klondike Mining Company, which is operating two dredges successfully.

The Yukon Gold Company is operating a full complement of dredges and hydraulic plants and making regular shipments of bullion. The management has 150 men at work constructing the two steel dredges shipped this year, that, when completed, will be installed, one on Bonanza Creek, and the other on Eldorado. This company is making a very interesting experiment with coal as a substitute for wood fuel for the thawing of the earth covering the ore bodies.

The wood supply is becoming scarcer each year, aud as they use nearly 15,000 cords of wood annually, they plan to resort to coal in future, as they can obtain a good quality in the district and find it much more easy to handle than wood.

A stampede was made recently to the lang aloug Britannia Creek, on the maiu Yukon River, a few miles from Coffee Creek. More or less actual work has beeu done and the verdict is that claims in that district will pay, not heavily, but better than a wage proposition for commou hand mining. It is stated that with machinery or a dredging outfit the return would be large. Another stampede was made a short time ago to Mc-

Millan River, a tributary of the Pelly, but the ore is low grade, and will hardly pay the expense of working.

Nanson Creek district sends in good reports, although a small paying proposition. This district is near Carmacks, and one or two concerns with machinery are doing well.

In the Forty-mile district the Milvain people are operating two dredges very successfully. The Consolidated Gold Dredge Company has one dredge on Forty-mile River that sank this spring. The company is having some difficulty in raising , but expect to do some work befcre the season closes.

The Northern Light, Power and Coal Company has clos its plant at Coal Creek and reduced the working force fr 150 to 10 or 15 miners. They are getting out some coal t is being towed to Dawson by their steamer Lightning, a disposed of in that city at their local electric lighting pla and to such other companies as they have contracted to supp

COMPANY NOTES

WETTLAUFER DIVIDEND.

At a meeting of the Wettlaufer Lorrain Silver Mines, Ltd., the regular dividend of 2½ per cent., with 2½ per cent. extra was declared payable October 20, to stockholders of record October 10.

Several important pieces of development and construction work were decided on at the meeting. Among these were the sinking of the main shaft to the sixth level and the drifting on that level for the purpose of exploring the ore bodies in depth; the erection of a picking and jigging plant for the plant for the purpose of sorting the ore and treating the low grade material; and the construction of a house and suitable quarters for the manager.

NIPISSING BULLION.

Nipissing made another shipment of bullion last week to New York, consisting of 47 bars, containing 50,462 ounces of silver. The shipment was valued at $26,366.

LA ROSE PRODUCTION.

The following table shows the operations of the La Rose Company by months since January 1st last:

	Production, ounces.	Gross value.	Operating profit.
January	318,187	$166,468	$118,497
February	307,661	158,135	108,891
March	.....	.....	98,873
April	289,895	155,548	101,325
May	314,543	167,195	103,745
June	310,524	162,816	104,683
July	.....	172,881	105,121

MILLERETTE SHIPMENT.

An ore shipment aggregating 41,600 pounds was sent out by the Millerette mine at Gowganda last week. The consignm was shipped via Latchford and the T. & N. O.

T. & H. B. DIVIDEND.

The Temiskaming and Hudson Bay Company has just clared one of its customary dividends of 300 per cent., p able August 31. This is the fourth of the kind this year, a the third in three months. The dividend makes the 32nd t the company has declared since its inception, and means total of 18,400 per cent., or a total of $1,428,024.

Shareholders have received d$184 a share in dividends to da

BIG PRODUCERS OF COPPER.

For years the Calumet & Hecla was the premier cop mine of the world, both from the viewpoint of production a dividends, but having reached the limit in point of producti other mines have, within the past few years, surpassed it both production and dividend rate, leaving the Calumet Hecla in fourth instead of first place. The Utah Copper Co pany, which was an undeveloped prospect six years ago, day leads the world's copper mines in amount of divide paid. The record of the five leading producers follows:

Company.	Production. 1910	Divide Paid, 19
Phelps-Dodge & Co.	116,688,000	$4,500,0
Utah Copper Co.	84,502,475	4,619,0
Amalgamated	233,808,546	3,065,7
Nevada Con.	62,772,342	2,988,9
Calumet & Hecla	71,509,261	2,800,0

The production of the Phelps-Dodge Company comes fr three mines, at Bisbee and Morenci, Arizona, and Nacoza Mexico, while the production of Amalgamated comes from dozen different properties on Butte Hill.

STATISTICS AND RETURNS

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending Sept. 1, and those from Jan. 1 to date:

	Sept. 1. Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger	.....	55,200
Bailey	.....	40,000
Barber	.....	6,000
Beaver	62,200	1,340,673
Buffalo	60,750	1,861,004
Chambers-Ferland	64,000	950,000
City of Cobalt	.....	557,980
Cobalt Lake	60,300	2,757,306
Cobalt Townsite	.....	719,280

Colonial		135,410
Coniagas	168,690	2,829,044
Crown Reserve		1,733,529
Drummond		290,000
Green-Meehan	60,000	60,000
Hargraves		161,100
Hudson Bay	124,350	1,066,340
Kerr Lake	61,504	1,867,089
King Edward		40,000
La Rose	207,650	4,884,928
McKinley Darragh	243,915	4,271,779
Nipissing	63,400	4,271,778
O'Brien		938,358
O'Brien, M. J.		47,000
Peterson Lake, Little Nip		58,430
Provincial	50,280	151,950
Right of Way		890,335
Silver Cliff		160,680
Standard		102,813
Temiskaming		1,181,892
Trethewey		834,420
Wettlaufer		117,232

The shipments for the week were 1,227,039 pounds, or 613 ns.

The shipments from January 1 to September 1 were 34,326,-) pounds, or 17,163 tons.

B. C. ORE SHIPMENTS.

The ore shipments for the week ending August 26 totalled 519 tons, and for the year to date 1,273,845 tons. The smel- receipts for the same period were respectively 15,071 tons l 1,184,011 tons. The returns to date are:

Slocan-Kootenay Shipments.

Sullivan	689	12,188
St. Eugene, milled	420	18,936
Richmond-Eureka	29	1,602
Ferguson	31	352
Ruth	34	385
Queen, milled	420	14,070
Granite-Poorman, milled	250	8,510
Nugget, milled	110	3,740
Emerald	66	1,318
Knob Hill	203	2,813
Van-Roi, milled	800	25,040
Molly Gibson, milled	300	1,800
Other mines		8,623
Total	3,352	99,377

Rossland Shipments.

Centre Star	4,147	132,078
Le Roi No. 2	730	18,550
Le Roi No. 2, milled	300	10,200
Le Roi	491	9,751
Other mines		448
Total	5,668	171,027

Boundary Shipments.

Mother Lode	4,480	202,695
Rawhide	3,201	134,180
Jack Pot	346	19,255
Athelstan	129	4,843
Napoleon	343	6,670
Other mines		635,798
Total	8,499	1,003,441

Consolidated Company's Receipts.
Trail, B.C.

Knob Hill	203	2,813
Van Roi	127	835
Centre Star	4,147	132,078
Sullivan	689	12,188
Le Roi No. 2	730	18,550
Le Roi	491	9,751
Richmond-Eureka	29	1,602
St. Eugene	25	4,218
Ferguson	31	352
Ruth	34	385
Emerald	66	1,318
Other mines		36,247
Total	6,572	220,337

B. C. Copper Co.'s Receipts.
Greenwood, B.C.

Mother Lode	4,480	202,695
Rawhide	3,201	134,180
Jack Pot	346	19,255
Athelstan	129	4,843
Napoleon	343	6,670
Other mines		5,618
Total	8,499	373,261

Silver Prices.

	New York. cents.	London. pence.
Aug. 26	52¼	24⅛
" 28	52⅛	24 1/16
" 29	52¼	24⅛
" 30	52¼	24⅛
" 31	52¼	24⅛
Sept. 1	52⅜	24 3/16
Sept. 2	52½	24¼
Sept. 4	..	24 3/16
Sept. 5	52⅜	24 3/16
Sept. 6	52⅜	24 3/16

NEW YORK METAL MARKETS.

Sept. 11th:—

Tin, Straits, 41.50 cents.
Copper, Prime Lake, 12.62½ cents.
Electrolytic Copper, 12.45 Cents.
Copper wire, 13.75 cents.
Lead, 4.55 cents.
Spelter, 6.05 cents.
Sheet zinc (f.o.b. smelter), 8.00 cents.
Antimony, Cookson's, 8.25 cents.
Aluminium, 19.75 to 20 cents.
Nickel, 40 to 45 cents.
Platinum, $46.50 per ounce.
Bismuth, $1.80 to $2 per lb.
Quicksilver, $47.50 per 75-lb. flask.

MINERAL MARKETS.

Acids—

Muriatic, 20°, tank cars, $1.15 to $1.50 per 100 lbs.
Nitric, 36° to 42°, $0.04 to $0.05 per lb.
Sulphuric, 66°, $0.01¾ per lb.

Chrome ore, 50 per cent., ton of 2,240 lbs, $15.

Fire Clay, $5.50 per short ton.
Fluorspar, lump, $8.50 per long ton.
Fluorspar, ground, $11 to $15 per long ton.
Graphite, lump, 4 cents to 9 cents per lb.
Gypsum, short ton ground, $4.30 to $7.50 per ton.
Magnesite, crude, 95 per cent., $7 to $9.25 per long ton.
Molybdenite, commercially pure, 25 to 30 cents per lb.
Pyrite, lump, arsenic free, 10 to 12½ cents per unit.
Pyrite, fines, arsenic free, 9 to 10½ cents per unit.
Tungsten ore, 50 per cent., $7.50 per unit.

LAKE IRON ORE SHIPMENTS.

Following are the iron ore shipments from upper lake ports as reported from month to month, with revised totals of the season movement, together with the all-rail movement by years, this not being compiled monthly, the grand totals of movement out of the region and the lake movement to September 1st. Based on the average of shipments during the preceding four years, the shipments through August indicate a total movement this season, by lake and all rail, of about 33,000,000 gross tons.

	1908	1909	1910	1911
April		55,794	1,520,305	331,645
May	285,315	3,253,275	6,081,358	3,684,819
June	2,585,682	5,393,255	7,316,592	4,826,505
July	4,364,283	6,693,025	6,945,289	5,221,373
August	4,749,655	7,193,199	6,964,381	5,548,311
September	4,646,024	7,050,985	6,273,832	
October	5,099,110	6,625,801	4,877,441	
November	3,618,095	4,899,220	2,641,886	
December	78,924	519,525		
Season, Lake	25,427,094	41,683,599	42,628,758	
Season, All-rail	587,893	903,270	813,639	
Grand total	26,014,987	42,586,869	43,442,397	
To Sept. 1st	11,984,936	22,588,549	28,827,029	19,606,068

Cobalt Stocks.

	Bidd.	Ask.
Bailey	.02¾	.03
Beaver Consolidated	.44½	.45½
Buffalo	1.60	2.00
Chambers-Ferland	.09¼	.11
City of Cobalt	.09¼	.10
Cobalt Central	off	.01
Cobalt Lake	.25	.25½
Coniagas	off	6.20
Crown Reserve	2.85	2.92
Great Northern	.11¼	.12
Green Meehan	.01⅝	.01¾
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Trethewey	off	.75
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United	off	.03¼
Porc. Gold	.44	.44½
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Butte Coalition	14½	15½
Ely Cent.	..	..
Ely Cons.	⅜	½
First National Copper	1	1 1/16
Giroux	4	4 1/16
Green-Can.	6	6¼
Inspiration	6½	6¾
Nevada Hills	2⅞	3
Ohio Copper	1½	1 3/16
Ray Central	1 3/16	1 5/16
Union Mines	¼	⅜
Yukon Gold	3 11/16	3 13/16
Goldfields Cons.	5½	5¾
Nevada Cons.	17⅜	17½
Miami	19	19⅛
Granby	28	29
Con. Min. & Smelt.	38	43
Davis-Daly	⅞	1
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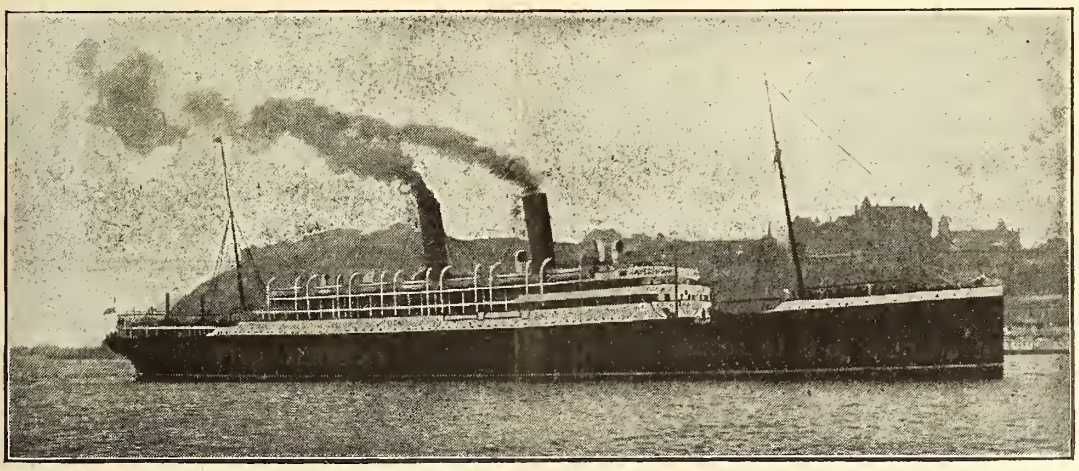

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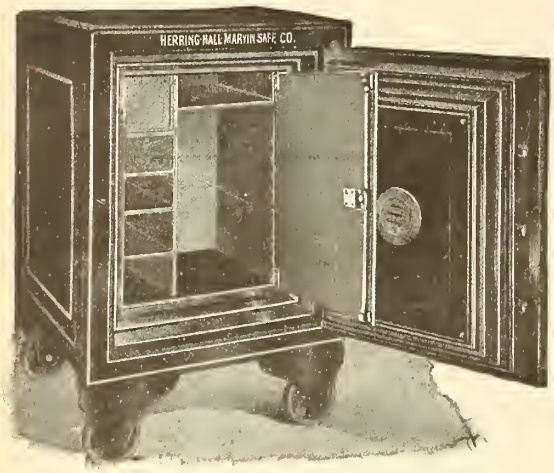

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1089. Map 9A. Explored Routes on Parts of the Albany, Severn and Winisk Rivers. Scale 8 miles to 1 inch.

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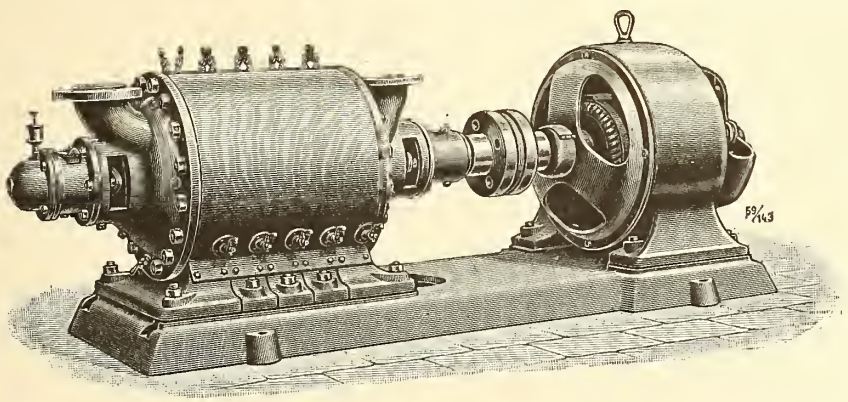

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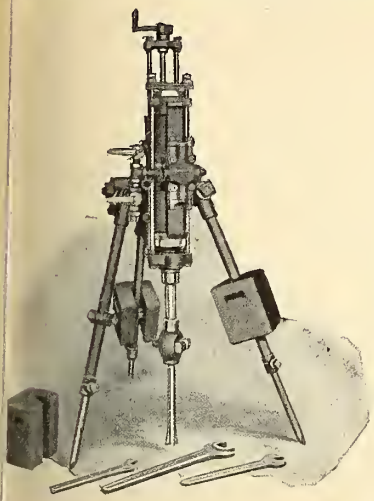

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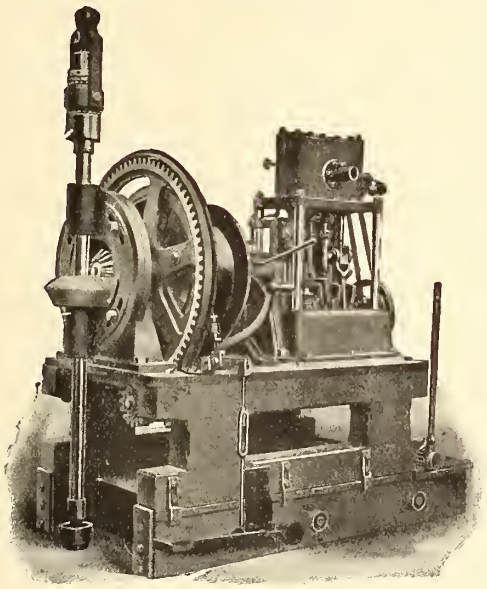

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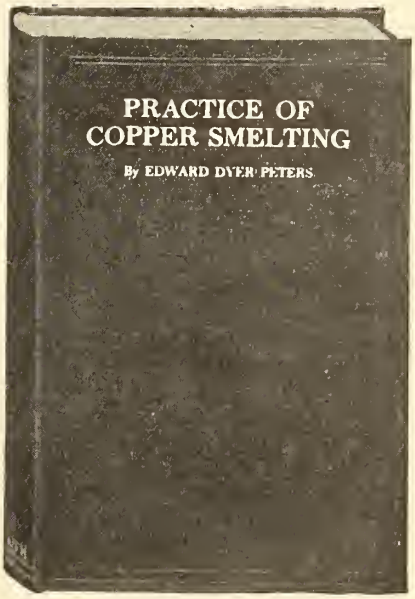

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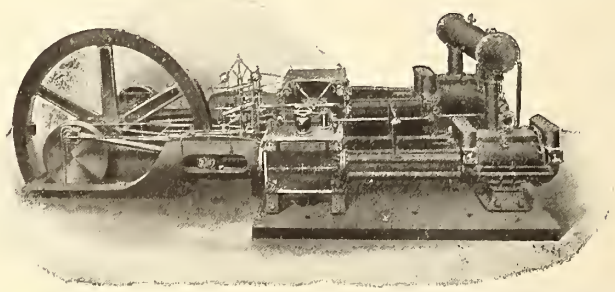

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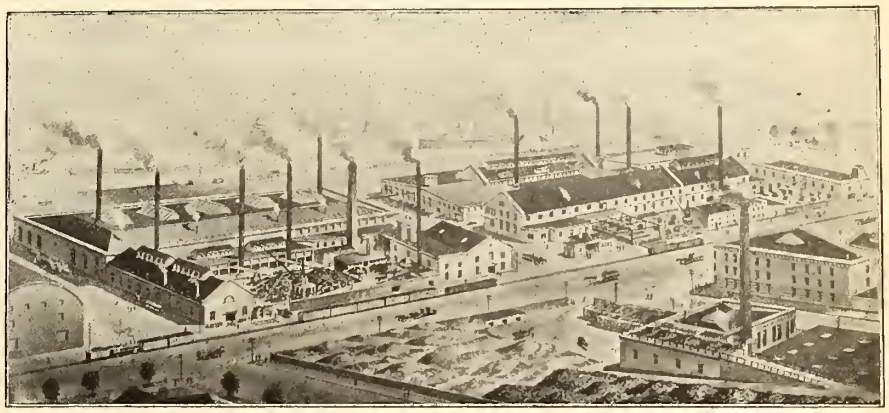

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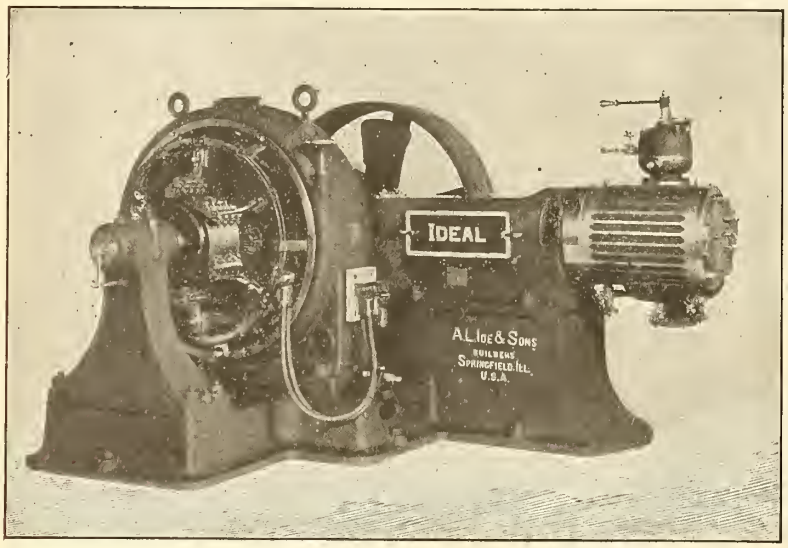

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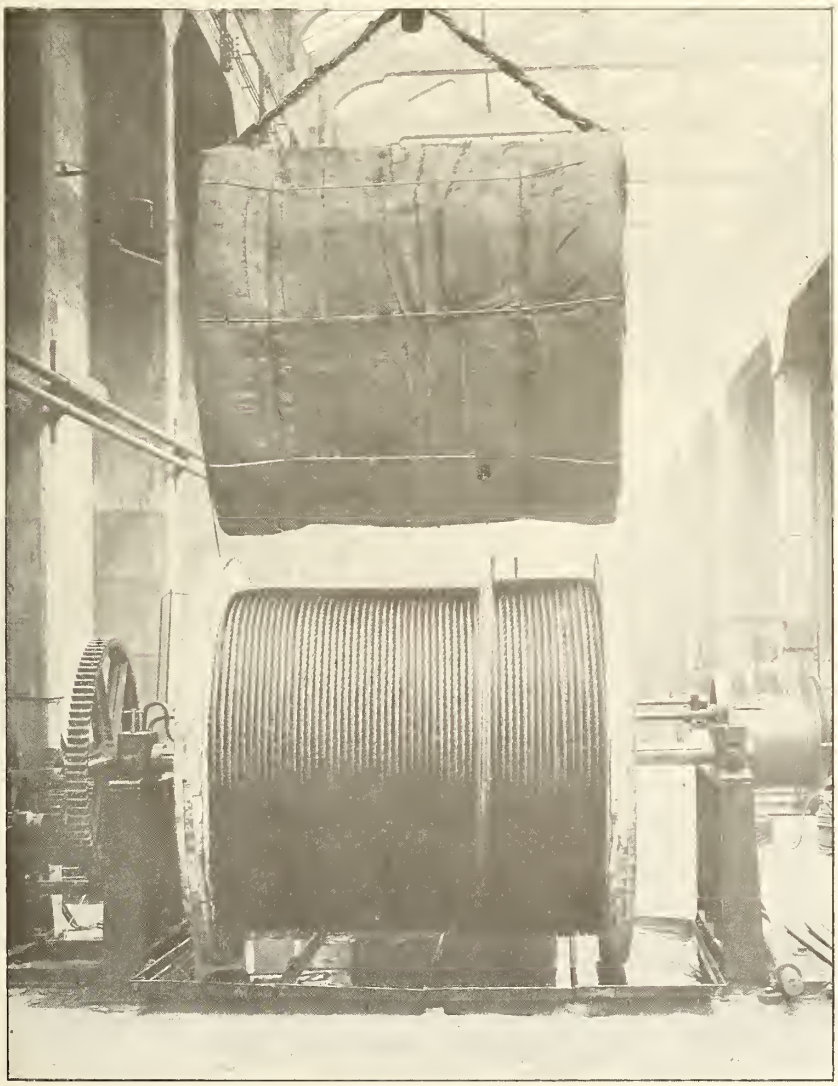

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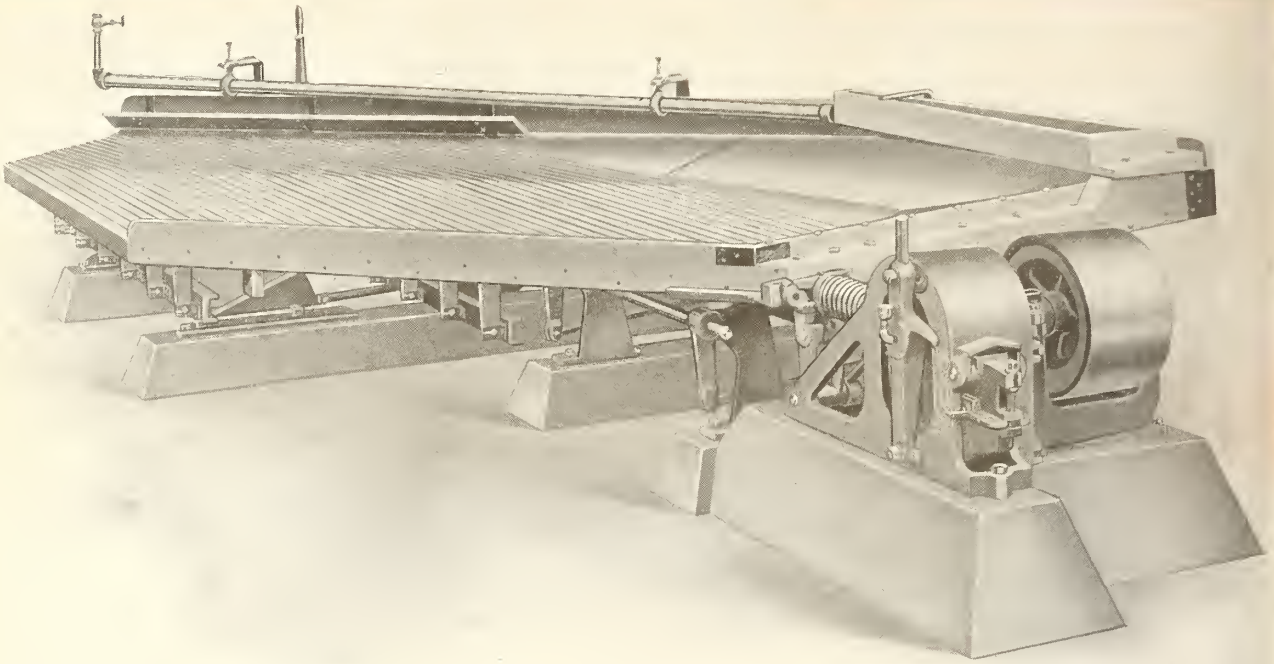

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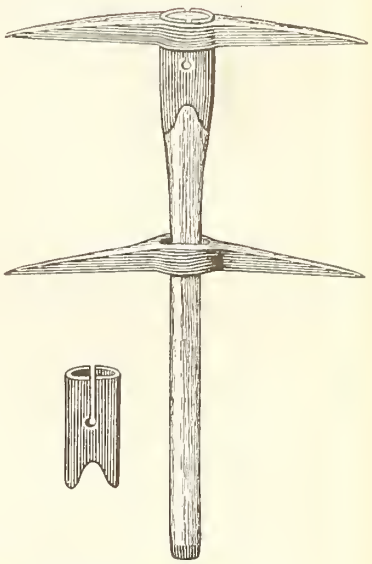

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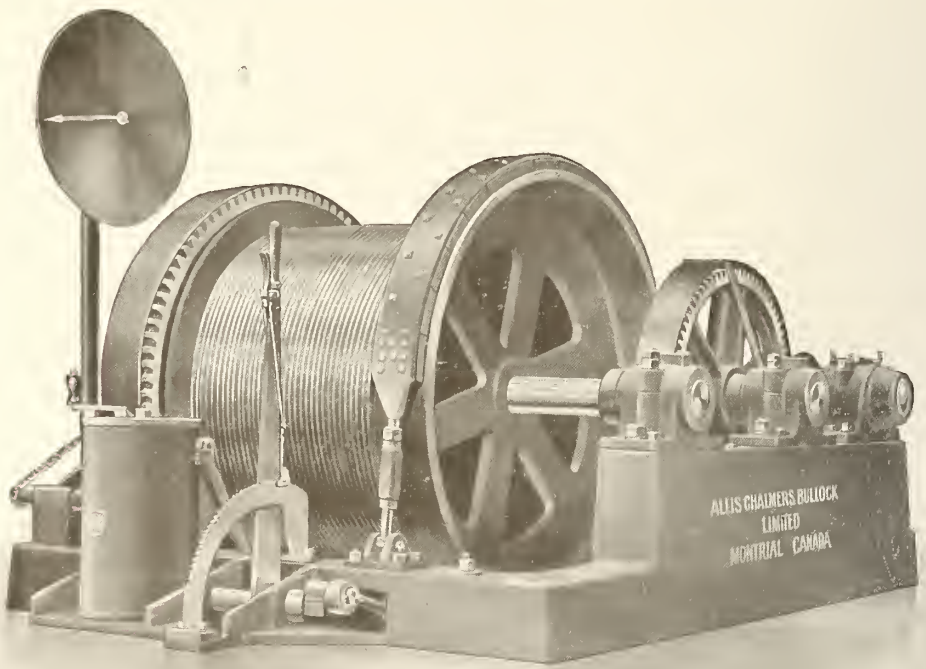

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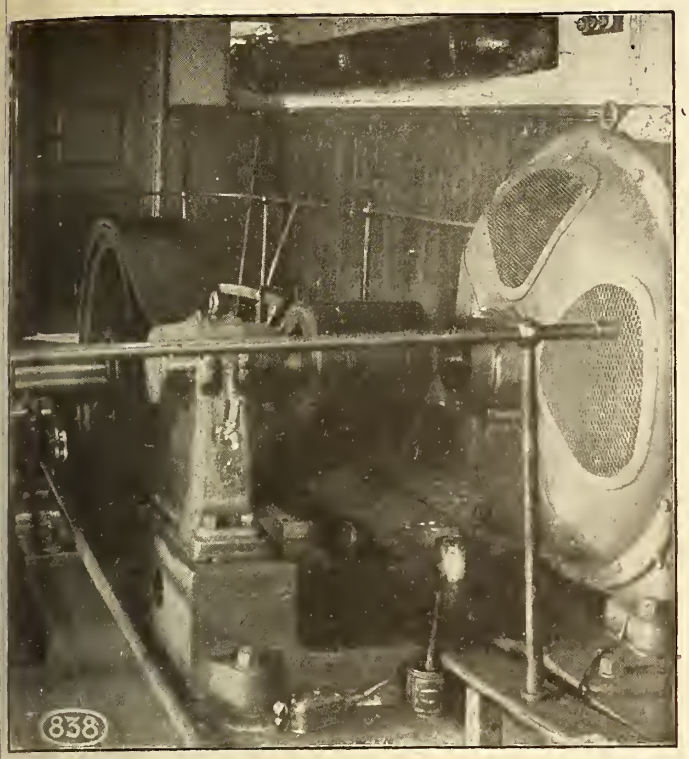

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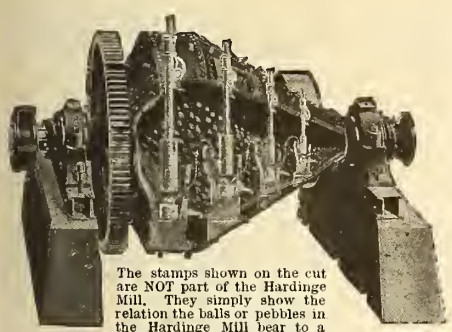

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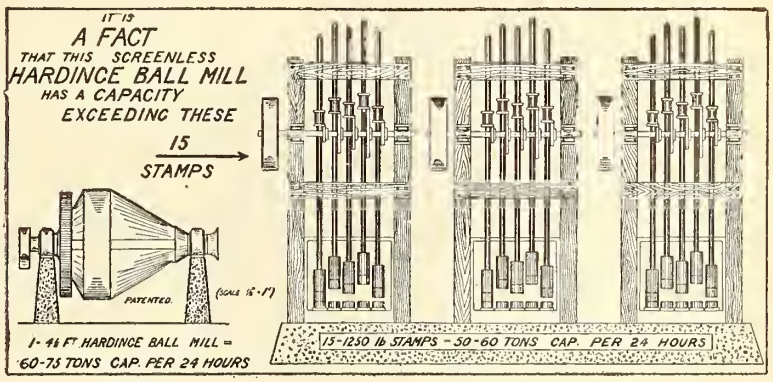

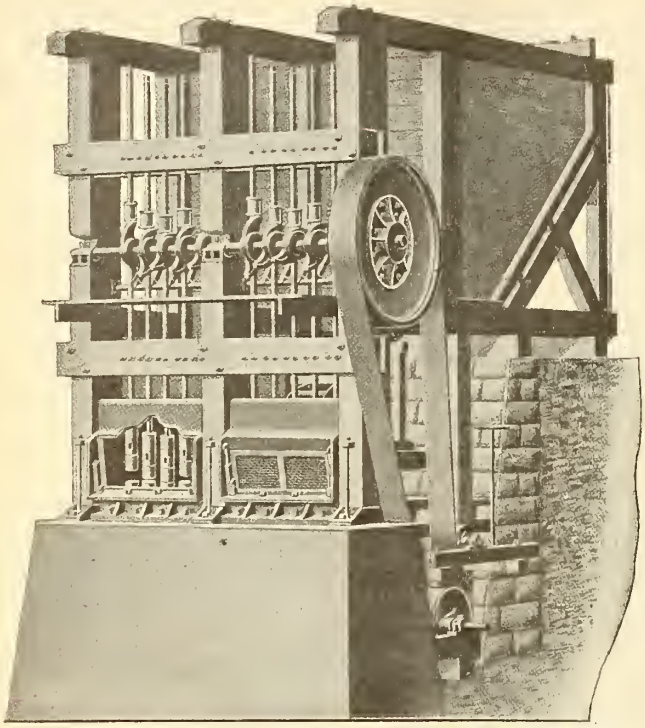

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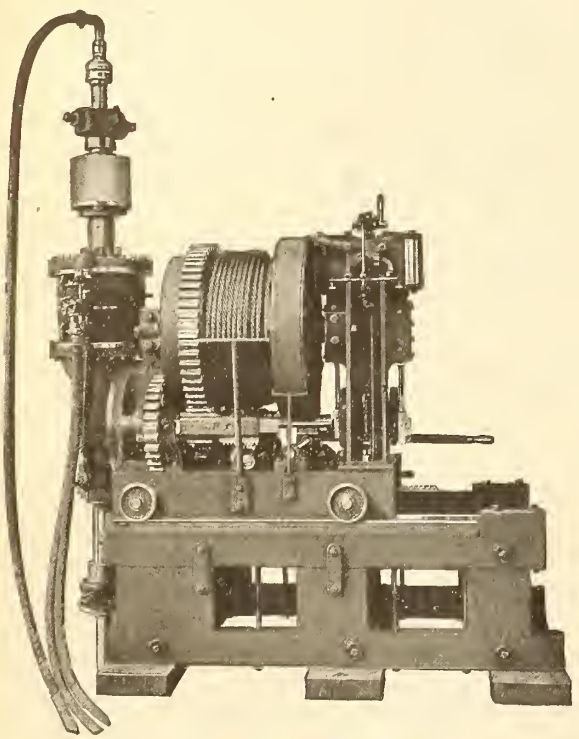

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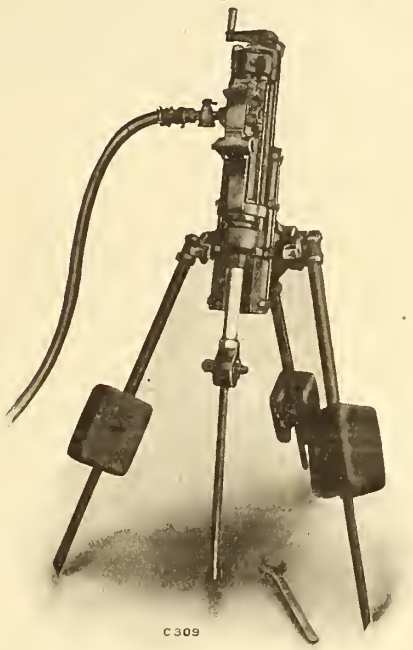

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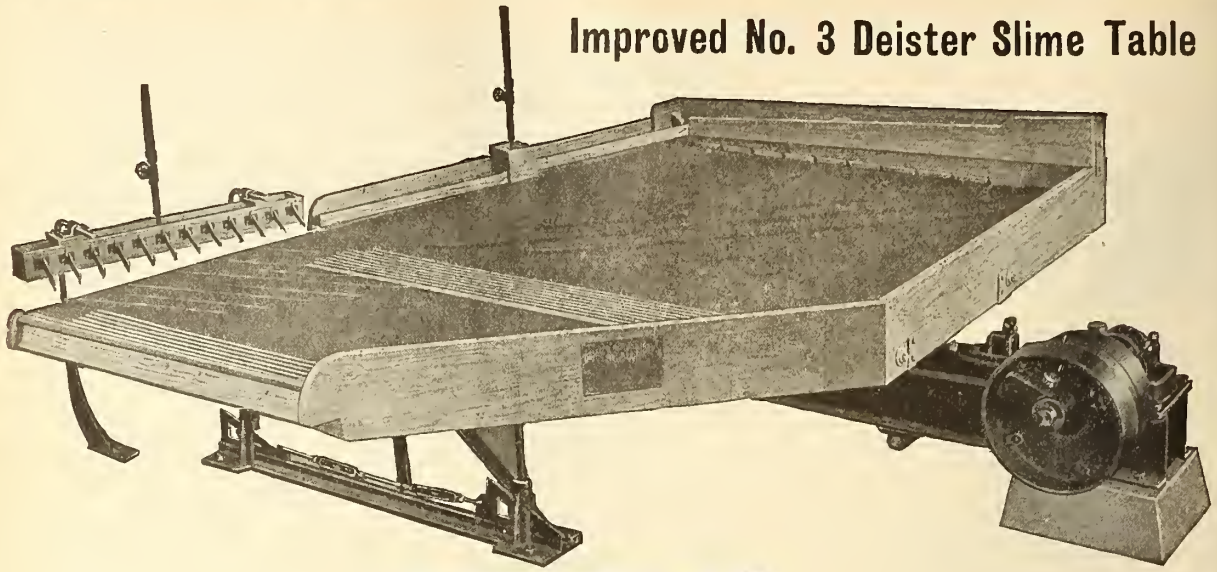

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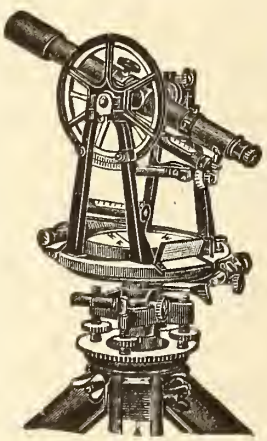

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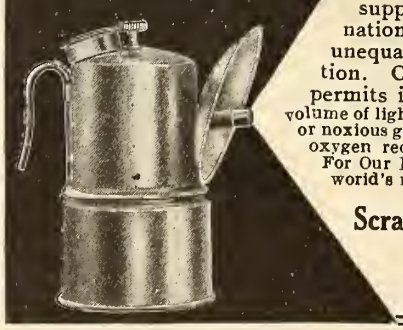

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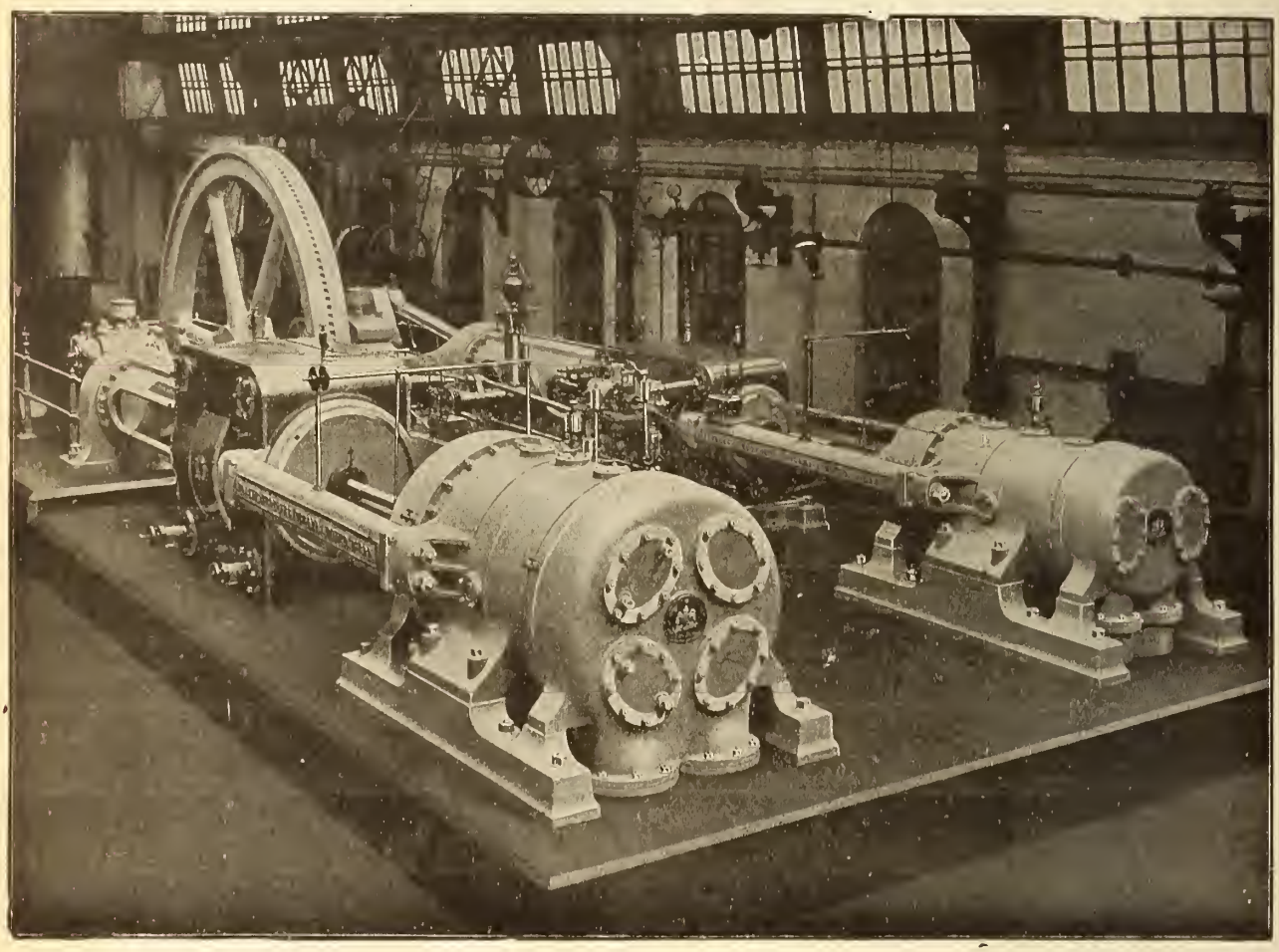

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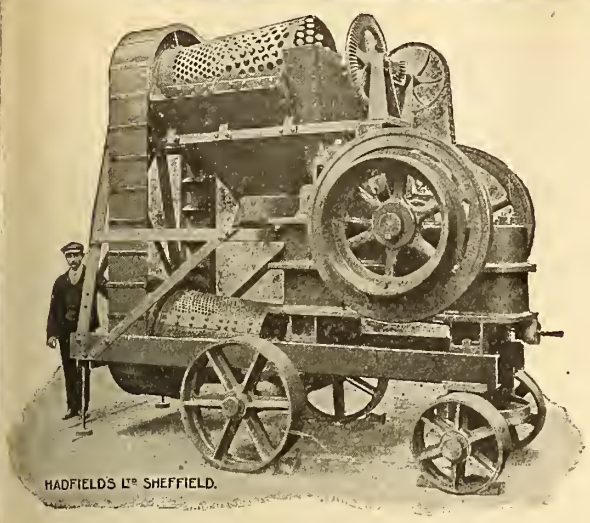

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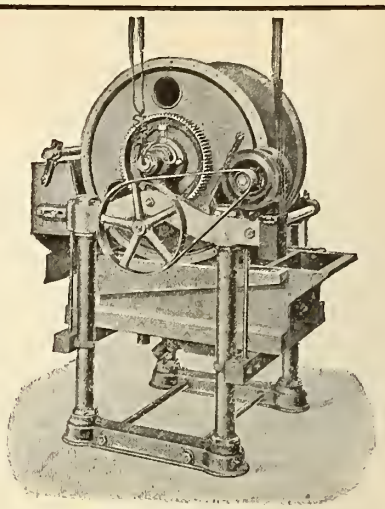

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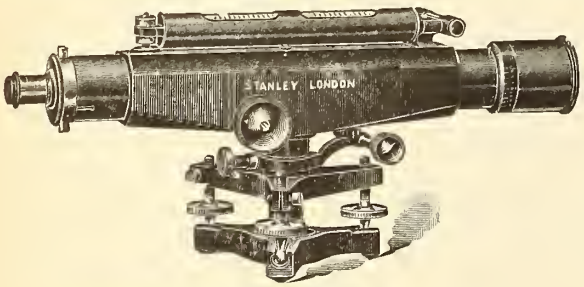

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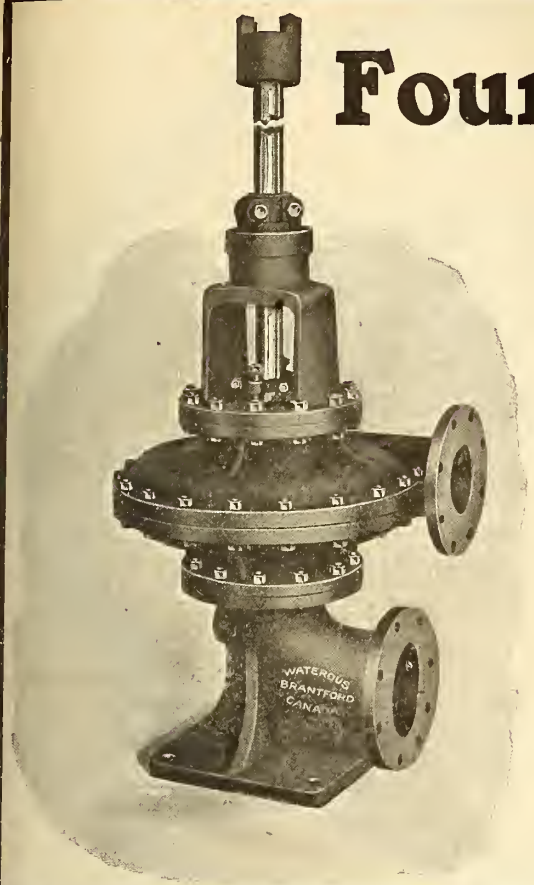

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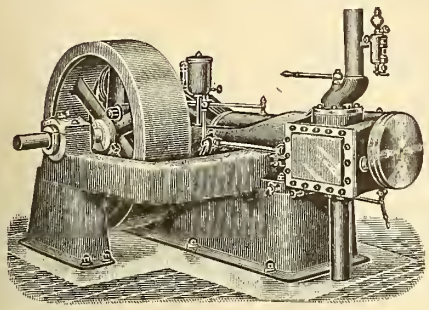

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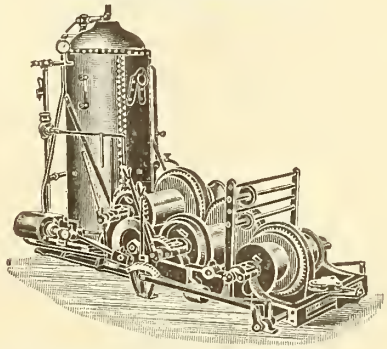

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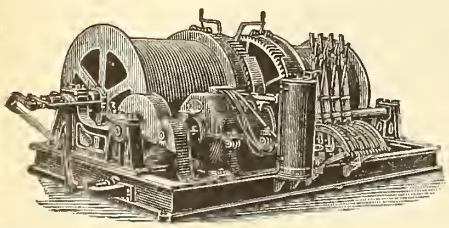

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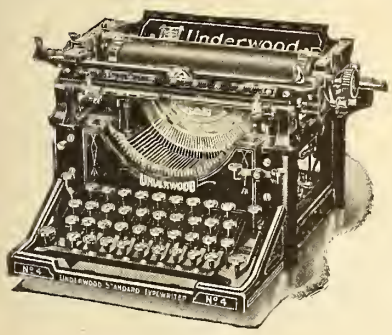

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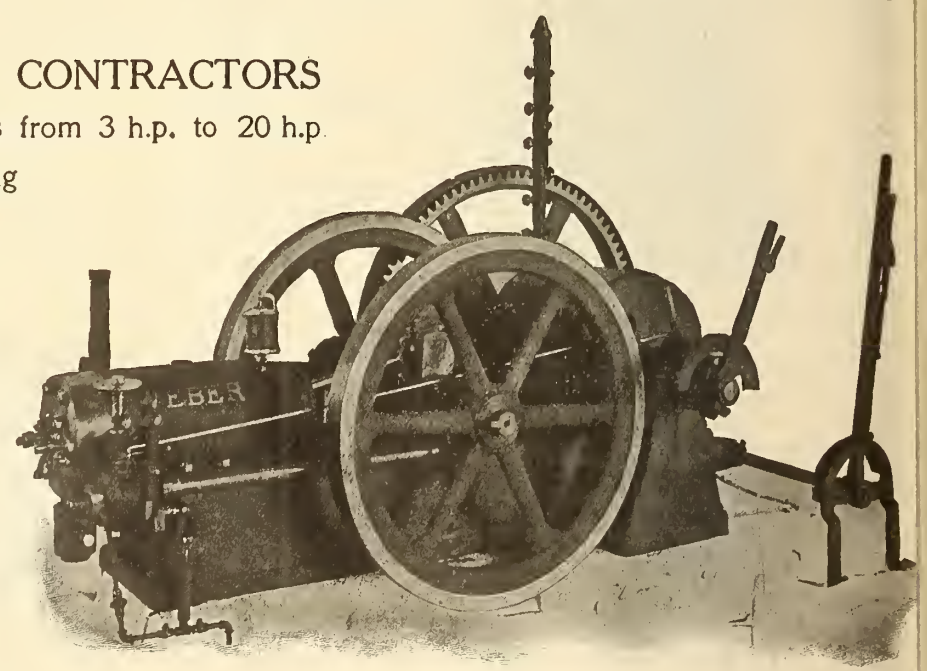

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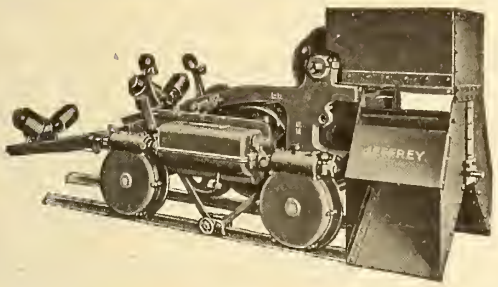

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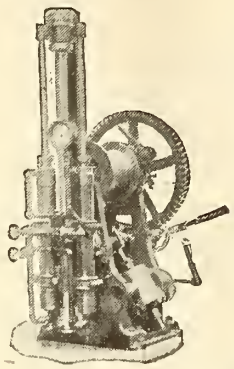

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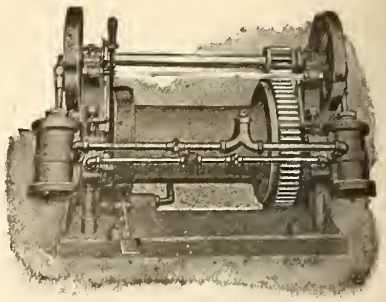

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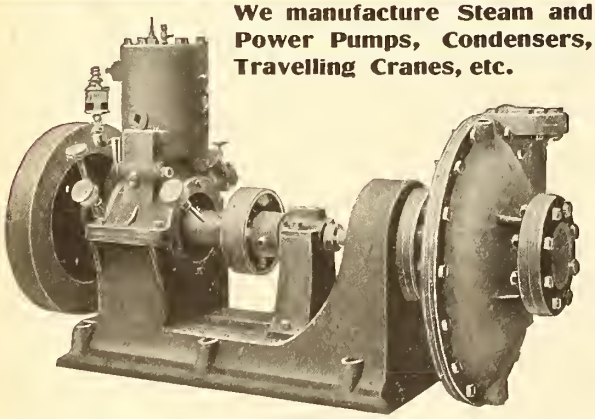

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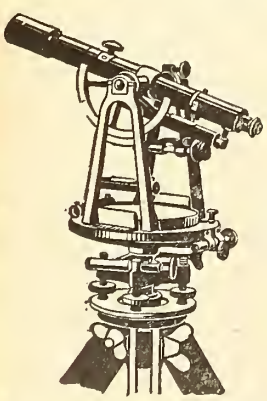

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THE CANADIAN MINING JOURNAL

OL. XXXII. TORONTO, Oct. 1, 1911 No. 19

he Canadian Mining Journal

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CIRCULATION.

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THE ELECTION.

We are not a nation of prophets. The overwhelming events of September 21st were unexpected by the shrewdest political diagnosticians. Never has a Canadian government been so finally defeated on an issue of grave national importance Never has the nation spoken with so little regard for political colour. Although, as is usual under our system of party government, the Conservative party reaps the glory and benefits of the election results, a deeper significance than party victory underlies the occasion.

Canada has definitely refused to endorse the reciprocity pact. This is not a hostile demonstration against the United States. It is, on the other hand, a dramatic declaration of Canada's desire and intention not to imperil her place in the British Empire. That the acceptance of the Taft-Fielding pact would have weakened the Imperial connection is not for us to say. We may safely leave that question to political journals. But it is certain that the majority of Canadians did think so on September 21st.

Personal sympathy with Sir Wilfrid Laurier, at once the most picturesque and the most magnetic figure in Canadian public life, will be felt and expressed throughout the length and breadth of the land. Of him any nation might well be proud.

Sympathy, also, will be felt for such of his former ministers as have done their duty honourably, a list that is not as inclusive as it might be.

Upon Mr. Borden, as Premier, and upon the cabinet that he will select, lies a profound obligation. Canada has emerged definitely and cleanly into self-respecting nationhood. Solidarity has been attained. It is known, now, that the interests of the nation must rule supreme. How to give those interests definition, how best to forward them, how to preserve harmony between conflicting commercial elements — these are the problems.

As Canadians we cannot but follow the whole trend of Canada's growth. As mining men we are particularly concerned with the new Government's policy in regard to the mining industry.

The first and, in itself, the one step that will determine the success or failure of the Government's mining policy will be the selection of a competent, enlightened, and vigorous Minister of Mines. Naturally this must be a totally independent cabinet position, and the jurisdiction of the Minister must be complete. It must include the function now anomolously assigned to the Department of the Interior, namely the administration of mining lands in Alberta, Saskatchewan, and Yukon Territory.

Any Minister selected will prove an encumbrance unless he surrounds himself with experienced advisers and keeps constantly in touch with the industry. Therefore it is imperatively necessary that the Minister, unless he is to be a figurehead, be forearmed with a knowledge of what mining means to Canada. In other words, he must have had occasion to study conditions at first hand.

We seize this opportunity of pronouncing our views because experience has convinced us that, of all our industries, that of mining is most in need of careful attention from Ottawa. This assertion needs no laboured proof.

* * * *

Before our new Premier and his Minister of Mines lies a supreme opportunity. Canada can easily improve her position in the mining world. But much will depend upon Ottawa. The revision and codification of our mining laws, a measure already begun, must be completed at an early date. The questions of handling explosives, of rescue work in coal mines, and similar problems can best be met by the Federal Mines Branch. Provincial Departments will follow the lead set by Ottawa.

There is no doubt that the erection of a vigorous Department of Mines at Ottawa, under a competent Minister, will mark the inception of a remarkable development in Canadian mining. We cannot too strongly urge upon the new Government its duty in this respect.

THE ECONOMICS OF TUBE-MILLING.

A remarkably exhaustive thesis, the work of Mr. H. Standish Ball, M.Sc., has just been published in the Bulletin of the Institution of Mining and Metallurgy, of which body Mr. Ball is a student-member. Mr. Ball undertook the work in order to acquire his M.S.C. degree at McGill University, and also to do his duty as the recipient of the Research Scholarship awarded by the Transvaal Chamber of Mines in the year 1909.

Working under the general direction of Dr. J. Bonsall Porter, Mr. Ball made an analysis of the conditions that determine the efficiency of tube-milling. Sketching first the growth of tube-milling practice, he touches upon the factors controlling efficient work, outlines the tests proposed and the tests actually carried out, the general theories of rock crushing, describes the equipment used, and then proceedsd to give a detailed account of each experiment.

The rock used was a hard, compact, nepheline syenite. The tests were divided into four series, in the first of which the feed was varied, the moisture, pebble load, and revolutions per minute remaining constant. In the second series, the moisture was varied; in the third, the pebble load; and in the fourth, the speed.

The preparation of the rock proved to be an unexpectedly arduous task. After reduction to -¼ in. through a "Comet" crusher, 14 tons had to be crushed in a 5-stamp battery through a screen of 18 holes to the linear inch, and de-slimed in a classifier. The sands were then dried, weighed, and stored.

The mill used was formerly an old chlorination barrel, the outside dimensions of which were: length 4 ft. 8in.; diameter, 3 ft. 5 in. The inside dimensions were: length, 3 ft. 6 in.; diameter, 2 ft. 10 in. The true shell was built of ⅜-in. steel, bolted to cast iron end pieces, 2 inches thick, which were stiffened by six 2-inch ribs. The lining consisted of 8-inch by 4-inch by 2½-inch Silex bricks, set in patent cement. An iron screen, with ¾-inch holes, was fixed at the discharge end. 18-mesh sand was delivered by means of a pipe from a bucket elevator to the cone, the size of the discharge orifice being regulated by means of carefully calibrated caps with different sized apertures.

The barrel was driven by a chain and sprocket gearing, and revolved on hollow trunnions. The stamp battery consisted of five 600-lb. stamps, the total crushing capacity being 800 lbs. per hour.

The amounts of rock used in each test ranged from 800 lbs. to 2,000 lbs. After careful screening of the sand through ⅛-inch screen, the water was measured and the flow adjusted. The time consumed by each test varied from 45 minutes to one hour. Thorough screen analyses checked every trial.

It is impracticable here to follow the elaborate tests conducted by Mr. Ball. It must suffice to note some of his conclusions. From figures adduced throughout the experiments, it is indicated, provided there be a fair basis of comparison between the large mills in use in South Africa and small mill used by Mr. Ball, that the present general tendency is to overfeed. That is, the "critical feed," is exceeded, power is wasted, and the results obtained are not commensurate with the material and power used.

As regards moisture, the fact is demonstrated that 37.7 per cent. is much more advantageous than any other proportion. This corresponds more or less closely, with the conclusions of other investigators.

The pebble load tests tended to show that the highest efficiency is reached when that load has a volume of 7/16 the volume of the mill.

The conclusion that a peripheral speed of 333 feet per minute, or 37 revolutions per minute, is most efficient is in close accord with results obtained by Richards and others.

Mr. Ball's paper is an excellent student production. It exhibits evidence of care, thoughtfulness, and ability. It is open to certain criticisms, as, for instance the fact that several of the curves, notably those displaying "moisture efficiency" and "moisture power," are based upon quite insufficient data. Generally this applies to the whole paper. There is no adequa

ason adduced for instituting close comparisons beveen the improvised tube mill and the large mills iat are used in actual practice. Hence there are ips in Mr. Ball's demonstration.

Yet the paper is most creditable as the effort of a udent working under all the disadvantages of the sual laboratory equipment.

COMPANY PROMOTION.

As chairman of the Western Branch of the Canadian lining Institute, Mr. Robert Hedley delivered a noteorthy address at the last gathering at New Denver, locan Lake, B.C. The leading topic touched on by Ir. Hedley was the subject of company promotion for ining enterprises.

The substance of Mr. Hedley's speech was to the effect that discreditable mining enterprises can be nipped in the bud if proper precautions be taken. In the rst place, there must be reasonable grounds for beeving that ore exists in commercial quantities in any iven prospect. This is one of the considerations glossd over by the promoter and rarely investigated by the asual investor. Secondly, the proposed distribution f capital contributes to kill whatever chance of sucess there may be. Thirdly, competent management an never be expected in connection with unsound floations. Fourthly, even if the physical aspects of the roposition be favourable, disproportionately small ums are provided for working capital, and the market for shares is overwhelmed with promotion scrip efore that working capital can be raised.

To meet these conditions, Mr. Hedley proposed that t be made a misdemeanour to "promote a company to 'operate a mine that has little, if any, reason to hope 'for commercial ore; so to distribute the capitalization 'that the treasury is inadequately supplied; to place 'the management in grossly incompetent hands; to 'sell promoters' shares before the property has been 'developed beyond the prospect stage.''

Mr. Hedley, of course, merely reiterated the opinons of all respectable mining men. His suggestions iave been made and discussed many a time and oft. All of them deserve close attention.

Taking these suggestions in order, it may be pointed ut that there is so much room for difference of expert pinion as to the merits of a prospect that the first suggested misdemeanour hardly comes within the scope of legislation. All that is really necessary is that the opinion of a competent and disinterested mining engineer be obtained. On the other hand, the matters of organization and distribution of capital shares are readily controllable. This is immediately the duty of each Provincial Government. As to the character of the management, the only way in which efficiency can be guaranteed is by securing legislation that precludes the incompetent man from mine management.

British Columbia laws already guard against the unqualified assayer, and require strict certification of coal mine managers. Why this measure cannot be enlarged so as to embrace the management of metalliferous mines, we cannot see.

We are in hearty accord with the opinion that it should be made a misdemeanour to place promoters' shares upon the market before a mine has been developed. But this restriction will require official definition in each instance. If a time limit be set, evasion of the law will be easy; but the public will have been given a chance of finding out what it is buying. If official sanction be made a condition, abuses will almost certainly be created.

The time limit, one year possibly, appeals to us as the most rational provision. The other essential is the establishment of a constant relation between promotion stock and treasury stock.

Canada's credit in the eyes of the world rests to a larger extent than ever before upon mining flotations. It is high time to do a little housecleaning.

JUSTICE.

On Monday, September 25th, a "high-grader" named Mountell, who had been found with about 150 pounds of silver in his possession, and who was alleged to have operated as a "fence" in the Cobalt region, was tried before Judge Winchester in the Court of Criminal Sessions, Toronto.

No evidence was heard, or, at best, only a tithe of the evidence was taken. The man was allowed to escape with a fine of $200.

It is unimaginable that Judge Winchester did not know that under Section 224 of the Criminal Code it is made a criminal offence for a person who is not the owner of a mine, or the authorized agent of an owner, to buy or sell silver or silver ore. We have reason to believe that the evidence against Mountell was unusually complete. In any event a fine has nothing to do with the case. The accused should have been acquitted or condemned according to law and not according to Judge Winchester's vagaries. Such conduct on the part of our judiciary is both mischievous and pitiful.

EDITORIAL NOTES.

The fourteenth annual session of the American Mining Congress has been postponed from September 26th to 29th, until October 24th, 25th, 26th, 27th, and 28th. The reason of the postponement was the fact that President Taft could not attend on the former dates.

From our British Columbian correspondent's note it will be seen that, as at July 1st of this current calendar year, there was due on lead bounty the sum of $832,979.68. The total appropriation made by the Dominion Government was $2,500,000. The total amount paid before that date was $1,617,020.32. Of this, the sum spent up to June 30th, of this year, is $49,713.32.

Upon Mr. J. M. Clark, K.C., who has been large instrumental in the recent codification of the mini laws of the Dominion, has been conferred the hono of election to the Honorary Council of the North B tish Academy. The Academy is a notable scienti society amongst whose officers are such persons the Right Hon. Viscount Milner, Field Marshall Ea Roberts, and the Right Hon. A. J. Balfour.

CORRESPONDENCE

COMPULSORY CERTIFICATES FOR MINE MANAGERS.

Editor Canadian Mining Journal:—

Sir,—What has played a prominent part in hampering the progress of the mining industry is the fact that the management of a large proportion of the mines has been left in the hands of men who are incompetent to fill such responsible positions. By paying a visit to some of the mining districts and observing the methods employed in carrying on operations it is possible to see where instances of incapable management have been the cause of squandering thousands of dollars. This fact alone demonstrates the need of establishing a strict standard of efficieney for the mine manager.

In order to establish a higher standard for men engaged in this branch of the profession, the urgent necessity for legislation compelling an examination in certain mining essentials is obvious. The passing of an Act of Parliament to this general effect would not only protect the industry but would raise the standard of competent mine managers to a higher plane. Certain reservations could be made in favour of men who have had years of practical experience in underground work. In some cases sueh men are of equal value to the industry as their technically trained brothers, particularly where mining properties are free from complexity of geological structure and chemical combination. It would be a hardship to the man who has graduated through the underground workings of a mine to exclude him from a higher position for the sole reason that he has not had the opportunity to secure a scholastic training. Cases of this kind could be taken care of in the arrangement of details. It is a matter of vital importance to the mining industry that practical experienee be not overlooked. Nevertheless the science of mining makes technical training absolutely necessary for the mine manager. A man who has taken a course in a school of mining, added to years of practical experience, is better fitted for the office than a man who has had no technical training.

For many years the mining fields of Canada and the United States have been the hunting ground for the unqualified man. Men of this character apparently overlook the fact that it is a grave misdemeanour to accept a position as mine manager when they are not qualified to fill the offiee—no matter under what conditions the position may have been secured. Positions as mine manager are often obtained through the influence of friends for men who have not the slightest knowledge of even the rudiments of mining, and in many cases the final result has been the closing dov of prospects before they have had an adequate te

Some idea of the clamant need for the certificati of the mine manager may be gathered from the fa that before a man is allowed to take charge of a boil and engine he is compelled to produce a certificat The lives of men are in his hands. None other but thoroughly reliable man is allowed to take charge a hoist, yet the mine manager is the hoist man's s perior offieer. His responsibilities are more divers and he is, to a great extent, responsible for the doin of the hoist man, therefore it is apparent that the should be some law eompelling the man in charge the hoist driver to pass an examination in mining ma ters before he is considered competent to fill such responsible position.

The question of certificating mining managers of sufficient importanee to warrant the co-operatic of the Minister of Mines with the Canadian Mining I stitute in aequiring the desired end.

Yours, etc.,

George R. Rogers,

Toronto, Sept. 21st.

Personal and General

Mr. G. C. Bateman is still in Porcupine.

Mr. J. W. Evans gave another successful demo stration of the Evans-Stansfield furnace at the Scho of Practical Science, Toronto University, on the eve ing of Sept. 21st. His audience was largely made u of members of the American Electrochamical Societ Much interest was roused, and it is probable that fu ther demonstrations will be arranged. Practical pul licity of this kind is highly desirable.

Mr. W. E. Segsworth, mining engineer, Jarvis Buil ing, Toronto, has returned from a lengthy inspectio of mining properties in Eastern Ontario.

Mr. W. A. Parks, associate professor of geolog University of Toronto, returned to Toronto on Se tember 21st, after being absent the whole summer o official business connected with the Federal Min Branch.

Mr. Kirby Thomas, mining engineer, 20 Broad St New York, recently examined several claims in th West Shining Tree region.

Mr. George P. Dempster, Porcupine representativ of J. S. MacArthur & Co., visited Toronto during th middle of September.

Mr. A. A. Hassan, consulting mining engineer, ha established an office in 11 Royal Exchange Buildin

balt, Ont. Mr. Hassan has started afresh the development of the Cobalt Station Grounds mine.

Mr. Thomas Kiddie, of Vancouver, B.C., was in California recently.

Mr. C. F. J. Galloway, B.Se., son of Professor Galway, of Cardiff, Wales, lately visited the Cariboo strict, B.C., to examine mining property.

Mr. Ernest Levy, manager of the mines of the Le Roi No. 2, Ltd., at Rossland, and that of the Van-Roi Mining Co., Ltd., in Four-mile Creek camp, Sloean Lake, has returned to British Columbia after an absence of about three months, which period he spent in England.

Mr. Wm. Fleet Robertson, provincial mineralogist for British Columbia, returned to Victoria on September 3rd from an official visit, extending over nearly two months, to mines in the country around Hazelton, Skeena River, Cassiar district.

Mr. O. E. LeRoy, of the Geological Survey of Canada, has been making Nelson his headquarters this season while supervising the geological and topographical work of several survey parties engaged in Kootenay and Boundary districts of British Columbia. Field work has been completed in Franklin camp, Boundary district, but there is still much to do in East Kootenay.

Mr. A. L. Larson, formerly superintendent of the Le Roi mine, but now of Vancouver, B.C., made an examination of the Sloean Star group of mines and the adjoining claims of the Star Mining and Milling Co., in connection with an amalgamation of interests that has been arranged between the several parties concerned.

Mr. Robert R. Hedley, of Vancouver, B.C., accompanied by Messrs. Hugh F. Marriott, of London, and G. G. S. Lindsey, of Toronto, paid a visit to Sheep Creek camp, in Nelson mining division, after their return south from a visit to the Skeena River country. Messrs. Lindsey and Marriott immediately afterwards left British Columbia for New York, whence Mr. Marriott proceeded to London.

OBITUARIES.

The death occurred at Atlin, B.C., on September 7, of Mr. Th. Obalski, the manager and mining engineer of La Societe Miniere de la Columbie Britannique. Mr. Obalski was about 50 years of age at the time of his death. Heart failure was the immediate cause. Mr. J. Obalski, formerly Superintendent of Mines for the Province of Quebec, and now a member of the mining engineering firm of Obalski and Dulieux, Montreal, is a brother of the deceased.

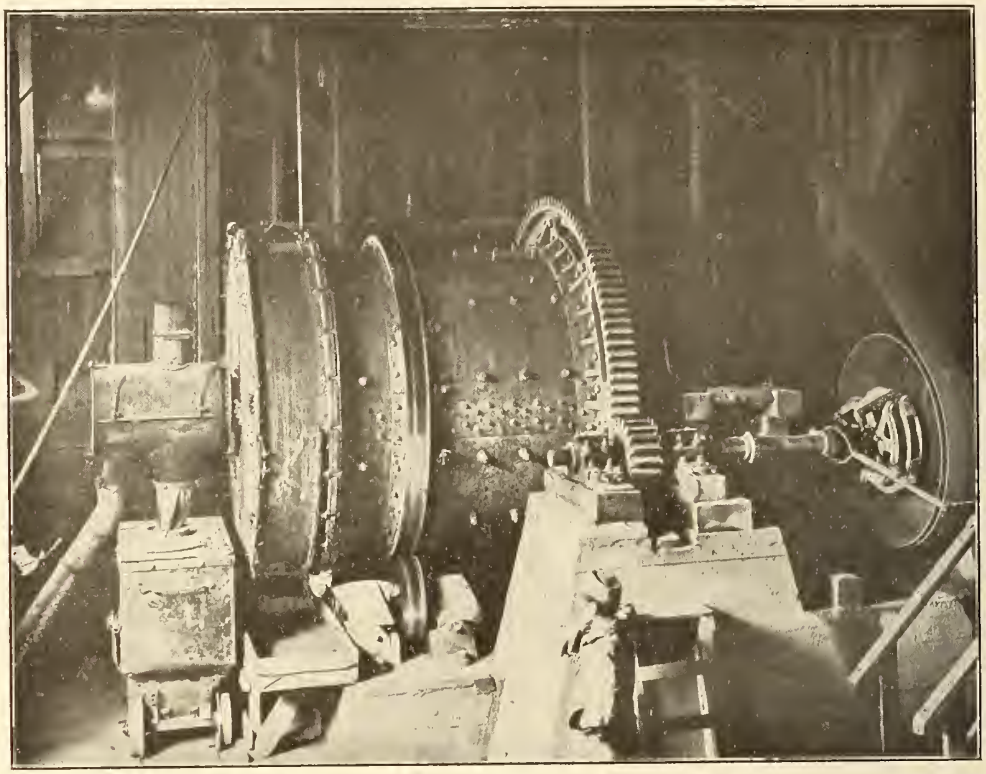
ORE SHIPMENT SAMPLING IN COBALT.

(Written for the CANADIAN MINING JOURNAL.)

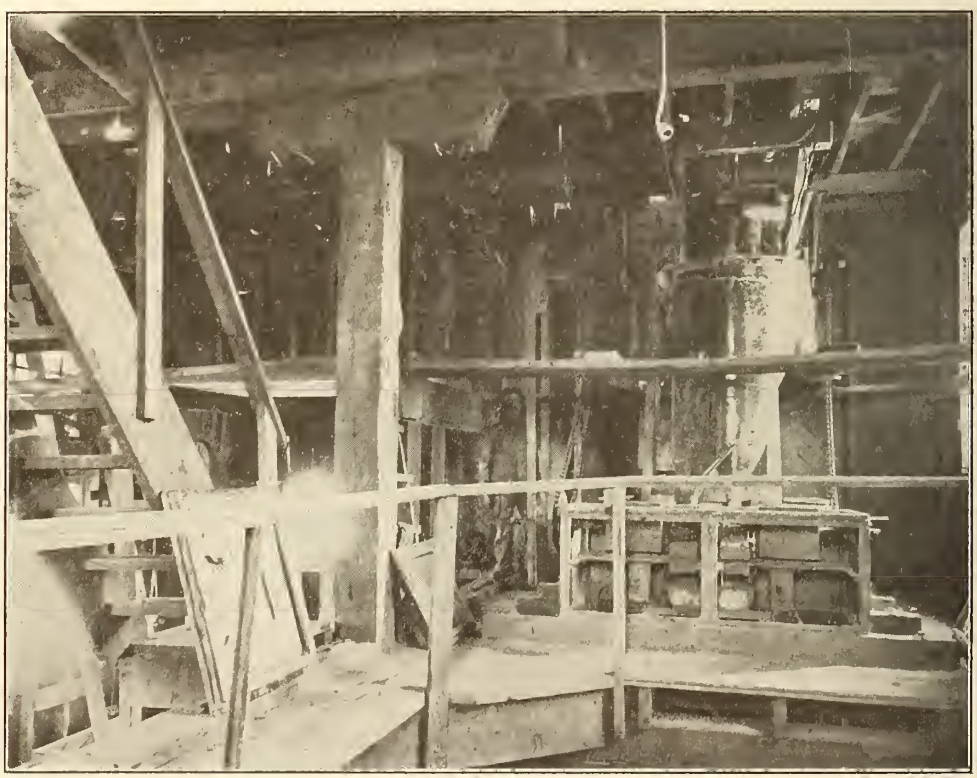
Exactly two years ago there was published in the CANADIAN MINING JOURNAL a description of a custom sampling plant then about to be built in Cobalt. The men behind the enterprise were Messrs. Campbell and Keyell, of Cobalt.

The idea that animated the enterprise was the recognition of the need of some standard system of valuing the ores locally. The discrepancies constantly noticeable between the sampling done by the shippers and that done by the smelters demanded attention. It was

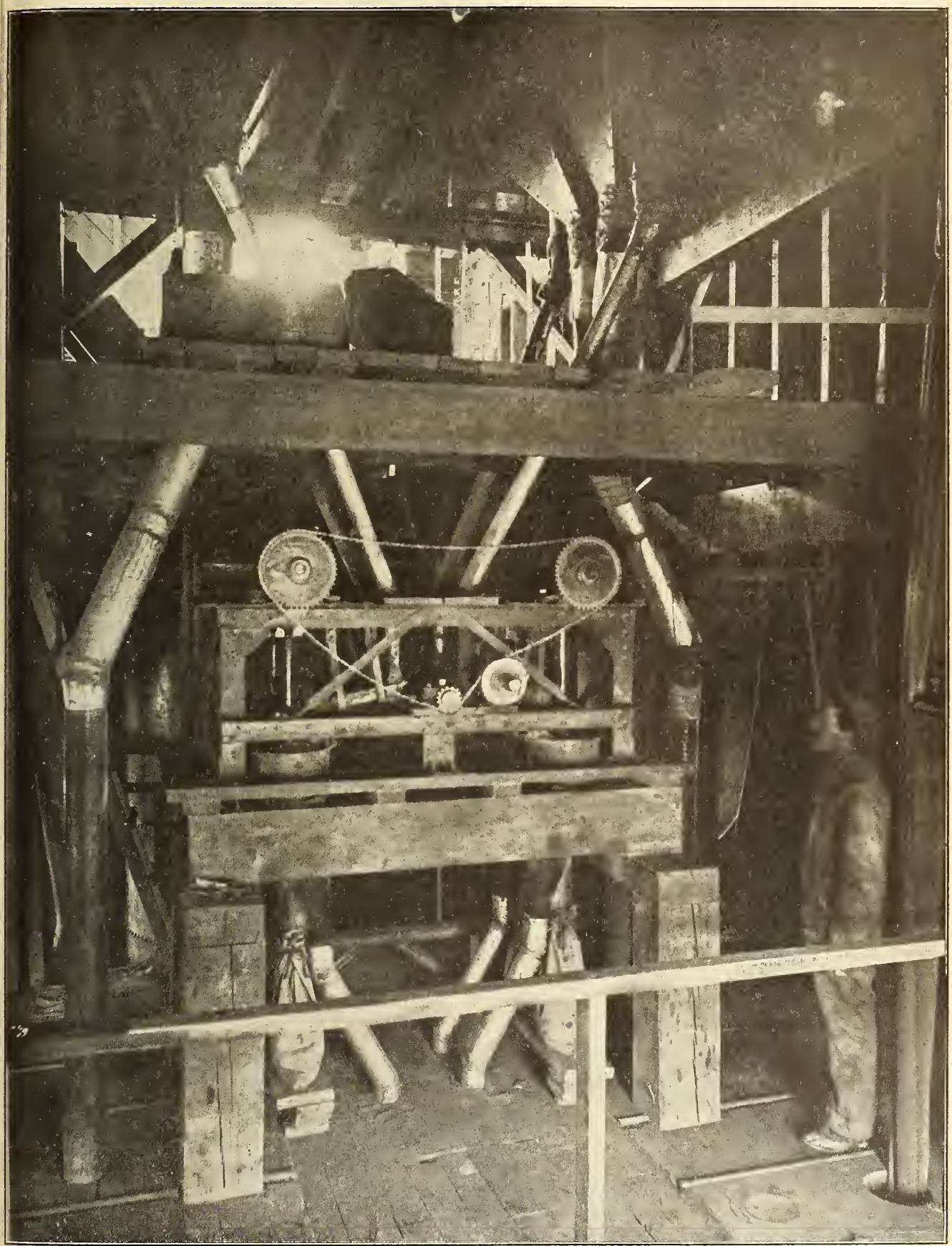
General View of Plant.



Ball Mill.



Spiral Mixer, Quartering Machine, and No. 1 Vezin Sampler.



Quadruplicate Vezin Samplers.

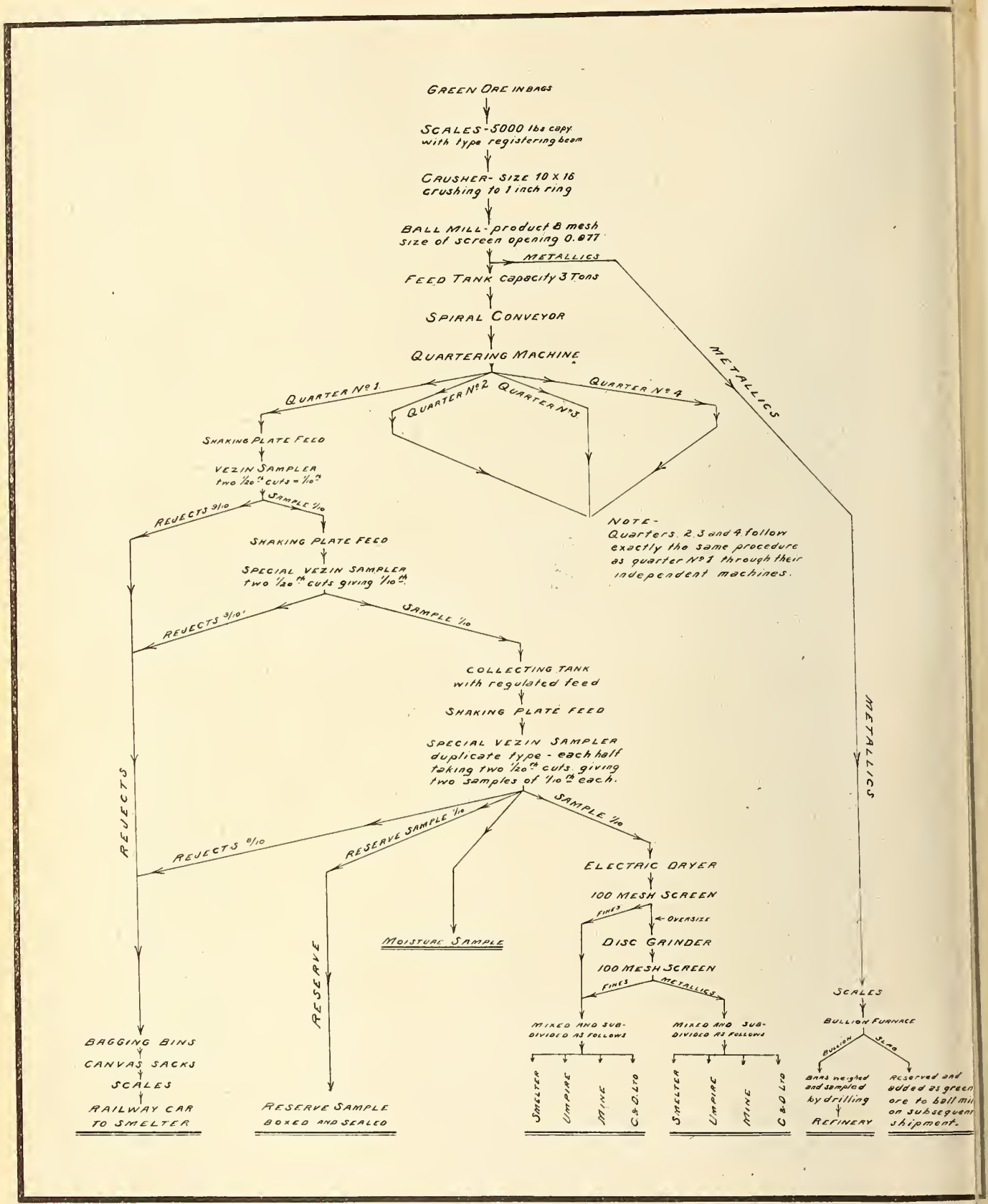
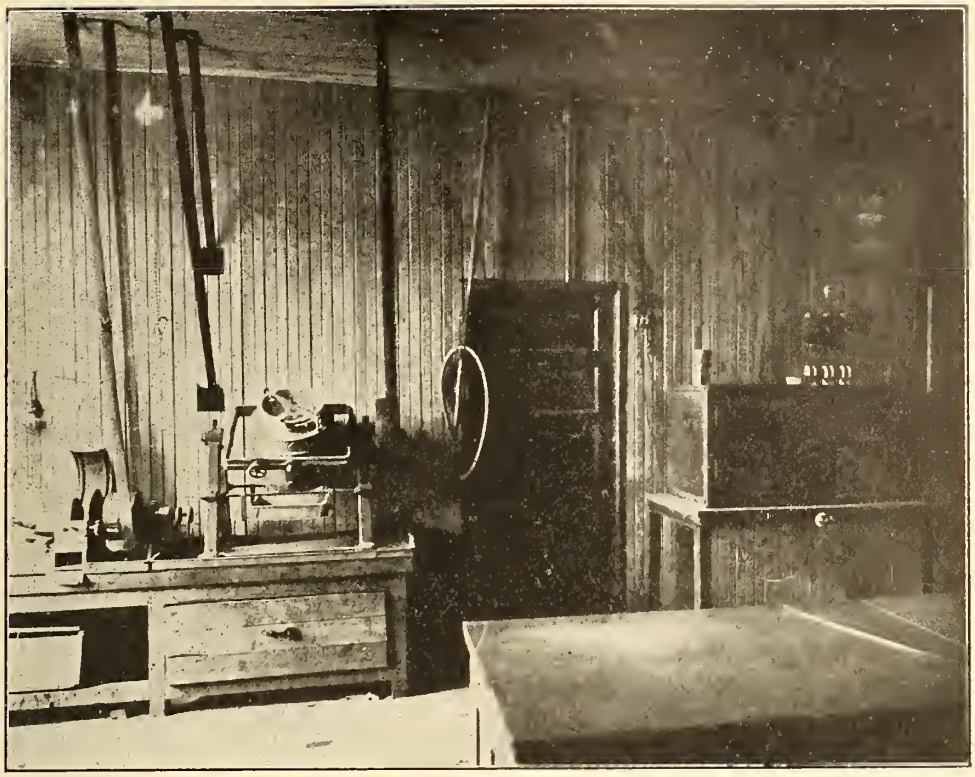


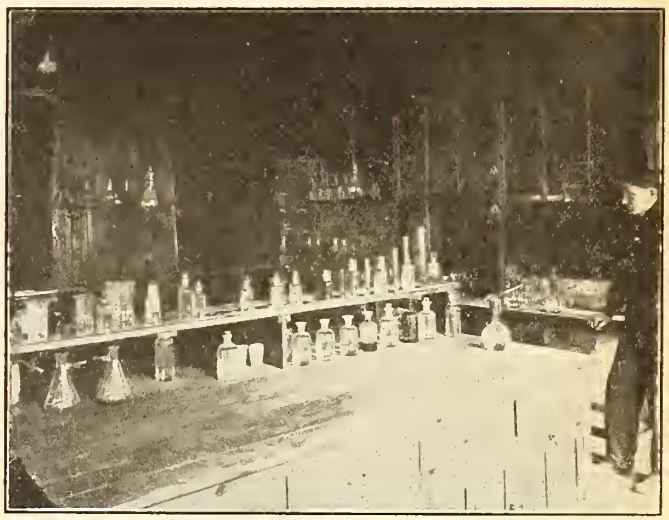
FIG. 1.

Flow Sheet,



Finishing Room, showing Disc-Grinder, Mixer, and Electric Drying Oven.

Bagging the Ore.



Corner of Laboratory.

felt that a local sampler was a necessity. The irregular and very variable ores of the camp presented difficulties that could not be met at each mine. Only a large and well-organized public custom sampler could fill the bill. For more than a year the sampler has been in operation. It has supplied a recognized need and has, moreover, created a larger demand for accurate sampling.

The flow-sheet that accompanies this article is practically self-explanatory. The ore is first crushed to pass a one-inch ring. It then is put through a ball mill giving an 8-mesh product. Here the screened metallics go straight to the bullion furnace, the slag being added to the next shipment of ore. A 3-ton feed tank now takes the ore. Through a spiral conveyor it goes to a quartering machine. Each quarter is treated precisely as quarter No. 1, which is reduced three times in 1/20 cuts.

It will be noted that full provision is made for umpire, control, smelter, and original samples. Moisture samples, also, are obtained on the last cut.

The bulk of the ore, that is, nine-tenths of the original, is transmitted to bagging bins and thence to canvas sacks. It is then weighed and put on board the car for shipment to the smelter.

The contrast between the present flow-sheet and that first proposed (see page 581, Oct. 1st, 1909) is marked. At first it was thought necessary to design two sections, one for low grade ore and one for high grade. As it stands at present, the mill is a unit, capable of sampling any class of Cobalt ore. The system of sampling has been modified, and the whole flow-sheet has been adapted to the changing conditions of the camp. Relatively little of low grade ore is now being shippe from Cobalt. More and more is being concentrate Thus scrupulous care is needed in handling satisfa torily the high grade ore sent to the sampler.

Every established mining camp that sends its pr ducts to outside smelters should possess an indepen ent sampler. Both the shipper and the buyer benef thereby.

RESEARCH WORK ON CERTAIN NOVA SCOTIAN GOLD ORES.

By Ora Willis Knight, M.Sc., D.Sc., Bangor, Maine, U.S.*

During the summer of 1910 I spent several weeks studying a number of the anticlinal gold districts of Nova Scotia, and since returning to my laboratory at Bangor, Maine, I have been engaged in a continuous series of investigations, both physical and chemical, of quartz, associated minerals, ores, slates, and quartzites, all of which were personally secured by me in Nova Scotia or in two instances were furnished me through the kindness of Mr. Holman.

This original work has been supplemented by a study of the geological literature of Nova Scotia, including a set of the maps of the various gold districts furnished me through the kindness of Mr. E. R. Faribault, and from a study of these maps alone it is possible to arrive at some very valuable conclusions.

My investigations were conducted on behalf of the Caribou Gold Mines, for which I was retained by Mr. C. Vey Holman, president of the Caribou Gold Mines and state geologist of Maine, and Mr. Holman has generously desired to place such of this privately acquired information as may tend to prove of value in aiding the future mining development of the province, at the disposal of its mining fraternity.

Discovery of Platinum.

Five weeks in all were spent in Nova Scotia, much of this time being passed in the Caribou district, but several other districts on anticlinal folds were studied. The names of these other districts cannot at present be mentioned, although it is permitted me to say that on a mine dumy in one of these districts several small crystals of sperrylite, ($PtAs_2$), a native platinum arsenide, were found by me. Though not actually taken from rock in place, there is every reason to believe that the material on the dump actually represented material from an adjoining vein. The gangue mineral containing the sperrylite was quartz, and the chief associated mineral was arsenopyrite, and a magnesia-bearing dike was in proximity. Laboratory tests were applied to this material after returning to Bangor, and the presence of platinum and arsenic in the crystals verified by positive chemical tests. This appears to be the first recorded discovery of platinum in Nova Scotia, but there is no reason why it should not be found elsewhere in the province associated with metallic sulphides such as covellite, tetrahedrite, bournonite, chalcopyrite, arsenopyrite, or other sulphide ores, or as an irregular dissemination in peridotite, pyroxenite, gabbro, syenite, or various basic eruptives, o in serpentine associated with chromite, the presenc of which latter may be considered quite a promisin indication of platinum. Reference to the discovery o selenium and tellurium in Nova Scotian ores will b found on a subsequent page.

Formation of Gold-bearing Rocks and Veins, and Depo sition of Ore.

A careful consideration of all the data at hand re garding the origin of the Meguma series of gold-bear ing rocks of Nova Scotia, would seem to indicate tha it is of pre-Cambrian origin and quite probably Al gonkian. (Cf. Van Hise and Leith, Pre-Cambrian Geo logy of North America, Bulletin No. 360, U. S. Geol Surv., p. 512). The Meguma series has been divide by Prof. Chapman into a lower or quartzite group, th Goldenville formation, and an upper or slate group the Halifax formation.

It seems very probable that the quartzites (Golden ville formation) were deposited as sediments in shal low water under the influence of strong waves and cur rents acting quite constantly for long periods of time with alternating shorter periods of temporarily deep er waters, and slacker currents. Thus we had de posited coarse sandy material alternating with lesse deposits of very fine clayey sediments. When th metamorphic agencies acted on these later on, thick strata of quartzite with intercalated thin beds o slate were formed.

Following the deposition of these sandy sediments there occurred a very abrupt change in the conditions and there was a long time of existing deep waters very moderate currents, and possibly sedimentary ma terial originating in a more distant land mass was being carried and deposited. This material was de posited as a fine clayey mass quite different in appear ance from the coarser sediments beneath. Later this clay sediment became the Halifax series of slates sharply contrasted in appearance and composition with the Goldenville formation beneath. At far later geologic periods other sediments were formed which we will not consider in this paper.

After deposition of the sediments, a gradual up lifting of them took place. A new land mass was rear ed above the water, and ultimately crumpled into a series of parallel anticlinal folds by a powerful, uni form, long-continued pressure exerted from the south. More or less coincidently heat was developed and hot water, bearing silica in solution, permeated the sands of the Goldenville sediments, and by the deposition o

*Abstract of paper read before the Mining Society of Nova Scotia.

silica as a cementing material the quartzites were formed. The interstratified clay sediments were not so readily permeated by the silicifying solutions, so acted on by heat and pressure chiefly they were changed into slates intercalated in thin beds with the quartzites. Similarly heat and pressure changed the Halifax sedimentaries into slates, placed conformably on the quartzites.

These disturbances and metamorphic agencies were directly caused by the intrusion of the granite magma beneath, and took place at a period generally admitted to be later than Devonian. After intrusion of the granite magma which, it must be remembered, was resting under the great pressure exerted by the Meguma series above, a gradual crystallization took place and the various minerals of the granite separated from the magma, until there was left as a final portion excessive quantities of hot water under great pressure and charged chiefly with silica in solution. Finally great convulsions opened fissures extending towards the surface into which these waters poured, and on their upward way were forced laterally through openings formed by the tearing apart of the various thin slatey strata met on the upward course. Silica was deposited in these openings, both the vertical and the horizontal ones, resulting in the one instance in the formation of the fissure veins of quartz, with direct lateral branches forming the so-called bedded leads. There can be no question that practically all of the bedded veins are of a common origin and source and are direct branches of certain of the more prominent fissures, for they clearly branch from the fissures and neither cut nor are cut by them.

At some subsequent period other fissures were opened, cutting directly through the bedded veins as well as the older fissures, and were filled with solutions bearing silica, gold and other minerals. These later disturbances caused faulting, shearing, and fracturing, and many of the bedded veins and earlier fissures were faulted. It seems very probable that in connection with these later disturbances many of the richer oreshoots were formed. The statement of practical miners has appeared in print and several have told me verbally that in their experience in mining in Nova Scotia, while working in zones of faulting, they have generally found the richest ore under the faults, and that a vein which was rich up to a fault was very often barren when located again above and beyond the fault.

In connection with the anticlines of Nova Scotia we find at several localities that the rocks have been forced up into the form of domes, and in the Caribou district we find existing perhaps the most perfect of these domes. It is evident that some powerful force exerted from below forced the rock formations into the shape which gives them their name, nor is it difficult to fully explain what force formed them. At various localities in granite formations there exist very perfect domes or bosses of granite from which all formerly existing rock which covered them has been eroded. It is also not infrequently the case that granite domes have other rock formations covering their sides more or less completely, and still other domes of which only the very tops have been exposed by erosion of the rock formerly covering them, and so on by an almost complete series of intergradations existing in various parts of the world. It seems very certain that the domes of Nova Scotia, existing on the anticlinal folds, owe their shape to the existence of granite domes beneath which were forced up but never subsequently exposed by erosion.

At various places throughout the Meguma series of Nova Scotia, granite outcrops, having been exposed by erosion, and granite dikes also are not uncommon. It is also very certain that granite exists, at no great depth everywhere beneath the rocks of the Meguma series. While partial erosion has exposed the granite in many places, there seems to be no locality in the province where the slates and quartzites both have been eroded sufficiently to expose the granite on one of the domes.

It is quite generally agreed by the authorities that all gold was primarily of magmatic origin, and it is likewise quite certain that the gold of Nova Scotia originated in the granite magma beneath, and, carried up by ascending waters, was finally deposited in the sedimentary formations above. Even as this paper is being written there has come into my hands an article which records the finding of gold in the granite formations southwest of Halifax about the head of Terence Bay and at Pennant. While particulars of the find are lacking, I am inclined to predict that any payore which has been or may be found in these granite formations will be in quartz veins or quartz segregations derived from the granite magma.

The natural solvents of gold are more numerous than commonly supposed, and the several naturally occurring solvents which have the power of dissolving gold at ordinary temperature and pressure have their solvent power increased proportionately by increased temperature and pressure. If such salts as ferric chloride, ferric sulphate, cupric chloride, cupric sulphate or any of the alkaline sulphides are dissolved in water then the resulting solutions are capable of dissolving gold, especially when heated with gold under pressure. Sodium carbonate solution containing dissolved carbon dioxide, and sodium silicate solution containing sodium sulphide or sulphydrate or other alkaline sulphides also dissolve gold. The presence of any compound capable of liberating oxygen, such, for instance, as manganese dioxide in acid solution, increases the solvent power of certain of the beforementioned solutions for gold, while heat and pressure likewise increase their solvent power.

In the Meguma formations of Nova Scotia we find an abundance of pyrite, pyrrhotite, arsenopyrite and other sulphides which, when bronght in contact with descending waters containing oxygen from the air dissolved therein, become oxidized, and soluble salts are formed capable of dissolving gold. Manganese dioxide is also common in the rocks of the Meguma formation, being more or less generally and finely disseminated, especially in the slates. The sulphur of the metallic sulphides named is first attacked and oxidized, and the finally resulting sulphuric acid attacks the iron, copper and other metallic elements of the sulphides, forming at first, in the case of iron, ferrous sulphate and finally by oxidation ferric sulphate, a gold solvent. The descending waters also contain some sodium chloride which, acted on by the sulphuric acid formed, sets free hydrochloric acid, and in the presence of manganese dioxide, chlorine, a solvent of gold. Ferric chloride is also formed and other solvents of gold as well by the complex series of chemical reactions resulting between the descending waters and the metallic sulphides they encounter.

These surface waters descend through various cracks, seams, joint planes, lateral fissures and through the pores of the rocks, becoming charged with solvents

of gold and other minerals, and becoming heated as well as under pressure with depth. These waters of meteoric origin and bearing "ie" salts in solution are very capable of dissolving gold and do dissolve it when brought in contact with it along their course. Finally at great depths and under great pressure these waters are forced into more or less vertical fissures extending towards the surface, and, charged with various salts dissolved from the rocks through which they have passed, they become ascending waters passing through trunk channels to the surface.

The waters entering the trunk channels at various places contain salts of a more or less diverse nature in solution, the nature of these salts varying with the nature of the local constituents of the rocks through which each set of waters has passed. Waters from the magmatic mass beneath also enter the trunk channels, and these are generally reducing waters, containing "ous" salts in solution and likewise containing agents capable of reducing "ic" salts to "ous" salts. Some branches of the trunk channels pour into them waters charged with alkaline silicates, alkaline sulphides, or alkaline carbonates, while other waters are charged with "ous" or "ie" salts. Under these conditions there would mingle in the trunk channels a series of solutions often of more or less neutralizing power, one to another.

It is a fixed law governing chemical reactions that if two or more solutions bearing different salts in solution are mixed together, and by reaction of these different salts on one another any insoluble compounds can be formed, then such insoluble compounds will be formed. In conformity with this law insoluble compounds are formed and precipitated along the course of the trunk channels. Reduction of both temperature and pressure as the waters near the surface result in the decrease of their solvent powers for certain salts which are precipitated. Locally also the walls of the trunk channels contain minerals capable of acting as precipitating agencies. While these conditions exist to-day and a certain amount of waters are still circulating in the rocks of Nova Scotia and doing the work described, such circulation is a mere nothing as compared with the vast volume which went through the same cycle in the period immediately following the granite intrusion of the past.

Among the common precipitants of gold positively known to exist either as minerals in Nova Scotia rocks, or to have been carried in solution by ascending waters, are ferrous sulphate, ferrous chloride, iron pyrite, pyrrhotite, arsenopyrite, native arsenic, the organic matter including the graphite and carbonaceous matter of the upper rock formations, and even pure slate, which latter has the power of throwing down gold from certain solutions.

Experiments and Analyses.

For the most part these statements regarding the solvent and precipitating power of various substances have been confirmed by conducting a series of experiments and analyses on material personally taken by me in the Province of Nova Scotia, and including gold, gold ores, slates, quartzites, gangue minerals, mine water, and similar material. In other words, I have been able to prove that the conditions in Nova Scotia were formerly very favourable for the solution and ultimate precipitation of gold, silica, and other minerals and metals, and that even to-day in a vastly lessened degree these same processes are being carried on. During my investigations I made many analyses and assays of material from bedded veins, fissure veins, slates, and whin (quartzite), to determine their gold content as well as the other minerals therein, but space forbids my giving more than a few of the most interesting analytical results.

A sample of mine water was taken where it poured from a crevice of the roof on the 100-foot level, east drift, Holman mine, near the intersection of the Ross vein with a little fissure vein of less than half an inch in width, at which place a large quantity of coarse, nuggety gold was taken in December, 1909. The analysis of this water is as follows:

Analysis of Mine Water.

Results in parts per million.

Total solid matter in solution	272.
Solids volatile on ignition	47.5
Solids not volatile on ignition	224.5
Free ammonia	.05
Albumenoid ammonia	none
Nitrogen as nitrites	none
Nitrogen as nitrates	none
Chlorine	1.354
Bromine	trace
Sulphuric acid radicle (SO_3)	60.01
Hardness by Clark's test	110.
Lead	none
Manganese	trace
Cupric oxide	.12
Ferric oxide	8.
Aluminum oxide	1.
Silica	21.5
Calcium oxide	73.
Strontium	trace
Magnesium oxide	24.1
Sodium plus potassium oxides	35.3
Gold	trace

The gold was detected by evaporating several liters of the filtered water and submitting the residue to fire assay, and at the same time carrying on a check test on the reagents used which proved them to be free from gold. A confirmatory test for the gold consisted in dissolving the metallic particle obtained by fire assay in a drop of chlorine water, adding a drop of stannous chloride solution and obtaining a precipitate of purple of Cassius. Here we have a mine water actually carrying gold in solution. The iron in solution in the water reacted for ferric iron but not for ferrous iron. Where the water flowed from the wall it deposited a sludgy mass of red, hydrated iron oxide.

At a point on the wast plunge, 40-foot level, Holman mine, a sample of the same hydrated oxide of iron was taken beneath the B vein where it had been deposited in considerable quantity by a stream of water. Every possible care was taken to obtain this material free from rock or other extraneous matter, and after being carefully dried it was taken to Bangor and assayed. The assay showed in the dry material that gold was present at the rate of 67 cents per ton. The water content of the original was not determined dbut is estimated at about 75 per cent.

To prove the precipitating power that certain metallic sulphides, occurring in almost every bedded vein, have when brought in contact with gold-containing solutions, three different experiments are quoted here, all being on material from the Holman mine. The details of these experiments follow:—

(a) A sample of V vein ore was taken from the east superstope on the dome, and from this sample a piece

s selected which measured 32 x 25 x 6 millimeters d weighed 27 grammes. This piece was chiefly a ss of yellow and silver coloured metallic minerals ntaining several particles of visible quartz. It was ced in a beaker and over it was poured 25 cubic ntimeters of a solution containing 55.5 milligrammes gold in solution as the chloride. After 3 hours the ution was decolourized, showing that reduction of ld had taken place. The solution was filtered and nd free from gold by the purple-of-Cassius test. amination of the ore under the microscope showed had become coated with minute crystals of gold and th a brownish mass of amorphous gold, the crys- s being distributed equally over the surface of the artz, the yellow, and the silver coloured metallic nerals. The quartz, in addition to being coated with rstals of gold, was coated in places with a yellow film metallic lustre such as I have frequently observed on s of Nova Scotian vein quartz. Examination of the nple previous to immersion in the gold solution was de, and no such yellow films of crystals were then esent. This C vein ore is a peculiarly distinct ore, ferent from anything else I have observed in Nova otia. As exposed in the various workings of the lman mine, it is found to be a mass of yellow and ver coloured minerals with metallic lustre, appear- g as a solid metallic vein until on closer examination all particles of quartz are found scattered through but the quartz content is probably never over 35 r cent. In width the vein varies from an inch to e or six inches. Everywhere it is found to carry tter than $4 in gold value to the ton, but this gold nnot be extracted by direct amalgamation, requir- g instead some modification of the cyanide process. hile the C vein appears to be a bedded vein wherever has been exposed, it is so absolutely different in ap- arance from the many other bedded veins below and ove it that I am not prepared at present to discuss its igin. An analysis of the C vein ore made for Mr. lman by the Pennsylvania Salt Manufacturing Co., as follows:

Iron	19.00 per cent.
Arsenic	20.22 per cent.
Sulphur	20.75 per cent.
Insoluble	31.60 per cent.
Total	99.57 per cent.

The material they classify as insoluble is probably ostly quartz. In this vein iron pyrite and native senic make up the major portion of samples I have amined.

(b) For the next experiment I selected a partly ystalline pyrite of a silvery colour with striated ces. This was taken from a vein immediately be- ath the Ross vein in the face of the east drift, 100- ot level, Holman mine, the sample being from the ce, as it was in July, 1910. After pulverizing and ixing the sample a portion was taken for analysis, d another portion, weighing one gramme, was placed a beaker and over it was poured 25 cubic centimet- s of a solution containing dissolved therein 55.5 milli- ammes of gold as gold chloride. The solution was irred at five minute intervals, and at the end of 15 inutes it had become decolourized, while after filter- g and testing the filtered solution no gold was found maining therein. A copious precipitation of both ystalline and amorphous gold had taken place on e particles of powdered ore, as was shown by ex- amination under the microscope. My analysis of the ore is as follows:—

Specific gravity, 6.17.

Insoluble (mostly quartz)	1.45 per cent.
Sulphur	20.67 per cent.
Iron	35.18 per cent.
Arsenic	42.68 per cent.
Selenium	traces
Total	99.98 per cent.

Eliminating the insoluble matter shown by this analysis, the metallic minerals of the ore would appear to exist in about the proportion of 46 parts arsenopyrite to 4 parts pyrrhotite to 1 part pyrite.

(c) From a mass of nuggety gold, quartz and metallic sulphides submitted to me by Mr. Holman, and by him stated to have been a part of the rich ore taken from the Ross vein in December, 1909, I selected particles of the metallic sulphides as free as possible from both quartz and gold. This gold was taken from the intersection of a little fissure with the Ross vein, 100-foot level, Holman mine. The silvery coloured sulphides were powdered and mixed, a sample taken for analysis, and a gramme weighed out into a beaker. On this gramme of material was poured 25 cubic centimeters of a solution of 55.5 milligrammes of gold as gold chloride. The solution was stirred as described in the previous experiment and at the end of fifteen minutes was filtered and no gold found remaining in the filtered solution. The powdered particles of pyrites were covered by a precipitate of both crystalline and amorphous gold.

My analysis of this pyrite is as follows:

Specific gravity, 6.72.

Insoluble (mostly quartz)	2.40 per cent.
Iron	35.35 per cent.
Arsenic	41.76 per cent.
Sulphur	20.22 per cent.
Selenium	trace
Tellurium	trace
Total	99.73 per cent.

We have here the first recorded instances of the occurrence of selenium and tellurium in Nova Scotian ores. The presence of both was confirmed by applying the usually recognized decisive tests.

The metallic material from the Ross vein, whose composition is shown by the above analysis, may be assumed to exist in the proportion of 23 parts arsenopyrite to 3 parts pyrrhotite, as calculated from the analysis and eliminating the insoluble matter. The presence of pyrrhotite is easily demonstrated by passing a magnet over the powder which is attracted in a small amount.

Other tests, not quantitative, have been conducted where dilute solutions of gold chloride in water were poured into beakers containing Nova Scotian slates of the Halifax formation, some of these slates containing metallic sulphides imbedded therein, and others free from sulphides but containing graphitic or carbonaceous matter, and still other nearly pure slate. In all these cases the gold was entirely precipitated from solution, fairly quickly in the case of the materials first named and requiring several days in the case of the pure slate, but ultimately in each case the precipitation of the gold was complete.

Formation of Ore-shoots.

While it is, of course, possible that some of the bedded veins were direct trunk channels and derived their quartz and ore direct therefrom, it seems to me certain that a vast majority of the bedded veins are merely lateral branches which were filled by vein material diverted from the trunk channels into lateral openings, made in the thin strata of intercalated slate, into which the solutions from the vertical fissures were forced and in which were deposited silica, pyrite, arsenopyrite, and other minerals. Examination of the intersection of fissures and the bedded veins branching from them seems in many cases to show that they are contemporaneous in origin, while in other instances the fissures are clearly of later origin.

(To be continued).

MINERAL PRODUCTION OF THE PROVINCE OF QUEBEC DURING 1910.

Asbestos.

The returns received from asbestos producers show a total production of 80,605 tons of the various grades of asbestos, valued at $2,667,829 at the points of shipment. This is a substantial increase as compared with the shipments made in 1909, which totalled 63,965 tons, valued at $2,296,584.

These figures represent the actual shipments made, and they are this year considerably less than the output, as a great deal of asbestos of all grades was reported as stock on hand on December 31st. As may be seen by the table given below, this stock on hand amounted to 41,159 tons, which, valued on the same basis as the shipments, amounted to $1,921,923.

The activity of asbestos mining was very notable during the first seven months of the year. The mines were working night shifts as well as day shifts, and most of the mills were producing to their full capacity. Unfortunately the demand did not keep pace with the increased output, and as a result the market became congested, prices dropped and the stocks on hand increased. Towards the end of the year several of the mines discontinued mining operations and a period of stagnation ensued. That this state of affairs is only temporary is shown by the past records of the asbestos industry. Periods of over-production and consequent depression have been noted before, and these have always been followed by periods of healthy growth.

	Shipments		Stocks on hand Dec. 31.	
	Tons	Value	Tons	Value
Crude No. 1	1,817	$ 471,649	1,703	$ 447,227
Crude No. 2	1,612	196,382	3,181	440,884
Mill Stock No. 1	10,313	627,635	4,938	313,053
Mill Stock No. 3	44,793	1,141,374	24,417	621,065
Mill Stock No. 3	22,070	230,789	6,920	99,694
	80,605	$2,667,829	41,159	$1,921,923
Asbestic	24,711	17,612		

The value of the asbestos shipments made during the year 1910 is the highest recorded to date. The previous banner year was 1908, when it reached $2,551,596.

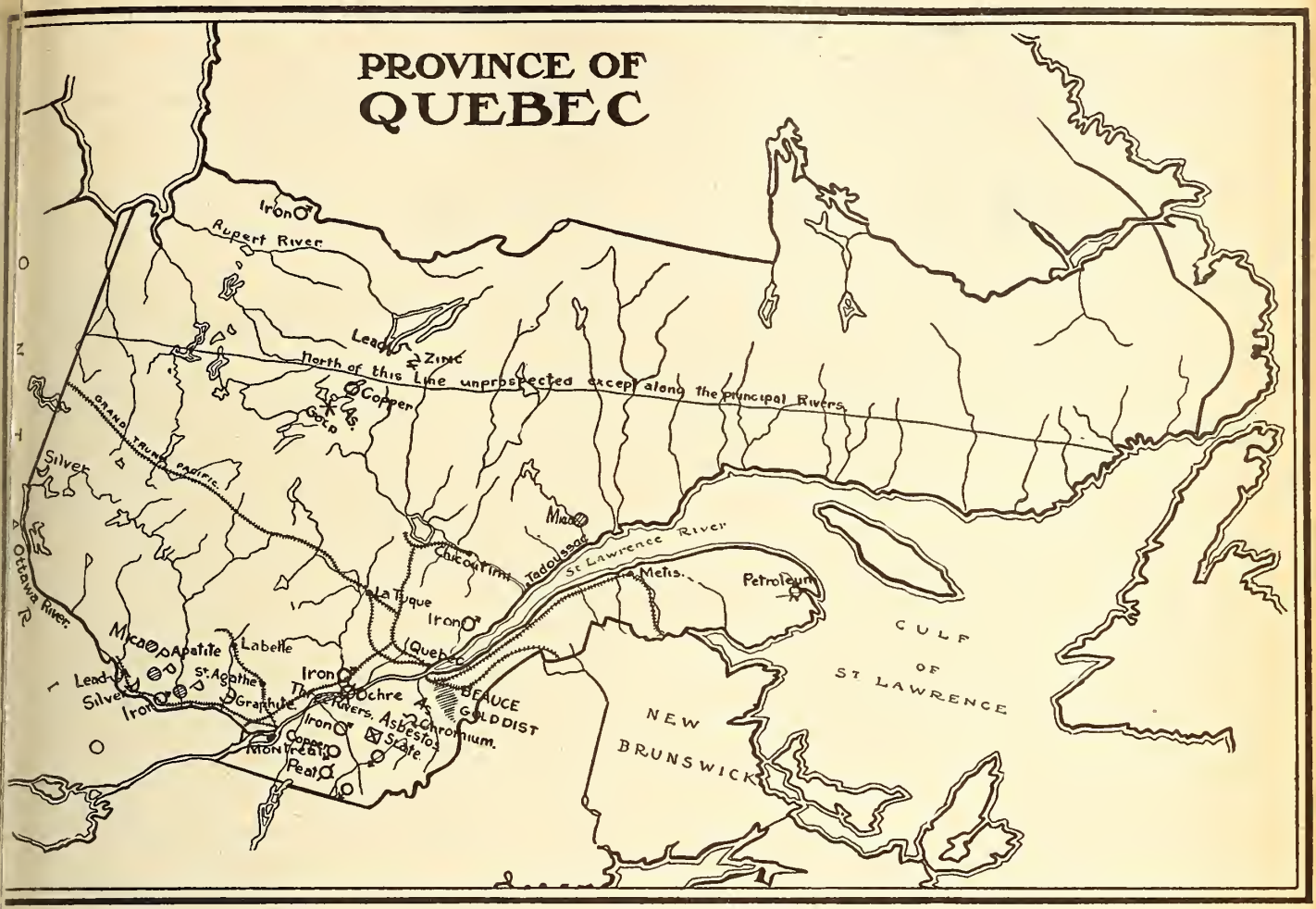
The following table illustrates the growth of the asbestos industry during the past decade:

Year	Tons.	Value
1900	21,408	$ 719,416
1901	33,466	1,274,315
1902	30,634	1,161,970
1903	29,261	916,9
1904	35,479	1,186,9
1905	48,960	1,476,4
1906	61,675	2,143,6
1907	61,985	2,455,9
1908	65,157	2,551,6
1909	63,965	2,296,3
1910	80,605	2,667,8

The returns which we received from the producers show that a quantity of 2,035,705 tons or asbestos bearing rock was quarried during 1910. Of this rock about 25 per cent. is waste, which goes to the dump without treatment as being too lean in asbestos for milling. Shipments of asbestos during 1910 and stocks on hand at the end of the year totalled 121,755 tons, valued at $4,589,756 at the prices prevailing during the year. To arrive at the output, we may substract the stocks on hand at the end of the previous year 1909, which, according to the Federal Mines Branch, amounted to 20,921 tons. These figures leave a total extraction during 1910 of 100,837 tons of asbestos from 2,035,705 tons of rock mined or from about 500,000 tons of rock milled.

It must be understood that these figures are averages of totals. In the case of individual mines the figures of extraction, may diverge considerably from these averages.

In last year's report, attention was drawn to some of the advantages which were likely to ensue from the amalgamation of individual asbestos properties into large corporations. One of these advantages was that it would be easier to establish a standard classification of the various grades of asbestos. The importance of this point can hardly be exaggerated, for it is quite likely that one of the reasons which militates against a more rapid extension of the uses of asbestos and contributes to the dulness of the market, comes from the fact that at present there is a lack of uniformity in the grading and classification of the various products of the asbestos mills. Each individual producer has its own grades and marks which can only be sold to manufacturers and consumers by submitting samples. In the classification which we have adopted in the short table given above, we have followed the Federal Mines Branch, based on value per ton of the product. Crude No. 1 represents asbestos quoted $200 a ton and over. Crude No. 2 under $200. Mill stock No. 1, is the product of the mills of a value of $45 per ton and over, No. 2 between $45 and $20 inclusively, and No. 3 under $20, but individual items of these groups vary widely between the limits assigned and the classification is arbitrary in the extreme. For instance, under mill stock No. 1,



have grouped asbestos representing not less than 17 grades according to prices, which are designated by the following marks: "No. 1," "No. 1 A," "No. 2 A," "No. 2 B," "A," "C," "D," "M," "X," "XXX," "Long," "Special Spin."

Similarly in Mill Stock No. 2 there are ten different prices and the products are classified as: "A," "3 B," "B," "C," "E," "No. 2," "No. 3," "X," "XX," "OO," "OK."

Whereas in Mill Stock No. 3 we get: "C," "CC," "F," "N," "D," "E," "Short F," "No. 3," "No. 4," "No. 5," "X," "XXX," "XX paper."

As may be imagined, these various designations which have no connection between themselves, must to a great extent puzzle and bewilder the buyers, and selling by samples must necessarily be resorted to.

This subject of classification is very important, and it is thought that great benefits to the industry would be derived from a better standardization of the various grades. But, of course, such a result can only be achieved through a concerted action on the part of the producers.

Returns of shipments of asbestos were received from 13 companies, as follows:

Amalgamated Asbestos Corporation,	Thetford Mines.
Asbestos and Asbestic Co., Ltd.,	Danville.
B. & A. Asbestos Co.,	Robertson.
Bell Asbestos Mines,	Thetford.
Belmina Consolidated Asbestos Co.,	Chrysotile.
Berlin Asbestos Co,	Robertson.
Black Lake Consolidated Asbestos Co.,	Black Lake.
Broughton Asbestos Fiber Co.,	East Broughton.
Frontenac Asbestos Co.,	East Broughton.
Jacobs Asbestos Mining Co.,	Thetford.
Johnson's Company,	Thetford.
Ling Asbestos Co.,	East Broughton.
Robertson Asbestos Mining Co.,	Thetford North.

Copper.

The copper bearing ores now produced in the Province of Quebec come from the cupriferous pyrite deposits of the Eastern Townships. This ore is primarily used in the manufacture of sulphuric acid and the cinder is sent to the copper smelters for the extraction of the copper.

The production of ore in 1910 was the lowest recorded since 1904, being 24,040 short tone, a decrease of 11,060 tons as compared with the previous year.

Year	Tons	Year	Tons
1893.....	64,960	1902.....	31,938
1894.....	47,132	1903.....	26,481
1895.....	42,470	1904.....	23,729
1896.....	47,730	1905.....	28,644
1897.....	41,233	1906.....	32,527
1898.....	39,968	1907.....	29,574
1899.....	43,599	1908.....	26,598
1900.....	37,791	1909.....	35,100
1901.....	22,732	1910.....	24,040

The Eustis mine was the principal shipper. This mine, which is situated at Eustis, on lot 2, range IX., Township of Ascot, nine miles south of the eity of Sherbrooke, began operations as far back as 1879. The ore occurs in lenticular masses, the sizes of which greatly vary in width, between a few feet and 75 feet. The lenses are usually conneeted by narrow veins which sometimes pinch down to an inch or less.

The length of the main slope of the Eustic mine is now over 3,000 feet long, on an angle of 40 degrees. The head of the slope is reaehed by a rock tunnel, 1,000 feet in length.

The orc is concentrated in a mill which is situated 3,000 feet from the top of the slope, and it is shipped mainly to Boston, where it is used in the manufacture of sulphuric aeid. The copper bearing cinder is then sent to West Norfolk, Virginia, where the Eustis company has a smelter in which are also treated some of the Virginia ores.

Some shipments are also made to the Nichols Chemical Company, at Capelton, Que.

It is interesting to note that the manager, Mr. Adsit, saved this year an appreciable amount of copper by the simple process of passing the mine water over scrap iron.

We reeord this year comparatively important shipments of eopper and sulphur ore from the McDonald mine, at Weedon, on lot 22, range II., Weedon, which has been under aetive development work for two years. This mine is worked by the East Canada Smelting Company.

The ore of this deposit eonsists of iron pyrites and chalcopyrite, occurring as lenticular masses, in more or less altered schists. Thc oceurrenee resembles closely that of the deposit which is worked at the Eustis mine. The main body of ore has been proved to be over 500 feet long, and to have a maximum width of 50 feet. It is likely that further development work will reveal other lenses.

The lens which has been developed has the same strike as the eounty rock, N. 40 deg. E., and dips to the S.E. at an agle of 45 deg.

The deposit has been developed to a depth of 110 feet by means of two shafts, 100 and 110 feet deep respectively. The latter is now being sunk to the 200 feet level. More than 700 feet of levels and crosscuts have been driven.

Shaft No. 1 is equipped with a 15 h.p. hoist, which can handle 70 tons per shift from a depth of 400 feet. The boiler equipment consists of two horizontal boilers and one vertical boiler, aggregating 200 h.p. The compressor plant comprises two Rand straight line eompressors eapable of running 8 drills.

Substantial shipments were maed to the Capelton Chemical Works of ore said to average 44 per cent. sulphur and 5½ per cent. copper.

The Albert mines in the same district, which shut down some two years ago, have not been reopened. The workings are now full of water. Some prospecting work was done on several of the old mines, but nothing of note has resulted.

A. O. Norton eontinued his prospeeting and development work at the Suffield mine, but no ore was shipped. The deposit worked here is a low-grade silicious ore, which consists of a mixture of chalcopyrite, pyrite, and a little bornite. The shaft is 400 feet deep, and there are 700 feet of drifts at various levels. The surfaee plant consists of a steam boiler of 100 h.p., a hoisting engine of 50 h.p., and a 4 drill air eompresso

Mr. Norton has also reopened the Marrington mi on lot 6, range V., Aseot Township, and did some pro pecting there with the help of a small 20 h.p. boil and hoisting engine. The drilling was done by han The shaft is 265 feet deep, and there are 500 feet drif ing.

At the Hepburn mine, lot 7, range IX., Aseot Tow ship, the Eustis Mining Company did some work of r opening and prospecting.

Thc Ascot mine, lot 8, range IX., Ascot Townshi was prospected by Mr. John McCaw, of Sherbrook for the East Canada Smelting Company, but no or was shipped.

On lot 24, range V., of Cranbourne, a little work wa done on a deposit which is said to contain bornite an chalcopyrite.

In the Beauce district considerable prospecting wor was done on two deposits in the vicinity of St. Fra cois. These deposits consist of quartz veins and lense cutting eruptive rocks largely serpentinized and co taining chalcopyrite and a little bornite.

In the fall of 1909 work was begun on the erectio of a small copper smelter at Actonvale, by Mr. P. Te reault, of Montreal. The intention was to treat th ore from the dumps of the old Actonvale mine, as wel as to do some custom work. The plant was complete and the furnaee blown in during the spring of 191 It consists of an Allis-Chalmers water-jacketed fur nace, of a capacity of 80 tons of ore a day; one Roo blower of a capacity of 6,600 c.f. of air per minute one 80 h.p. boiler and other accessories. After a shor run the operations were diseontinued to make altera tions. The plant is still in the experimental stage.

The old Aseot mine was unwatered and some samp ling was done.

On the whole, the copper industry of the Eastern Townships was not very active during 1910, owing in a measure to the low price of the metal which prevailed during the year. But other reasons also militate against an active resumption of work. One of the main causes, as remarked by Dr. Wilson, who studied the question for the Federal Mines Branch in 1909, is the attitude assumed by the majority of owners of undeveloped and unexplored prospects, who usually have high pretentions and disproportionate ideas as to the value of sueh prospects. The owners will not, as a rule, assume the risks of development, and yet ask prohibitive priees for their properties, and often are not even willing to give facilities to have them tested. Instances have come to our notice in whieh thousands of dollars are asked for mere eopper-bearing outerops, on which no work beyond a few days' stripping have been done.

Mr. Samuel Owen Greening, for 34 years the head of the well-known B. Greening Wire Company, Limited, died on the morning of August 31st, at his residence in Hamilton. The late Mr. Greening was born 64 years ago in Manchester, England. He came to Hamilton in 1856, in which year his father founded the company. Under the son's management the business grew to its present large dimensions.

Mr. Greening was one of the very best types of citizen and business man. He weilded a large, though quiet, influence for good.

FLUORSPAR

By Ernest F. Burchard.*

Fluorspar.

ommercial Value.—Fluorspar is a mineral of rela- ly low value as compared with metallic ores ed under similar conditions. Under the most fa- rable conditions, therefore, the margin of profit never be expected to be large, and it requires ex- tionally good management to conduct any spar ing operations profitably, especially in the west- states. In 1910 there were 69,427 short tons of estic fluorspar, including gravel, lump, and ground ieties marketed in the United States at an average ue of about $6.20 per short ton. Of this total, 61,- short tons were sold as gravel and lump spar, at average value of $5.58 per ton at the mines, and 91 short tons were sold ground, at an average value $10.72 per ton, f.o.b. cars.

Uses and Requirements of fluorspar—Fluorspar is d in the manufacture of glass and of enamelled and itary ware, in the electrolytic refining of antimony l lead, the production of aluminum, the manufac- e of hydrofluoric acid, and in the iron and steel ustries, in which it is used as a flux in blast fur- es and in basic open hearth steel furnaces. It is imated that about 80 per cent. of the American orspar output, mainly in the form of gravel spar, consumed in the manufacture of basic open hearth el. The use of fluorspar is increasing in practically of these industries. The western market for fluor- ar is more limited than that of the central and east- n states, but it is nevertheless increasing. Recently e iron and dsteel works at Irondale, Washington, d in Shasta County, California, have been enlarged. Supplies of spar mined in the west have heretofore t been sufficient to supply the western market for re than a few months at a time. This has been due several conditions, the most important of which is at most of the western spar thus far produced has t been of as high a grade as that produced in the inois-Kentucky district. Fluorspar for iron and eel making should carry at least 85 per cent. calcium oride and preferably it should be purer. For most her chemical uses it should contain from 95 per cent. 98 per cent. calcium fluoride.

Production.

The total quantity of domestic fluorspar reported the Survey as marketed in the United States in 10 was 69,427 short tons, valued at $430,196, as com- ared with 50,742 short tons, valued dat $291,747, in 09, an increase in quantity of 18,685 short tons, and value of $138,449. This increase represented nearly 7 per cent. of the quantity and 47 per cent. of the alue of the production of 1909. The production in 10 was the largest ever recorded. The average alue per ton for the whole country, considering all rades of fluorspar, was about $6.20 in 1910 as com- ared with $5.75 in 1909. This value represents the elling price on board cars at railroad or water ship- ing points, and with reference to the product from olorado, New Mexico, and Kentucky the price re- orted for much of the spar includes the cost of a ng wagon haul—$1.50 to $3 a ton. In Illinois the principal producing mines are near river transportation, and the cost of long wagon hauls has not entered into the reported value of the fluorspar.

Fluorspar was produced in 1910 in Illinois, Kentucky, New Mexico, and Colorado in the order named, each state, except Colorado, reporting an increased production. The product of Colorado and New Mexico has been classed as gravel spar, although much of the New Mexico product was equal to the grade of lump spar. Both Illinois and Kentucky produced gravel, lump, and ground spar.

In 1910 Illinois produced a total of 47,302 short tons of spar, valued at $277,764, or $5.87 per short ton on board cars. The gravel spar amounted to 35,477 short tons, valued at $178,880, or $5.04 per ton. The sales of lump spar in Illinois were 6,151 short tons, valued at $38,415, or $6.25 per ton. The ground spar sold in this state amounted to 5,674 short tons, valued at $60,469, or $10.66 per ton. Kentucky reported total sales of 17,003 short tons of spar, valued at $124,574, or an average price of $7.33 per ton, distributed as follows: Eleven thousand four hundred and fourteen short tons of gravel spar, valued at $75,823, or $6.64 per ton; 2,972 short tons of lump spar, valued at $20,359, or $6.85 per ton; and 2,617 short tons of ground spar, valued at $28,392, or $10.85 per ton. Colorado and New Mexico together produced 5,122 tons of gravel spar, valued at $27,858, or $5.44 per ton. The total stocks of fluorspar reported on hand in all the states December 31, 1910, were less than 2,000 tons.

Trade Conditions.

The demand for American fluorspar at Pittsburg, Birmingham, and other cities during 1910 was apparently greater than the capacity of the mills operating in the Illinois-Kentucky district. Prices advanced a little, but not enough to pay many of the smaller companies for operating, and consequently many of them were idle in both states. As a consequence of the increased demand, large stocks left over from previous years were practically cleaned up in localities within reach of transportation lines. Many steel plants purchased reserve stocks in anticipation of possible future scarcity of fluorspar. The steel plant at Pueblo, Colo., took the whole output of the Colorado and New Mexico producers in 1910, besides some spar from Illinois, but did not consume the total quantity purchased. Although, as noted on another page, the imports were exceedingly high, notwithstanding the import duty of $3 per ton imposed in 1909, the market for domestic spar does not appear to have been seriously affected by the quantities of fluorspar imported.

The conditions in the open hearth steel industry have a most direct bearing on the production of fluorspar, since the greater part of the gravel spar produced is used in the manufacture of basic open hearth steel. The increase in the quantity of basic open hearth steel in 1910, as compared with 1909, amounted to 1,874,857 long tons, or nearly 14 per cent. The following table* shows the production of open hearth steel during the last three years

*Abstracted from advance chapter Mineral Resources of the United States.

*Ann. Statis. Report Am. Iron and Steel Association, Philadelphia, Pa., July 25, 1911.

Production of open hearth steel in 1909-1910, in long tons.

	Basic.	Acid.	Total.
1908	7,140,425	696,304	7,836,729
1909	13,417,472	1,076,464	14,493,936
1910	15,292,329	1,212,180	16,504,509

Imports.

Before August, 1909, fluorspar was imported into the United States duty free, and the full statistics of importation were not given before that date. Large quantities of gravel spar produced at a low cost from the tailings of lead mines and from the gob in abandoned mines in England have been shipped to this country as ballast at a very low freight rate. The material thus produced is high in silica and is almost entirely consumed by open hearth steel makers. Before 1909 spar from England competed with American fluorspar as far west as Pittsburg and practically fixed the market price at that point. In the Lehigh and Susquehanna valleys of Pennsylvania and other localities near the Atlantic seaboard English fluorspar can yet be advantageously purchased under present conditions, and large quantities are consumed annually in the open hearth steel furnaces. The imports of fluorspar entered for consumption into the United States in 1910 were 42,488 short tons, valued at $135,-152, as compared with 6,971 short tons, valued at $26,377, in 1909. The value assigned to the material in 1910 was $3.18 per ton, as compared with $3.78 in 1909.

Mining and Milling Developments.

Illinois.

The principal developments during 1910 were confined to the properties of the Fairview Fluorspar & Leadd Company at Fairview Landing, and the Rosiclare Lead and Fluorspar mines, at Rosiclare. At other properties there was some prospecting by drill and a little mining, but the greater part of the output came from the two companies named.

At the Fairview mine four shafts produced ore, including one mining the "blue" vein. The deepest shaft (or steep incline) was reported 503 feet deep in the spring of 1911 and the deepest working level was 475 feet below the surface. At this level considerable calcite is encountered, either mixed with spar or else constituting nearly the whole vein. The vein is irregular in width, ranging from pinches 18 inches wide to swellings 25 feet wide. The spar bodies exhibit irregular outlines within the vein, and range from a few feet to 22 feet in width. One of the largest bodies was encountered at the 400-foot level. A new shaft has recently been sung to a depth of about 320 feet, with levels at 100 feet, 235 feet, and 295 feet from the surface. The "blue" vein shaft was at that time reported to be down 120 feet and to show 4½ feet of ore at the bottom. An important production was stoped from this vein in 1910. The main workings of the Fairview and the Rosiclare companies are approaching one another and are believed to be on the same vein. The mill at Fairview has recently been improved and enlarged, particularly with reference to the facilities for the preliminary picking and the final jigging of the spar. The jigs are reported to consist of a 5-cell rougher, a 6-cell cleaner, and a 5-cell finisher. The capacity of the mill is reported at 200 to 250 tons of cleaned spar per 10-hour shift and the storage capacity at about 3,000 tons. Spar is loaded directly at the mill into standard-gauge cars, which are moved over a short line to the landing on [illegible] River and towed on barges to the Illinois Central Railroad at Golconda.

At Rosiclare the mining method has been changed from underhand to overhead stoping. Only one shaft is operated here, and the lowest level was 235 [illegible] below the surface in April, 1911. In July it was reported that the shaft had been sunk to 275 feet and was planned to be sunk to a depth of about 335 [illegible] where a new level will be established. Local pinching and swelling is characteristic of the vein, the width ranging from a few inches to 22 feet. In places the vein is found to carry almost entirely calcite, but there are large quantities of good ore still available at the lowest level, in both directions from the shaft. A new steel and concrete mill, entirely fireproof, has been built at Rosiclare, designed to reduce 500 tons of crude ore per day. The shaft has been reconstructed and consists of three compartments, two of which for hoisting, are 5 feet 5 inches by 4 feet 4 inches, and one is a pump compartment, 5 feet 5 inches by 3 feet 8 inches. The mill consists of three large buildings. The sizing and sorting building, with the shaft at the south end, stands in the middle, with the power house and grinding building to the west and the concentrating building, or jig house, to the east. All the buildings are approximately 90 feet long. The middle building is 20 feet wide at the base, and the head frame stands 84 feet high. The two other buildings are 36 feet wide and stand 30 feet to the eaves. The alleys between the middle building and the two others buildings are 14 feet 6 inches wide.

From the mine the spar is hoisted to the top of the mill in steel cars having a capacity of one ton each. The spar is dumped on steel grizzlies having 2½-inch spaces. The grizzlies are inclined toward two 24-inch steel apron conveyers. From the oversize No. 1 lump spar is picked and thrown on the conveyers. The common spar not passing the grizzly is shoveled into a No. 5 gyratory crusher. The total capacity of the grizzlies is about 100 tons of material. The material passing the grizzly and the crusher feeds down into two 150-ton steel bins on the floor below. These bins feed into two shaking screens on the floor next below. These screens have steel frames 17 feet by 2 feet 9 inches, with bottoms of heavy wire with meshes about ½-inch by 1⅛ inches. The lump spar is delivered by the apron conveyer to a rotary drier 25 feet long by 36 inches in diameter, which is supplied with hot air from the top of the boilers. The ore falls from the drier on a "butterfly," which diverts the material as desired, either into a bin for No. 2 lump spar or through a drying tower into a No. 3 crusher. The No. 2 lump spar may be drawn directly from the bin, barreled, and shipped. The No. 1 spar passes through the No. 3 crusher, which feeds by gravity into a grinding mill. This mill discharges through a 30-mesh, 30-wire screen into a screw conveyer, which moves the ground spar to four storage bins. Each bin feeds into a barrel which stands on a packer. The barrels of ground spar weigh 550 to 610 pounds when filled. The capacity of this packing room is about 10 barrels per hour, or 30 tons a day.

From the shaking screens the undersize is carried by water through a 9-inch pipe to the jig house, and the oversize of the screens falls on a picking belt, at which 9 to 15 men may work. On this belt separation is made by hand of the larger fragments of lead and zinc ore, calcite, waste, and fluorspar. Lump spar can thus be picked, if desired, in order to increase the

tity secured by picking on the grizzly above. The e and calcite are thrown directly to chutes lead- to their respective bins, while the lead and zinc pass through short chutes to separate troughs below the picking belt, and are moved by a double ing conveyer to separate 13-inch disk crushers. overrun of fluorspar from the picking belt passes he opposite direction to a 24-inch disk crusher. lead and zinc ores discharged from their respec- disk crushers are carried through pipes across to ator jigs in the jig house. From the 24-inch disk her the spar and the fine lead and zinc ores are into a bin. This bin feeds into the same service which receives the undersize from the shaking ens. This service pipe crosses to the jig house and s into a 5-celled rougher jig. The ore from the her jigs goes to a cleaner jig having six cells. vision is made for catching the lead from the righ- ig and for taking care of the tailings. Between rougher jig and the cleaner jig are sand crushers several pumps, and the system is very flexible. lead and zinc ores coming from the 13-inch disk shers are treated by two 4-celled pulsator jigs, hav- a set of laboratory rolls. Of the ore at present sidered normal about 90 per cent. consists of con- trates of fluorspar, galena, and sphalerite (zinc de). The galena recovered constitutes about 1 cent. of the concentrates, and the sphalerite still . It is planned to treat a large quantity of tailings m the oil mill, of greater richness than those now duced, as soon as the new mill is working perfect- The milling of fluorspar offers rather difficult blems, for unlike most ores, the bulk of the pro- t must be saved, and the waste which must be minated constitutes relatively a small percentage. addition, the separation of the lead and the zinc m the fluorspar is difficult, particularly where such all percentages of the former minerals are present, it is essential that they be almost completely re- ved, since the presence of sulphide ores renders the orspar of little value as a flux in steel making. reover, if the separation can be completely and eco- mically effected, the lead and zinc ores recovered terially assist in paying the expense of cleaning the e.

Under normal conditions about 57 men are em- yed overhead, including office force and superin- ndents, and about 48 men underground. When vis- d in April, 1911, this mill had not been entirely mpleted, and its capacity had not been demonstrat- . It was expected, however, that its capacity would r exceed any other mill built to treat fluorspar and sociated ores. The product of this mill is carried Ohio River over an electric tramway 3,300 feet ng, and is then loaded on barges and towed to Shaw- etown, Ill., Evansville, Ind., or Golgonda, Ill. The er is generally closed by ice for a short period in inter, and in very dry summers the water may be- me too low for transportation. For this reason an deavour is made to maintain sufficient stocks of ar from the Rosiclare mines at the railroad in Shaw- etown to provide for shortages caused by interrupt- l shipments.

New Mexico.

Only recently has fluorspar been found in New exico in sufficicit quantities for exploitation. The merican Fireman's Mining Company, of Kansas ity, Mo., in prospecting for metallic ores on property tuated 10 miles northeast of Deming, Luna County, N. Mex., has opened a number of veins of fluorspar which give promise of containing nearly if not quite sufficient spar to supply the western market for several years.

Location.—The fluorite occurs on the flanks of a small ridge called "Fluorite Ridge," one of the foothills of Cooks Range, 10 miles northeast of Deming. The most promising prospects have been made in two localities separated by a distance of about 1¼ miles. One of the localities is at the extreme southeastern base of the ridge on a gentle rise about 400 feet above the plain; the other well up the south slope of the ridge about 900 feet above the plain. Deming lies in a nearly flat valley covered by desert deposits, with Cooks Range 10 to 15 miles northeast and the Florida Mountains 10 miles or more southeast. The fluorspar deposits are most easily reached by a 10-mile drive from Deming, but the product is shipped from a siding, on the Atchison, Topeka & Santa Fe Railway, called Mirage, 5½ miles southeast of the prospects.

Geologic Relations.—Fluorite Ridge consists of a central mass of monzonite pohphyry which has intruded strata of Paleozoic and Mesozoic age, chiefly Ordovician limestone and Carboniferous and Cretaceous sandstone, quartzite, and conglomerate. The dips of the sedimentary strata on the south and west sides where the fluorspar is found are very steep, or vertical, and masses of the strata have not only been tilted up by the intrusive action, but folded into the intrusive rock. The base of the ridge is surrounded by an agglomerate consisting of angular masses of ondesite embedded in tuff. Some thin dikes of balast cut the agglomerate, and unconsolidated "desert fill" overlies it at a short distance from the base of the ridge.

Occurrence and Character of the Fluorspar. — The fluorspar occurs in veins, cutting and altered monzonite porphyry. Certain of the veins fill fractures in the rock along which there has been movement in both a vertical and a horizontal direction, but between the walls of some fissures there has not been noticeable displacement. The rock at the southeast base of the ridge is cut by two or more groups of approximately parallel veins. As shown by the openings that have been made, there appear to be at least five or six distinct veins in each group. One group of veins strikes N. 17 deg. E. to N. 27 deg. E., and the other strikes N. 6 deg. E. to N. 18 deg. W., and still other veins were observed to strike at various angles between these limits. The veins are nearly vertical or dip steeply in a southeast or northeast direction. The vein material is mainly fluorite mixed with a little quartz. Where the veins are partly siliceous they resist weathering slightly better than the surrounding porphyry, and therefore leave broken traces on the surface. At the surface the fluorspar in places is altered to calcium carbonate. The thickness of the veins as shown by surface cuts and by prospect pits and shafts ranges from a few inches up to 12 feet or more, but it is generally from 2 to 5 feet. The structure of the veins is in places distinctly banded; in other places the vein appears to consist mainly of a mass of crystalline spar, showing no banding, but carrying pockets of quartz. Brecciation of the vein by which large fragments of the wall rock have been included is not uncommon. The walls of the veins where open to any considerable depth are found to be smooth in places, but they are rarely smooth or regular for many feet, and the wall rock is generally much decomposed.

At the locality on the south slope of the ridge only

one set of veins, striking in a northwesterly direction, was observed. They stand nearly vertical or dip steeply toward the northeast. These veins had been opened in only two or three places in 1910, and the maximum width observed was only about 4 feet, not all of which was filled by spar. The veins cut monzonite porphyry, as at the first locality, and were observed to outcrop at intervals in the direction of strike for a distance of one-quarter mile.

Developments—At locality No. 1 the American Fireman's Mining Company opened in 1909 a number of veins by means of shallow cuts, and sank several test pits to depths of 6 to 12 feet and two shafts to depths of about 80 feet. In all, about 20 openings had been made up to August, 1910. A triangular area about one-fourth mile wide at base from northwest to southeast, and about one-third mile from northeast to southwest, has been shown to carry productive veins of fluorspar. The surface of the area slopes gently to the southeast. At the main opening the vein strikes N. 17½ deg. E. to N. 22½ deg. E. and dips 65 deg. to 70 deg. toward the southeast. The vein had been opened to a depth of 75 or 80 feet in August, 1910, and had been worked for a distance of about 100 feet on the strike. The thickness between the walls of the vein measures 4 feet to 12½ feet, the irregularities being due to pinching together of the walls in places. The strike of the vein is apparently slightly sinuous, according to the irregularities in the walls, but there are no evidences of movement between the walls. The rock inclosing the vein is altered to a reddish colour so far as observed, and although the vein walls are smooth and clean in places, in other places there is interpenetration of vein and wall material.

The fluorspar is principally of a light-green shade, but there is some purple spar present, especially near the margins of the vein, and some quartz is present in pockets and thin stringers scattered throughout the mass of spar. The spar is mined from several levels and milled down through chutes to the lowest level, from which it is hoisted in buckets up the shaft to the surface. A steam hoist was being installed in Aug. 1910. On the strike of the opening, less than 100 yd. north of the shaft, an open cut and shallow burrow showed a promising vein of spar with a fork extending in a northwest direction. These veins and another a few yards to the west are the nearest to the limestone mass, which lies 35 yards or more to the west. So far as could be ascertained, none of the veins extend into the limestone. The greater part of the spar that has been produced in this region has been taken from the shaft just mentioned.

Grades of Western Fluorspar.—None of the spar that has been mined in Colorado and New Mexico has been cleaned in any way except by hand. Mechanical concentration would improve the grade of the Colorado spar greatly, but none of the fluorspar prospects in Colorado have proved of sufficient richness to warrant the installation of washing plants. In certain places water is available, but in others the problem of finding water would be difficult. The Colorado product has never averaged quite high enough in grade fully to satisfy purchasers or to command a price satisfactory to producers. With regard to the deposit near Deming, N. Mex., there is little necessity for washing, but such a process would not be at all possible on account of thescarcity of water. Supplies of water for men, teams, and hoisting engine have to be hauled from a well more than 4 miles distant on the road to Deming. There is little probability that a supply could be obtained by drilling anywhere near the fluorspar deposits on account of the nature and structure of the underlying rocks.

Analyses.—The following table gives analyses of gravel fluorspar from Mirage, N. Mex., generally in carload lots used in basic open hearth steel furnaces and analyses of spar from Colorado, Illinois, and Kentucky, made on a similar basis, are given for comparison.

Analysis of Fluorspar from New Mexico, Colorado, Kentucky, and Illinois.

Locality	CaF_2.	SiO_2.	Al_2O_3+ Fe_2O_3.	$CaCO_3$.	$MgCO_3$.	Authority.
Mirage, N. Mex.	93.68	4.68	0.74	0.76	Trace	Colorado Fuel & Iron Company.
Mirage, N. Mex.	93.55	4.97	.80	.62	Trace	Colorado Fuel & Iron Company.
Mirage, N. Mex.	91.98	6.60	1.00	.67	Trace	Colorado Fuel & Iron Company.
Mirage, N. Mex.	88.80	9.83	1.10	.48	Trace	Colorado Fuel & Iron Company.
Mirage, N. Mex.	88.30	9.85	1.06	.98	Trace	Colorado Fuel & Iron Company.
Mirage, N. Mex.	89.52	8.62	.92	.79	Trace	Colorado Fuel & Iron Company.
Mirage, N. Mex.	91.32	6.60	.74	.74	Trace	Colorado Fuel & Iron Company.
Mirage, N. Mex.	90.13	7.86	.70	.74	Trace	Colorado Fuel & Iron Company.
Mirage, N. Mex.	92.19	6.05	.68	.83	Trace	Colorado Fuel & Iron Company.
Mirage, N. Mex.	90.90	6.96	.86	.86	Trace	Colorado Fuel & Iron Company.
Mirage, N. Mex.	90.22	7.60	1.04	.68	Trace	Colorado Fuel & Iron Company.
Mirage, N. Mex.	88.59	9.66	.96	.83	Trace	Colorado Fuel & Iron Company.
Mirage, N. Mex.	93.99	3.84	1.12	1.12	Trace	Colorado Fuel & Iron Company.
Mirage, N. Mex.	89.70	8.60	.92	.80	Trace	Colorado Fuel & Iron Company.
Rosita, Colo.	81.55	13.3	5.1	....	.....	Colorado Fuel & Iron Company.
Rosita, Colo.	86.75	9.3	4.2	....	.....	Colorado Fuel & Iron Company.
Rosita, Colo.	82.25	12.6	5.0	....	.....	Colorado Fuel & Iron Company.
Rosita, Colo.	84.3	11.6	n.d.	....	.....	Colorado Fuel & Iron Company.
Rosita, Colo.	60.9	27.0	n.d.	....	.....	Colorado Fuel & Iron Company.
Jamestown, Colo.	76.05	19.8	4.2	....	.....	Colorado Fuel & Iron Company.
Jamestown, Colo.	83.76	12.2	4.0	....	.....	Colorado Fuel & Iron Company.
Jamestown, Colo.	85.9	10.5	3.75	....	.....	Colorado Fuel & Iron Company.
Jamestown, Colo.	79.06	15.24	5.26	....	.....	Colorado Fuel & Iron Company.
Jamestown, Colo.	86.75	8.60	4.46	....	.....	Colorado Fuel & Iron Company.
Marion, Ky.	84.25	2.98	1.28	10.28	.....	Colorado Fuel & Iron Company.
Marion, Ky.	87.8	3.10	2.06	....	.....	Colorado Fuel & Iron Company.

Marion, Ky.	90.02	4.72	1.5	....	.....	Colorado Fuel & Iron Company.
Marion, Ky.	92.7	2.5	.64	....	.....	Colorado Fuel & Iron Company.
Marion, Ky.	96.01	1.9	1.88	....	.....	Colorado Fuel & Iron Company.
Marion, Ky.	94.72	1.22	.98	1.82	0.68	Lackawanna Steel Company.
Marion, Ky.	95.63	1.32	.93	.38	1.22	Lackawanna Steel Company.
Fairview, Ill.	88.85	3.4	1.45	....	.....	Carnegie Steel Company.
Fairview, Ill.	87.07	3.12	....	8.96	.....	Fairview Fluorspar & Lead Company.
Fairview, Ill.	86.31	4.30	....	7.57	.....	Fairview Fluorspar & Lead Company.
Fairview, Ill.	86.60	2.38	....	10.94	.....	Fairview Fluorspar & Lead Company.
Fairview, Ill.	85.35	8.17	....	4.50	.....	Fairview Fluorspar & Lead Company.
Fairview, Ill.	83.49	4.0	....	7.67	.....	Fairview Fluorspar & Lead Company.
Fairview, Ill.	84.80	3.51	....	8.29	.....	Fairview Fluorspar & Lead Company.
Fairview, Ill.	84.50	3.85	....	8.27	.....	Fairview Fluorspar & Lead Company.
Fairview, Ill.	85.63	3.82	....	9.21	.....	Fairview Fluorspar & Lead Company.
Fairview, Ill.	88.67	5.13	....	4.49	.....	Fairview Fluorspar & Lead Company.
Fairview, Ill.	85.61	6.05	....	4.22	.....	Fairview Fluorspar & Lead Company.
Fairview, Ill.	85.57	6.76	....	2.26	.....	Fairview Fluorspar & Lead Company.
Fairview, Ill.	86.10	7.39	....	2.14	.....	Fairview Fluorspar & Lead Company.
Fairview, Ill.	86.87	7.39	....	4.44	.....	Fairview Fluorspar & Lead Company.
Fairview, Ill.	98.27	.58	....	.27	.....	Fairview Fluorspar & Lead Company.
Fairview, Ill.	96.62	1.67	....	.79	.....	Fairview Fluorspar & Lead Company.
Fairview, Ill.	98.30	.46	....	.46	.....	Fairview Fluorspar & Lead Company.
Fairview, Ill.	95.38	.47	....	3.55	.....	Fairview Fluorspar & Lead Company.

From these analyses it will be seen that the spar hipped from Mirage, N. Mex., is of an exceptionally igh grade, considering the fact that it has not been ashed and cleaned as has the Illinois-Kentucky pro-uct.

Cost of Production.—The mining of the fluorspar ear Deming is done almost wholly by contract. Mexi-an labour is employed, and miners earn about $1.50 er day. Mining the spar costs per ton $1.75, plus 5 cents for incidentaly expenses, and haulage to the ailroad costs $1.50, making a total cost of $3.50 per on dumped into cars. The spar in 1910 was selling t $5.25 per ton on the cars, based on at least 90 per ent. calcium fluoride, and the freight from Mirage to ueblo, paid by the purchasers, was $2 per ton. Ac-ording to contract a penalty of 20 cents per ton is leducted for each per cent. that the spar falls below 0 per cent. calcium fluoride, but no premium is paid nless it carries more than 95 per cent. calcium fluor-de, when each unit brings 20 cents more per ton. The equipment for mining the spar is simple, the larg-est items of expense being the small steam hoist sta-tioned at the deepest working, and the several teams necessary to haul the output. Small store buildings and machine shops have been built at both places where the spar was being developed. The labourers live in tents, and work can be carried on the year round. From the opening of these deposits in the summer of 1909 to the close of 1910 nearly 5,000 tons of fluorspar had been shipped, averaging 92 per cent. calcium fluoride.

Conclusions.—The exploration for and development of fluorspar deposits under present conditions in the western states can not be said to offer attractive pro-fits; nevertheless the market for fluorspar is growing, and where deposits are found so situated that the freight rates do not hold down the price to a profitless level and the cost of haulage does not further wipe out all chances of gain, the development of such deposits should be encouraged.

THE PREVENTION OF ACCIDENTS IN MINES.

In Queensland and New South Wales the Acts for he prevention of accidents in mines provide that in nines employing more than ten men below ground the nining inspector shall be the holder of a first-class nine-manager's certificate, and be over thirty years f age. The Queensland Act states: "Wherever any nining inspector shall have inspected any mine or nachinery he shall enter in a book, to be kept on the nine or works for the purpose, his opinion derived rom such inspection of the actual condition of the nine and machinery at the time of such inspection, nd he shall also record what alterations or require-nents he thinks necessary." This is doubly useful, as it keeps the inspector up to the scratch and allows the manager to know at once the position, while should an accident occur it shows that the mine was in a safe condition at the time of the inspection. This record is also useful for reference purposes on any subsequent visit of an inspector. There is another use-ful regulation in the Queensland Act, namely, that the manager of every mine has once a week to sign a state-ment in a book kept for the purpose, that during the week he has at least once visited every working face in the mine, and he has to state whether conditions were safe or otherwise. In big mines this regulation will keep the manager up to his work and prevent too much dependence being placed on the foreman.

As to the storage of explosives, the Queensland Act states that: "Detonators for blasting shall be kept on the surface of the ground, in a covered box placed in a separate magazine. No more than 100 detonators shall be kept underground in any level at one time, and these shall be kept in a covered box in a separate drive or chamber and only taken out in such quanti-ties as required for immediate use. Detonators shall not on any pretence whatsoever be placed near any travelling road, pass or working face." The Austra-lian Acts require the mine manager to supply the Mines Department with a copy of the working plans of the mine, and are very particular about the tensile strength of hoisting ropes, etc. In the case of fatal accidents no work other than that required to save life shall be done, nor the conditions altered in any way until the inspector has had an opportunity of examining the position.

Preliminary Programme of the National Mine Safety Demonstration

Pittsburg, Pa.

October 30 and 31, 1911.

Board of Managers.

H. M. Wilson, representng United States Bureau of Mines; Dr. M. J. Shields, representing American National Red Cross Society; S. A. Taylor, representing coal operators of the United States; Francis Feehan, representing United Mine Workers of America; John Laing, representing the State Mine Inspectors; Thos. B. Dilts, representing Industrial Department of International T. M. C. A.

General Committee.

Chairman, H. M. Wilson; Mine Rescue and First Aid, J. W. Paul; Arsenal Demonstration, Clarence Hall: Experimental Mine, L. M. Jones; Programme, Lauson Stone; Reception, J. C. Roberts; Ushering, J. K. Clement; Secretary, C. S. Stevenson.

United States Bureau of Mines.

Arsenal Grounds, 40th and Butler Streets, Pittsburg.

October 30, 1911.

Address of welcome, 9 a.m., Director J. A. Holmes, Bureau of Mines.

Event No. 1—(Continuous from 9.15 a.m. to 12M., with interruptions for Events 2 to 6.)

Building No. 10—Electrical laboratory, showing the effect of breaking lighted incandescent lamps which are surrounded by an explosive mixture of gas and air.

Building No. 13.—The foundry cupola in operation and method of securing gas samples and taking temperature measurements from different zones in the coke bed for the purpose of studying the fundamentals of the process and possible improvements therein.

The operation of a gas producer when burning coke at high temperature, at high capacity and eliminating ash and clinker by slagging.

The smokeless combustion of low-grade fuel in boilers when using mechanical stokers.

Operation of the long combustion chamber, designed to make a comprehensive investigation of the processes of combustion in boiler furnaces and the conditions requisite for complete combustion with coals of varying volatile matter, with various rates of firing and heating of coal with variations in the amount of air supply and in the rate of mixing of air with the volatile combustible.

Building No. 17.—Demonstration of the relative safety of single gauze and double gauze bonnetted safety lamps when subjected to a current of gas and air containing eight per cent. of methane and ethane at a known velocity.

The training in a noxious atmosphere of men wearinfi different types of rescue apparatus.

Exhibition of apparatus for the physical testing of explosives, including ballistic pendulum, pressure gauge, calorimeter, flame test apparatus, rate of detonation apparatus, large and small impact machines, cone and pendulum friction devices, and Trauzl and small lead blocks.

Building No. 32.—Demonstration of lignite and coal briquetting plant, making briquets from California lignite.

Gas and Dust Gallery No. 2.—Test of an electr mine motor surrounded by an explosive mixture gas and air, and provided with explosive proof pr tection device.

Event II.—9.30 a.m.

Gas and Dust Gallery No. 1.—To determine the e fect of a charge of a permissible explosive, equivale in disruptive force to one-half pound of forty per cen nitroglycerine dynamite, tamped with one pound dry fire clay, when fired into a mixture of gas an air containing seven per cent. of methane and ethan

Note.—At Forbes Field, October 31, at 10.30 a.m Events II. and III. will be repeated in the presenc of coal dust instead of mine gas.

Event III.—10 a.m.

Gas and Dust Gallery No. 1.—To determine the e fect of a charge of FFF black blasting powder, equ valent in disruptive force to one-half pound of 40 pe cent. nitroglycerine dynamite, tamped with tw pounds of dry fire clay, when fired into a mixture gas and air containing seven per cent. of methane an ethane.

Event IV—10.30 a.m.

Near Gas and Dust Gallery No. 1.—Illustrating th ignition of coal dust by means of the laboratory coa dust ignition apparatus devised and used by th Bureau of Mines.

Event V.—11 a.m.

Gas and Dust Gallery No. 2.—Illustrating the effec of removing the explosion proof protective device from an electric mine motor operating in an explosiv mixture of gas and air.

Event VI.—11.10 to 12 m.

Building No. 21.—Chemical and physical laborato ies: Inspection of fuel, oil, explosives, gas, and othe laboratories.

United States Bureau of Mines Explosion at Exper mental Mine.

Near Bruceton, Pa., Oct. 30.

2 p.m. Leave Pittsburg on special train over th Wheeling Branch of the Baltimore & Ohio Railroad

2.30 p.m. Arrive at Experimental Mine.

2.30 to 3.30 p.m. Inspection of Exeerimental Mine.

3.45 p.m. Explosion in Experimental Mine.

4 to 4.45 p.m. Inspection after explosion.

5 p.m. Return to Pittsburg by special train.

Programme of National Mine Safety Demonstration

Tuesday, October 31, 1911.

Forbes Field, Pittsburg, Pa.

Field Officers.—Manager of Field Events, J. W Paul; Field Marshal, Francis Feehan; Chief Usher J. K. Clement.

Event I.—9 to 10.30 a.m.

Demonstration of first aid to the injured by team of men representing mining companies from all sec tions of the United States of America.

Problems I, II, III, IV, V. (These problems to b published October 1).

Companies represented in demonstration of first ai to the injured and personnel of teams. (This to b filled in after entries have closed on September 30).

Rules.

1. The officers shall be as follows: A manager of ents, a secretary, and assistants, a field marshall id assistants, and a chief usher and assistants.

2. Each team may be identified by the number worn y the captain, the same corresponding to the num- er on the printed list of teams on the final pro- ramme.

3. Each team shall perform according to the num- ers assigned; all holding odd numbers performing gether; subsequently, those holding even numbers, gether.

4. All patients must be placed on stretcher after ach treatment. All artificial respiration must be iven for one minute.

5. No practicing shall be permitted on the day of emonstrations, nor shall the patient assist in any reatment.

6. As soon as an event has been completed, the eam shall stand at position and the captain shall aise his hand.

7. The number of each event will be displayed, as erformed upon the bulletin board.

8. The beginning and closing of each event will be lesignated by the sounding of a gong. Two signals vill be given for removal of bandages.

EVENT II.—10.30 to 11.30 a.m.

Part I.—A permissible explosive, equal in disruptive force to one-half pound of 40 per cent. nitroglycerine dynamite, tamped with one pound of dry fire clay, will be fired into the gallery.

No explosion of the coal dust is expected.

The Forbes Field Dust Gallery.

This gallery is cylindrical, 133 feet long, and an internal diameter of six feet four inches, and represents an underground tunnel or part of a coal mine. The explosive is fired into the end of the gallery. Within the gallery are 133 pounds of fine coal dust from the Pittsburg seam, distributed uniformly throughout, and 20 pounds on a wooden bench 20 feet long near the mouth of the cannon, making a total of 153 pounds of coal dust.

Part II.—Demonstration of the use of birds in exploring mines after explosions or mine fires, at which carbon monoxide causes a large percentage of the fatalities. A few birds, which are much more sensitive to the effect of poisonous gas than men, can be taken into a mine with a rescue party, and as soon as they show signs of distress, the party can retreat to safety. In the demonstrations a man will enter a glass box, the atmosphere of which contains 0.25 of 1 per cent. of carbon monoxide gas, and remain there for some time after the birds have collapsed.

Part III.—A charge of FFF black blasting powder, equal in disruptive force to one-half pound of 40 per cent. nitroglycerine, tamped with dry fire clay, will be fired into the gallery containing 153 pounds bituminous coal dust, being the same dust as that used in Event II, Part I.

An explosion of coal dust is anticipated.

Part IV.—Foremen miners of the Bureau of Mines, equipped with various types of artificial breathing apparatus, will enter the gallery immediately after the coal dust explosion and recover supposed victims of mine explosion. First aid miners of the Bureau of Mines will resuscitate those overcome by noxious gases, using artificial respiration and oxygen respirating apparatus. They will administer first aid to the injured, using in this demonstration only the pocket first aid packet and those things which might be near after an explosion in a mine.

EVENT III.—11.30 to 12 Noon.

Introduction of President Taft by Joseph A. Holmes, Director, United States Bureau of Mines.

Presentation of medals, by William H. Taft, President of the United States.

Address, John K. Tener, Governor of the Commonwealth of Pennsylvania.

Address, Walter L. Fisher, Secretary of the Interior.

Address, Miss Mabel Boardman, American National Red Cross Society.

EVENT IV.

Parade of 19,927 miners, each of whom in his person represents one of the 19,927 men killed in the coal mines of the United States in the last twenty years.

Miners to march in review before the President's stand, and then to special cars on Forbes Street, which will carry them to the river front, where they will witness the marine parade commemorative of the Centenary of the Opening of Steam Navigation on the Ohio River.

NATIONAL MINE SAFETY DEMONSTRATION.

Entrance Rules.

The following rules, with suggestions, are sent mine operators who expect to enter first aid teams in the National Mine Safety Demonstration.

Rule 1.—The National Mine Safety Demonstration will be a non-competitive exhibition of skill in first aid to the injured in mines.

Rule 2.—Not more than one team of five men to represent any one coal mine, or the U. S. Bureau of Mines, or state mine departments, except that coal mining companies operating more than one mine may enter additional teams representative of groups of miners, helpers, trapper boys, or other mine workers.

Rule 3.—All persons entering to submit certificates showing that they are, or have been, bona fide mine workers.

[Suggestion—Submit a brief statement by one of the state mine inspectors to the effect that Messrs. John Doe, Richard Roe, etc., have worked in and around coal mines (give minimum length of time). (Signed and dated:— Inspector).]

Rule 4.—All entries to close one month prior to date finally selected for the meet (viz., Sept. 30, midnight).

[Suggestion.—The entries, like the certificates, need not follow any particular form, being merely a letter stating that you enter the following men, giving the full name of all entrants with the company name and official in charge.

Positively no entries will be accepted after October 1, since names are to appear on souvenir programme, which will go to press that day.]

Rule 5.—Coal companies entering teams to be invited to present, not later than one month in advance of the meet, viz., Sept. 30th, a list of five events as their choice, these to be submitted to the managers, who will select five for adoption from the various events suggested, each entering team to exhibit in these events suggested by them and such others of the five as they may elect.

[Suggestion.—The five events you prefer will, with others, be submitted to the committee to the committee of managers, who will select for the public exhibit frrom all those sugestions, the five which have the majority of recommendations. No suggestions will be received after October 1, on which date the five events selected will go to press. You will be notified prompt-

ly of the events decided upon so that your team may practice them. It is essential that you do this in order to assure that your team can perform within the time limit fixed for each event. The programme must President Taft is limited.]
be run off with snap and speed, since the time of

Rule 10.—Souvenir badges of the American Red Cross, souvenir buttons of the U. S. Bureau of Mines, and souvenir programmes will be presented to individual entrants; a souvenir first air box to each team entering; a souvenir pennant with the name of the company sending entrant, and to be used on the field as a marker, to be presented to the company represented.

Rule 13.—Each team will select its own subject in addition to the five operating members thereof, or will have a miner present, selected for them.

Rule 14.—In this exhibition, the correct use of the roller bandage of the triangular bandage will be given the same credit. In dressing wounds, the first aid packet only will be used. There will be no restrictions as to the make of the first and packet. Teams are to bring their own material, consisting of splints, cotton, bandages, first aid packets, picric acid gauze torniquots, stretchers, and at least two woolen blankets.

THE BENONI CONSOLIDATED PLANT.

A Modern Gold Mill.

Our Porcupine readers will be much interested in the following description, culled from the South African Mining Journal, of a large new plant that is soon to be put in commission. It represents the last word in mill equipment:

At the present time the mine is only being developed by the east and central shafts, and the ore hoisted through these two shafts will be carried by bottom discharge hopper trucks, and dumped direct into the main ore bin at the reduction works, which has a capacity of 1,000 tons. From this bin the ore will be fed on to conveyer belts and carried direct to the crusher station. The crusher station, which is of steel construction, is laid out for double sorting. The crushers are of the jaw type, 30 in. by 28 in. in size, and are four in number, three serving the intermediate sorting belts and one the coarse sorting belt. They are belt driven from a countershaft operated by a 150 h.p. motor. The fines from the Nos. 1 and 2 fines bins are carried by a belt, which, after passing over a weighing machine, feeds them on to a shuttle belt conveyer erected above the mill bins. This conveyer distributes the fines to the mill bins, which have a capacity of 2,000 tons. Both the mill bins and building are of steel construction.

The battery consists of 55 stamps of 2,000 pounds weight, operating in open-fronted mortar boxes, which stand on anvil blocks bolted to heavy concrete pile blocks. The king posts, which are of cast steel of special design, are secured to heavy wooden timbers bolted to the concrete pile blocks, whilst the guide beams are also of cast steel and are fitted with cast iron guides for the stamps. The stamps are arranged in batteries of five each, each battery being electrically driven. The tube mill plant consists of four 22 ft. by 5ft. 6 in. tube mills, each operated by a belt drive from an A. E. G. motor. The shaking tables are of the usual type, and are 28 in number—seven for each tube mill. The pulp, after passing over the amalgamating tables, is lifted by two 8 inch pumps to a second series of four Stadler classifiers, the overflow from wh passes to the cyanide works, whilst the underflow returned to the tube mill circuit.

The overflow from the Stadler classifiers, just m tioned, passes to primary and secondary Stadler cla fiers, the final underflow from which goes to a 21 diameter Caldecott filter table, whilst the final ov flow runs to three 21 ft. diameter Arbuckle dewat ing cones. The dewatered products from these t sets of apparatus pass together to the first set of fo mixing agitators, 8 ft. diameter by 22 ft. high, whe they are mixed with the required quantity of stro cyanide solution, and then pass to a series of Wa Arbuckle air agitators, in which the gold dissolvi process is carried out. These agitators are so a ranged that they can be used in series or in parall as desired, it being possible to short-circuit any o tank or section of tanks as required. The combin sand and slime, together with the gold in solution, then lifted by two 5 in. pumps to a Stadler classifie the overflow from which goes to the first set of thr 21 ft. diameter Arbuckle desolutionizing cones, the u derflow from which cones joins the underflow fro the Stadler classifier and passes to the second set four mixing agitators 8 ft. in diameter by 22 ft. hig where they are mixed with a weak wash cyanide sol tion. The sludge from these agitators passes to a se ond series of primary and secondary Stadler class fiers, the final underflow from which is treated on second 21 ft. diameter Caldecott filter table.

The extractor house is fitted with eight 12-co partment steel extractor boxes and with the necessa motor-driven solution pumps. The solution, aft passing through the boxes, gravitates to the stro solution tanks, from which it is lifted by two 5 i pumps to the first set of mixing agitators. The clea up room is fitted with the usual appliances, and under the same roof as are the shaking amalgamatin tables in order to simplify supervision. The whol plant has been laid out with a view to simplify joi administration with the plant to be ultimately erecte by the Apex Mines (gold section), and at the sam time in such a way as to permit any unit of eithe plant to be enlarged to any extent that future deve opments may render necessary.

CANADIAN MINING INSTITUTE — WESTERN BRANCH.

Eleventh General Meeting.

The eleventh general meeting of the Western Branc of the Canadian Mining Institute was opened at Ne Denver, Slocan Lake, B.C., on Wednesday evening September 13, Mr. Robert Hedley, of Vancouver. B.C chairman of the Branch, presided, and among thos present were the following: Wm. Fleet Robertso provincial mineralogist, and E. Jacobs, branch secre tary, Victoria; S. S. Fowler and A. H. Gracey, Nelson Thos. Kiddie, Vancouver; M. E. Purcell, superintend ent of the Consolidated Mining and Smelting Co.' Centre Star group of mine, Rossland; A. J. Becker Lucky Jim mine, Slocan; John Vallance, superintend ent Standard mine, Slocan, and the following visitin members: C. E. LeRoy, of the Geological Survey, an Dr. A. W. G. Wilson, Cosmo T. Cartwright, and L Heber Cole, all of the Mines Branch, Canada Depart ment of Mines, Ottawa. Other visitors included M. S Davys and H. M. Ridge, London, England; W. An derson, C.E., Vancouver; H, Nation, Bureau o Mines, Victoria; A. H. Tuttle, Wilcox mine, Ymir

C. V. White, superintendent Slocan Star mine; Sandon; W. A. Cameron, Richmond-Eureka mine, Sandon; Thomas Avison, Alamo mine; J. C. Moen, Black Prince mine; S. A. Griffith, Eastmont mine; Ed. Shannon, Enterprise mine; T. J. Lloyd, Van Roi mine; Alex. Smith, Surprise mine; Julius Wolff, Mollie Hughes mine; Geo. H. Ayland, general manager Standard Silver-Lead Mining Co., Silverton; Capt. Harry Johns, Wellington group mines, Boundary; J. V. Richards, and O. Jeldness, Spokane, Wash.; John Wagener, Butte; Mont. A. Lakes, Jr., Denver, Colorado; Wm. Hunter, M.P.P., Silverton; Wm. Thomlinson, G. B. Webster, A. E. Ritchie, Colin J. Campbell, W. P. White, formerly superintendent of the St. Eugene mine, East Kootenay, and about 30 others.

On behalf of the New Denver Town Improvement Society, Mr. J. C. Harris read an address of welcome to the visitors, and he was followed by Mr. W. Hunter, M.P.P., who also heartily welcomed the visitors. The chairman replied briefly in acknowledgement, and then delivered an address.

Chairman's Address.

The chairman, Mr. Hedley, after having thanked the Town Improvement Society and Messrs. Harris and Hunter on behalf of the residents of New Denver and district for their cordial welcome, first mentioned the natural beauty of the district, which had always attracted him since his first visit to it in 1898; and then referred to two items of general interest to the public which had been published the previous day in the Nelson Daily News. One of these was an account of a new find of an apparently large body of carbonate of lead on Deen Creek, Nelson mining division, which had been sufficiently opened by its owners to draw to it the attention of the Consolidated Mining and Smelting Co., of Canada, Ltd. The other was the information made public to the effect that A. Gordon French had succeeded at his small plant in Nelson in handling the complex zinc ores of the country. Mr. French first roasts the ore, then dissolves the zinc by aid of a chemical reagent, recovers the zinc in metallic form by electrolysis, and smelts the residue for lead and silver. He (the speaker) wished Mr. French God-speed, and hoped he would make a commercial success of his zinc reduction process, which would be of inestimable benefit to the country.

He next said: "The Canadian Mining Institute enjoys a high standing among the technical societies of the world, and our Transactions are recognized as embodying material that is the result of the experience of men of brains and capacity for doing things. Among our members are men of attainment in all branches of the mining and metallurgical industries and research, and they do not hesitate to give their best efforts toward the advancement of the Institute. Our facilities in Canada are second to none. In addition to the well equipped and constantly improving testing plants of the Dominion Government, and of McGill and Kingston, we have metallurgical plants at Sudbury, Ontario; at Trail, and Boundary, B.C., and elsewhere, which stand in the front rank for efficiency. I was much impressed the other day to hear Mr. Hugh F. Marriott, consulting engineer of the Central Mining and Investment Company of London, say that he had arranged with McGill University, Montreal, to complete certain research work in its metallurgical department.

"At the last meeting of this branch we were asked to approach the Provincial Department of Mines, asking that it take further steps toward assisting in opening our vast unknown fields, by sending capable engineers to observe the geological structure to the end that the Government might advise prospectors of favourable conditions. This did not seem to arouse much interest, and was disposed of without discussion. It seems to me there is a much better field in which the Institute might endeavour to improve the conditions of the mining industry of the province, and that is the field of company promoting for mining enterprises. In this we could well ask the co-operation of the Provincial Government.

"Why is it that the general public — the cautious public — shies at a mining proposition? Why has mining enterprise fallen into disrepute? You and I know it is not for lack of opportunity to select judiciously and operate a mining property that will make good.

"About 18 months ago, Mr. Thomas Kiddie told the Vancouver Canadian Club, when addressing a large meeting of that organization, what a very small proportion of the money subscribed for mining was used for actual mining operations. The long-suffering public has been asked lately to subscribe to many schemes that from their inception were impossible of success, and impossible from either crass ignorance or deliberate and premeditated dishonesty. Often both these combine to fleece our investing public. Now, can you in some measure protect the public. They must, of course, take some chances.

"Mining enterprises that start as prospects cannot be sure of success, but they can be protected against that class of investment that is from the start absolutely sure of failure. Most of us can recall one instance, perhaps many instances, of company promotion that was predestined to failure from one or more of the following reasons: (1) The prospect gave but little reason to hope that it ever could yield commercial ore. (2) The proposed distribution of the capital was such that there was no chance for the sufficient development of the property. (3) The management of the company's affairs was placed in grossly incompetent hands. (4) Often it has been the case with a property of some merit, that large blocks of promoters' shares were issued and a small block sold to raise working capital. This might have been sold at 25 cents a share with the expectation that when needed further capital could be raised by selling another block at a higher figure. Before that became necessary, however, the promoters' shares might have been offered for what they would bring, and the market consequently so demoralized that treasury sales became unsalcable.

"It should, I think, be made a misdemeanour to (1) promote a company to operate a mine that has little if any reason to hope for commercial ore; (2) to so distribute the capitalization that the treasury is inadequately supplied; (3) to place the management in grossly incompetent hands; (4) to sell promoters' shares before the property has been developed beyond the prospect stage.

"Surely this Institute can approach the Provincial Government with a view to persuading it to so legislate so that it shall be required that all prospectuses shall be submitted to an advisory committee to detect faults, if any, that will surely lead to failure of the enterprise. It may not be necessary to ask for a staff of Government engineers who will investigate and pass on the merits of the proposition, if it be required that the opinion of a reliable mining engineer be obtained before proceeding to promotion. The ideal way, of

course, is to develop prospects to a certain point where there is a fair chance of making good, by a syndicate or a development company. Mr. Marriott, when commenting on the fact that there are so few mining properties sufficiently developed to attract his company, said: 'What you need here is a few good development companies.' ''

After a few further observations by Mr. Hedley, a discussion ensued, in which Mr. H. M. Ridge (who gave the meeting information relative to some of the disadvantages that had followed the passing in Great Britain of laws intended for the protection of the public from abuses in connection with company promotion), and Messrs. Kiddie, W. F. Robertson, E. Jacobs, and others.

Reading of Papers.

Papers were read, as under:

1. ''Early Slocan Days,'' by Prof. J. C. Gwillim, School of Mining, Kingston, Ontario.

2. ''Notes on Minerals Found in Slocan District,'' by Wm. Thomlinson, New Denver, B.C.

3. ''Notes on Geology and Ore Deposits of the Slocan,'' by O. E. LeRoy, of the Geological Survey of Canada.

4. ''Costs and Cost Conditions at the Blue Bell Mine, Kootenay Lake,'' by S. S. Fowler, Riondel, B.C.

5. ''The Lucky Jim Zinc Mine, Slocan, B.C.,'' by A. J. Becker, superintendent.

There was also some discussion on the present position of the zinc ore reduction question in British Columbia, in connection with which reference was made to W. R. Ingalls' paper on ''The Problem of Mixed Sulphide Ores.''

ROTARY CONVERTERS FOR MINING SERVICE.

Rotary converters are being used in many coal and metal mines. Direct current is necessary for the operation of mining locomotives because alternating current motors cannot satisfy the speed and space requirements. Alternating current is used for the transmission of the energy from the steam or hydro-electric generating stations to the mines, and the rotary converter is the logical machine for efficiently converting the alternating to direct current at the point where the energy is to be used.

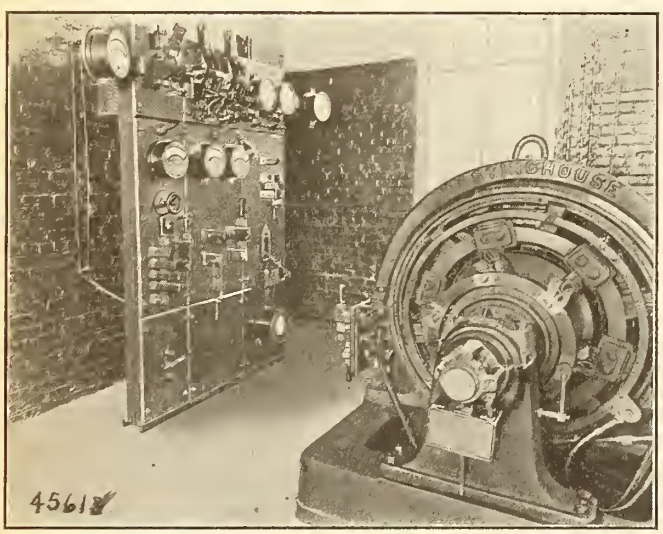


Fig. 1

Several public service companies in both Pennsylvania and in Colorado are making a specialty of supplying mines with alternating current energy and are developing excellent mining loads. The larger mining companies find it economical to establish steam or hydraulic generating stations at points where energy can be generated cheaply and to transmit it as high tension alternating current to the mine or group of mines where it is utilized. Whether alternating energy is generated by a public service company or by the mining company, experience shows the rotary converter to be an efficient, reliable machine for converting the alternating to direct current. A nominal voltage of either 275 or 600 is adopted for the direct current distribution systems within the mines.

A good example of a mining plant rotary converter installation is shown in fig. 1, which is a view of the substation at Mine No. 22 of the Consolidated Coal Company of Pennsylvania. This station received energy as alternating current at 2,300 volts, three-phase, 60 cycles. The pressure is stepped to 158 volts for the alternating side of the Westinghouse 150 k.w. rotary, and is delivered therefrom as direct current at 275 volts. A standard Westinghouse black marine finished switchboard, carrying the usual switch gear and instruments, controls the incoming alternating current line, the rotary converter, and the outgoing direct current feeders, which radiate to different parts of the property.

In large mines it is sometimes expedient to locate rotary converter substations underground near the centre of the area that they serve. Such an underground substation of the Consolidated Coal Company is shown in fig. 2. The room forming the station is lined with brick, which is waterproofed on the outside, and the roof is arched so that it will drain and that dripping water cannot damage the apparatus. The incoming lines to this station are alternating current, 2,300 volts, three-phase, 60 cycles, and the 150 k.w. rotary converter delivers direct current at 275 volts. The transformers stepping down from the alternating transmission voltage of 2,300 to the alternating rotary voltage of 158 are located in the substation. (See fig. 2). A pipe frame work arranged over the high tension transformers supports the high tension bus-bars. A two-panel black marine finished switchboard carries the equipment for metering and

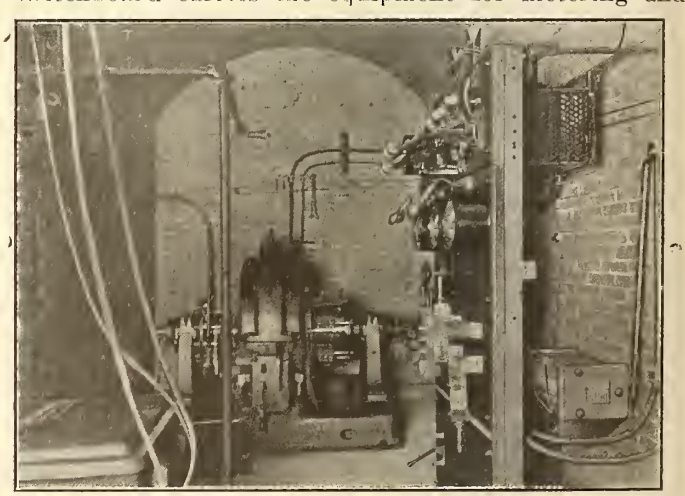


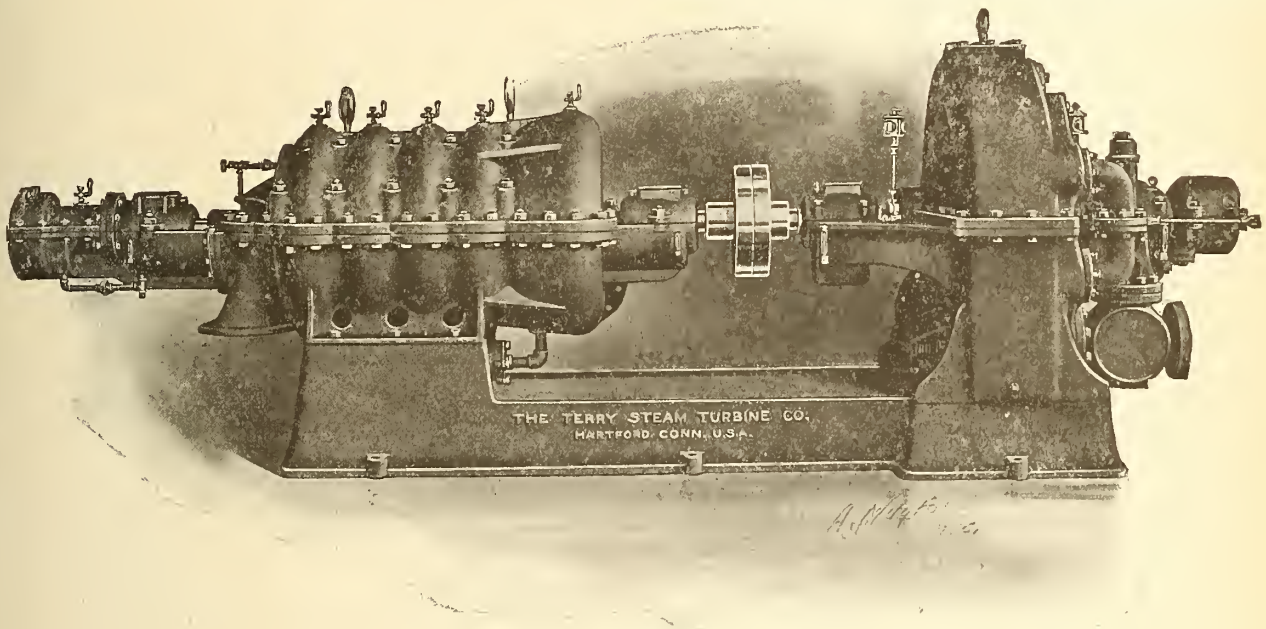
Fig. 2

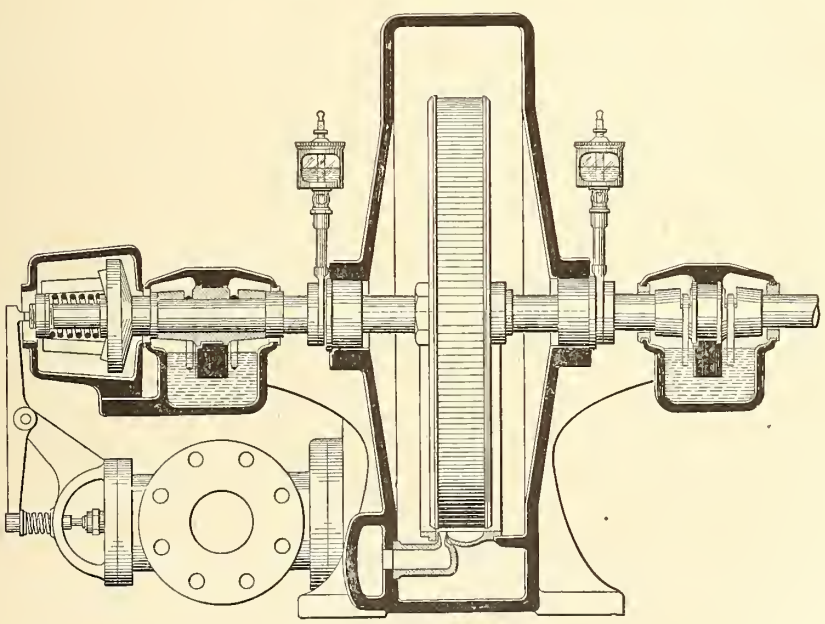
controlling the incoming and outgoing lines, the transformers, and the rotaries.

Armored lead-covered cables are generally used to convey the high voltage energy to an underground substation in a mine. The cable is usually carried down a bore-hole rather than through the workings, so that the chance of injury from falling rock and from interference will be minimized.

Turbine Driven Centrifugal Mining Pumps.

For keeping mines free from water and for creating hydraulic power for placer mining, the turbine-driven centifugal pump in its present development is peculiarly applicable. The very small dimensions of such sets would commend their use where space conditions are important without very deep inquiry into their other virtues. Turbine pumps can be started up at any time from a cold condition and once started operate for an indefinite time until stopped by the simple closing of the throttle valve. To those unfamiliar with the modern turbine and centrifugal pump the power and speed of these machines is almost incredible.





For example, the larger illustration shows a Jeanesville 5-stage centrifugal pump driven direct-connected by a single-stage Terry steam turbine. These units are about 48 inches in height and not over 10 ft. in length, yet have a capacity of 1,000 gallons of water per minute against an average discharge pressure of 270 lbs. The small size and simple construction is in striking contrast to the great weight of a reciprocating pump for the same service.

As a means of propulsion for centrifugals no machine has yet been devised which fills the bill as satisfactorily as the small steam turbine. Because of its superior range of speed it is possible to get a unit of much smaller diameter than would be necessary in a larger pump driven by a reciprocating engine. The accompanying cuts show its extreme simplicity; there is but a single row of buckets on the rotor. This single-stage feature reduces complications, but in order that the speed shall be normal the steam in the course of its expansion is made to traverse the buckets several times, each time being redirected into the wheel through return passages in the casing. The wheel thus receives energy in successive stages and therefore the peripheral speeds are much lower than would be the case if the steam impinged on the wheel but once.

INTERNATIONAL COAL AND COKE CO., LTD.

The colliery of the International Coal and Coke Co., Limited, is situated at Coleman, southwestern Alberta. The head office of the company is in Spokane, Washington, U.S.A.

The annual meeting of the company is held on the fourth Thursday in March in each year. The printed "Seventh Annual Report of the Directors" to the shareholders in the company, however, was not circulated until the latter half of August, ultimo. It should be noted, therefore, that the period covered by the appended report and balance sheet was the calendar year 1910, so that the information given below relates to an earlier time than that during which the strike of coal miners and other employees of the various coal-mining organizations comprising the Western Coal Operators' Association was in progress, which strike took effect as from March 31, 1911, since which date there has not been any production of coal or coke at the company's colliery at Coleman, though the payment of the quarterly dividend has been continued, the same having been made out of accumulated funds.

The report and balance sheet follow:

Directors' Report—

"The net profits for the year, after paying all operating expenses at head office and mine, amount to $300,097.02, which sum has been derived from the various departments of the company's business, including the sale of coal and coke, receipts on account of lots sold from the company's townsite, and returns from rentals, water and electric light.

"On the 1st of February, May, August, and November, a dividend of 1½ per cent. was paid, aggregating $180,000, and, as will be seen by reference to the accompanying balance sheet, the handsome sum of $120,097.02 was carried to surplus account for the year.

"The total amount of the payroll for 1910 was $567,974.99; average number of men employed, 524; days worked, 280. During the year there were additions made to coal lands, plant and equipment (expenditure under this head being $71,958.10) all of which were deemed necessary in the company's best interest and approved by the board."

The balance sheet as at December 31, 1910, is as under:

Liabilities.

Capital — authorized and issued		$3,000,000.00
Dominion Government — Balance of royalty on coal mined between 1903 and 1909, payable at $3,000 per month		58,019.97
Accounts payable — Sundry	$ 19,362.96	
December payroll, payable Jan. 14, 1911	49,347.81	
Unclaimed dividends	882.36	
		69,593.13
Reserve for Contingencies		39,448.16
Surplus—		
As shown December 31, 1909	$634,595.93	
Less items chargeable against 1908	5,018.19	
	$629,577.74	
Net profits earned during 1910	$300,097.02	
Less dividends paid during 1910	180,000.00	
	120,097.02	
		749,674.76
		$3,916,736.02

Assets.

Coal lands	$3,103,214.31
Plant, dwellings, horses, etc.	606,295.41
Warehouse stock	45,098.08
Accounts receivable	119,447.53
Stocks of coal and coke	3,572.32
Unexpired insurance	3,679.53
Timber rights	4,304.82
Cash on hand and in bank	31,124.32
	$3,916,736.02

WESTERN BRANCH C. M. I. MEETINGO

The Lead Bounty Situation.

The following figures obtained by E. Jacobs for submission to the recent meeting of the Western Branch of the C. M. I., at New Denver, B.C., show the balance unexpended as at July 1, 1911, of the amount of $2,500,000 originally voted for the payment of a bounty on lead mined in Canada:

Total expenditure (under old Act) for period ended June 30, 1908		$ 700,390.04
Expenditure during fiscal year ended March 31, 1909		274,447.50
Expenditure during fiscal year ended March 31, 1910		343,099.08
Expenditure during fiscal year ended March 31, 1911		249,370.38
Expenditure during three months ended June 30, 1911		49,713.32
Total paid as bounty on lead		$1,617,020.32
Add amount appropriated for zinc ore reduction experiments, etc.		50,000.00
		$1,667,020.32
Balance available as at July 1, 1911..		832,979.68
Total amount voted		$2,500,000.00

On Thursday morning, September 14, about 20 members and visitors were conveyed in gasoline launches from New Denver down Slocan Lake to Silverton, and driven thence to the Standard silver-lead-zinc mine (Note—This mine was described in the Canadian Mining Journal of Dec. 15, 1910). The very large body of clean galena exposed on No. 5 level of the mine excited much interest among the visitors, the greater number of whom also went into the intermediate and No. 4 levels, and afterwards into No. 6. The last is in about 2,000 feet from the portal and is just entering the downward extension of the big oreshoot opened in No. 5, below which it is 190 feet, vertical depth.

After having been hospitably entertained at luncheon by Mr. Geo. H. Aylard, general manager of the Standard Silver-lead Mining Company, the visitors

next went to the Wakefield concentrating mill, operated by the Silverton Mines, Ltd., owning the Hewitt-Lorna Doone mines, distant about a mile up the mountain. Then the new concentrating mill of the Van-Roi Mining Company, Ltd., was inspected, the company's resident superintendent, Mr. Douglas Lay, showing the visitors through the works. Here refreshments were liberally served, and then the return trip was made.

In the evening, after dinner, a smoking concert, given by the citizens of New Denver in honour of the visitors, was held, and this was numerously attended and a very enjoyable evening spent.

Next day the visitors dispersed in various directions, and the New Denver meeting, which had proved one of the most enjoyable and successful the Western Branch has held, was a thing of the past.

SPECIAL CORRESPONDENCE

ONTARIO.

Cobalt and Gowganda.

Probably the best strike yet made on the Nova Scotia was that reported a few days ago, when No. 14 vein was encountered 50 feet below the first level. The vein shows three inches of calcite, smaltite, and silver that runs 5,000 ounces to the ton. At the 100-foot level on this vein high values were obtained, the ore assaying 13,000 ounces.

The report of the returns to the Ontario Department of Mines, recently issued, shows that the silver production of the Province, of which 95 per cent. comes from Cobalt, was 15,231,969 ounces in the first six months of 1911. This amount is valued at $7,644,200. The increase in value over the silver produced in the first half of 1910 is over $1,300,000. The shipments consisted of 7,733 tons of ore and 4,380 tons of concentrates, while in addition, 1,302,699 ounces of bullion were shipped. Although shipments this year have been much below those of 1910 in tonnage, the higher value of the ore shipped, and the increased amount of concentrates, has brought the total values up to a sum exceeding that of last year's shipments. In the six months Gowganda shipped 110 tons of ore and 2 tons of concentrates, while South Lorrain shipped 216 tons of ore, the whole containing 430,540 ounces of silver.

The quarterly report of the Beaver Consolidated Mines, Limited, shows that there is cash on hand of $59,960.45. During the three months ending August 31, drifting, cross-cutting, sinking, and raising to the extent of 1,102 feet was accomplished. Eight cars of ore were shipped by the company, two of them of high grade.

There is a possibility that the Alexandra mine will resume operations. Mr. E. W. Beidler, of Buffalo, is at present in the camp looking over the property, where the main shaft was sunk to 200 feet before work ceased.

Shipments of ore for the week ending September 8th were noteworthy because of the falling off from the average which had been maintained for several weeks previous, only 10 cars being despatched from the camp by eight mines, totalling 618,120 pounds. Several bullion shipments were made in that week. Two consignments of bars were made by the Nipissing, one of 47 bars, worth $26,366, and one of 43 bars, valued dat $23,615. The O'Brien shipped 18 bars worth $8,773, the Drummond 2 bars worth $681, the Wettlaufer 1 bar of 22 pounds, valued at $160, and the Nova Scotia shipped 22 bars, valued at $17,500.

For the week ending September 15th the ore shipments were the second highest of any week this year, over 600 tons leaving the camp. There were 663.67 tons in the 20 cars shipped, McKinley-Darragh leading with 4 cars of high grade. Following are the figures for the week:—

	Tons.
McKinley-Darragh, 4h	134.66
La Rose, 21	74.14
Coniagas, 2h	61.57
Drummond, 21	60.00
City of Cobalt, 1h	53.00
Trethewey, 2h	50.40
Cobalt Townsite, 1h	50.26
O'Brien, 1h	32.00
Chambers-Ferland, 1h	32.00
Temiskaming, 1h	31.11
Cobalt Lake, 1L	31.00
Kerr Lake, 1h	30.31
Buffalo, 1h	23.20

Bullion shipments were made during the week by the Nipissing, which sent out 36 bars, valued at $20,550; and by the Buffalo, which sent out 8 bars, worth $4,844.27.

Shipments for the month of August were the heaviest of any month this year, exceeding those of any other month by over 500 tons and those of July by almost 1,000 tons. Eighteen mines shipped a total of 86 cars during the month, 55 of these being of high grade, the shipments amounting to 5,426,934 pounds.

West Shining Tree, about 40 miles northwest of Gowganda, is the centre of the latest rush of gold seekers. It is reached either by rail and canoe from Sudbury, or by trail from Elk Lake and Gowganda. The Gosselin claims, whose rich deposits started the stampede, are located in Churchill township. They were sold a few days ago for $300,000, it is reported. In addition to Churchill, the townships of McMurchy, Asquith, and Fawcette are practically all staked up, and many prospectors are going in daily. It is said that representatives of the big Dome interests are in the district looking for promising claims. Inside of a week or so the C. N. R. will have its extension within about 15 miles of the district.

On the Moosehorn property, in James township, a rich mineral deposit has been uncovered in the course of trenching operations. Samples taken of the vein have been sent away to be assayed, and as yet the actual value of the find is not known, but it is considered rich by the official of the company.

Porcupine and Swastika.

Cody Township is coming to the fore with the reported discovery of free gold on a property being worked under the direction of A. J. Bouzan, son of the manager of the La Palme property. The belt of schist in which the quartz is found is 20 feet wide. Assays ran from $4 to $30.40 per ton.

While stripping and trenching at the Rea property, what is thought to be a continuation of the main vein was struck a few days since. The vein is 60 feet in width and pans gold freely. Underground work is progressing rapidly.

Although little is heard of the district near Matheson, yet considerable development work is being carried on in Munro Township. Several companies have shafts down 100 feet or more, and on the Porcupine Townsite Mining Company's pro-

perty a 4-foot quartz vein has been uncovered, from which samples assayed $20 to the ton.

The end of the present month will see the new plant at the Swastika mine in running order. The five-stamp mill now in operation will be used as a test mill, but no plans have yet been formulated for the erection of a large mil. Last week connections were made with the raise from the 100-foot level to the surface. This new opening will constitute the main shafe, as the shaft that has been in use for some months past has proven too small. Mr. M. W. Summerhayes, manager of this property for the past three months, has resigned, and Mr. R. B. Lamb, consulting engineer of the mine, is in charge at present.

The new plant for the West Dome is almost completely installed and every effort is being expended in getting camp buildings completed. The boilers for the Dome Extension, two locomotive type portables of 80 horsepower each, have reached the property and are being erected. The new compressor is already in position. At the Dome the greatest activity prevails, hundreds of men being engaged in the construction of the various buildings on the property. Two diamond drills are working and large gangs are engaged in surface work.

Three hundred thousand dollars was the sum paid the Sutherland Brothers, of Toronto, for their two claims in Bristol Township, staked during the early days of the rush in June. Development work on the Thompson, Yates, and Jowse Woods claims in that township continues with excellent r sults.

What is considered by many a most important developme in the Porcupine field is the fact that at a depth of betwe 650 and 700 feet free gold was found by a core drill at t Pearl Lake property. The free gold was found in both t quartz and schist stringers. The vein encountered at th depth is thought to be an extension of the Dixon-McInty vein. Two shafts are being worked on the property just no both being over 100 feet down. A 12-drill compressor ar large motor are being installed and as soon as in running c der, more drills will be set at work below.

Eight drills are at present working underground on the M Intyre, and this number will be increased as soon as mo machines can be secured. Developments underground are qui extensive and good ore is being mined in several of the shaft which have reached the 100-foot level.

A general assay of $20.10 has been obtained from the sam ling of No. 3 vein at the Vipond. Cross-cutting showed feet of ore from which the samples were taken, but the sout wall of the vein had not been reached. This vein was fir reached by cross-cutting the day before the big fire, and the 100-foot level it is much wider than when first encountere

GENERAL MINING NEWS.

NOVA SCOTIA.

(Special to the Canadian Mining Journal.)

Halifax, Sept. 20.—Representations are to be made to the Provincial Government by local mining men with a view to organizing a Royal Commission to report upon the gold mines of the province. Although the Government has not yet been approached it is believed that the proposal will not be looked upon unfavourably. It is recognized by all that some steps must be taken in this direction if only to set matters right in the eyes of the public. The strong investor is needed very badly, and he will not come until he knows more about the mines. The Report of a Royal Commission would arouse interest at once. It could be made absolutely clear and authoritative. There is really nothing to be hid.

Just so long as the present policy of inertia prevails, just so long will the gild mines stand idle.

Three Toronto investors have recently been looking round the Province, but no news has been made public.

ONTARIO.

Cobalt.—Two drills have been started to sink the main shaft of the Temiskaming mine to a further depth from the 575-foot level and at the present time the shaft is now down between 590 and 600 feet. It will be continued to a depth of 650 feet, where the eighth mine level will be cut and all the veins drifted upon at this depth, which will be the deepest by over 75 feet ever atempted by a mine in the Cobalt camp.

Porcupine, Sept. 19.—A new mark for depth in the camp was set Saturday, when the drill penetrated 800 feet at the Pearl Lake Gold Mines, cutting through 60 feet, carrying gold in vein matter of schist and quartz. The drill ran down on an angle, and it is believed the Dixon vein, on the McIntyre, to the south, is encountered.

The drill on the "A" vein reached 350 feet yesterday, bringing up free gold in 25 feet of quartz. Consulting Engineer Lamb reports the new mark as showing mineral all th way down. Hretofore the Dome at 700 feet of drilling hel the record for depth.

ALBERTA.

Calgary, Alta., Sept. 17.—The Trades and Labour Congres of Canada concluded its business and adjourned till next yea when the meeting will be held in Guelph. The time of th session was occupied with a consideration of the various re ports of committees, and there was an acrimonious discussio on several topics, chief of which was the future relations o the Congress with the Social and Moral Reform League. Afte a heated discussion in which the western members bitterl opposed the grant of $50 to the League, the motion to mak the grant, and also the give the support of the Congress t the Moral and Sociay Reform League, was carried after a amendment to discontinue affiliation with the League had bee defeated.

Resolution 64 was considered next. This was a motion by Delegate Hooper of, Winnipeg, to incorporate in the platform of the labour movement the principle of the abolition of the wage system. In a rather long speech, for which he was grant ed extra time, Delegate Hooper advocated his resolution from the standpoint of the Socialist party of Canada. "They were all opposed," he said, "to capital," which he dedfined as the "right to exploit labour."

Another resolution advocating the incorporation ini their platform of the principles of collective ownership and the democratic control of land and capital, was spoken to by se eral members, but the committee's report recommending non concurrence was also endorsed by the assembly.

Section 13 of the officers' report, which was held over for discussion, was proceeded with. This section had reference to the condition of the miners in the present strike in the Crow's Nest Pass and at the invitation of the convention the

rnie delegate detailed the history of the strike and ex-ined why the miners had refused to accept the Gordon re-t. The main reason for their rejection of it lay in the fact t that it recommended an increase to the day wage worker ich had to be paid by the miner who was paid on piece work, d who had to pay the day wage man who was his helper. He d that when they refused to consider or recognize the opera-n of the Lemieux Act, the Minister of Labour had wired em a royal commission would be sent down to investigate d make a report. The miners did not want a royal com-ssion because the appointments to such a body were made litically, and their grievance was not a political one, but is one of wages, and they did not wish to be concerned with liticians.

President Powell, of District 18 of the United Mine Work-s, made a short speech in which he thanked the Congress for e kindness they had shown the mining delegates and for the ant of $300.

BRITISH COLUMBIA.

Hope, B.C., Sept. 19.—During the past week M. C. Williams, M.E., of Hope, B.C., has just concluded a deal which involves a transaction of $100,000. It includes the sale of three groups of claims owned by Andrew Larson & Co., of Vancouver, and Frank Fritz & Co., of Grand Rapids, Mich.

Williams' property has been sold by Mr. Williams to Charles F. Solderling, of Spokane, who will call the new mining camp, 23-Mile camp. It is located within easy reach of Hope.

Coalmont, Sept. 18.—A. S. Williamson, of Williamson & Turner, agents for Coalmont Townsite, arrived in town from Vancouver. He is sepnding a fow days making an inspection of the Columbia Coal & Coke Company's properties here and is more than surprised at the great amount of work which has been done by the company in so short a time.

George L. Fraser, general manager for the coal company, has been absent in Chicago and eastern cities for the past 30 days, where he has been completing the final arrangements for the installation of the company's plant with Messrs. Roberts & Schaffer, of Chicago. While in the east Mr. Fraser has also visited some of the largest coal mines in Pennsylvania.

COMPANY NOTES

CANADA IRON CORPORATION.

The Canada Iron Corporation, of which Mr. T. J. Drummond is president, has just issued its annual report for the year ending May 31st.

Although some of the plants are undergoing construction and are not up to full working capacity, earnings were good.

The profits for the year were $401,885, and the bond interest $175,200, leaving $226,685.

There were minor charges of $16,305, and the year's surplus added to the balance last year of $149,427 made $359,807 of undivided profits carried forward. The showing is thus very satisfactory.

Since the close of the fiscal year the position of the corporation has been further very materially improved through the acquisition of valuable assets which will not show in their statements until the close of the present year.

LE ROI No. 2 AUGUST OUTPUT.

Following is cable sent by the management of Le Roi No. 2 to London head office:—

Le Roi No. 2—"Josie mine report for August—Shipped 2,240 tons of ore and 142 tons of concentrates. The receipts from smelter are $43,579 (£8,985), being payment for 2,314 tons shipped, and $6,364 (£1,312), being payment for 135 tons concentrates shipped. In all $49,943 (£10,297). Estimated costs for corresponding period:—Development, $9,000; ore production, 09,000; milling, $1,250—$19,250 (£3,969). Poorman drift west, 500 ft. level—Advance 20 feet, which averaged 1 oz. 4 dwts. gold and 5 per cent. copper over 9 ins. Rodney drift west from crosscut, 1,200 ft. level—Advance 20 feet, which averaged 11½ dwts. gold and 4¾ per cent. copper over 4 feet. Rodney drift, east from crosscut, 1,200 foot lovel—Addvance 50 feet, which averaged 1 oz. gold and 3¾ per cent. copper over 2½ feet. Rodney raise, 1,200 foot level—Advance 27 feet, of which 27 feet averaged 7 dwts. gold and 5¾ per cent. copper over 2 feet 9 inches."

A EUROPEAN VIEW OF ZINC MARKET.

An interesting review of the position of the zinc market, in which both England and Germany are about equally interested, appeared last month in the "Frankfurter Zeitung" apropos of the recent advances in the price of the metal. During August, according to this account, the price of crude zinc has been raised no less than four times, aggregating a total advance of M3½ per 100 kilos for tho month. The rise was grmly based on the strong and well-sustained demand for zinc by consumers and the reduction of stocks which took place. Production did not keep paco with the extensive consumption. It was free to the zinc foundries this year to increase their output as much as they pleasod; but though the statistics show that an increaso of ontput took place, it was not in proportion with the advance in consumption, and the stocks at the foundries went back to a minimum. They could not supply the quantities for which orders were received in July and August, and the Zinc Foundries Union has recently been repeatedly in the position of only having small quantities to dispose of at the enhanced prices. Reviewing tho course of operations under the Zinc Convention, which was agreed to in 1908, and prolonged by the Zinc Foundries Union to 1916, and by the International Zinc Syndicate to 1914, it will be found that, starting from the low level of £18 to which the price had fallen in 1908, an upward movement has taken place continuously ever since, uninterrupted by any important break. The London price is now at the £27 10s level, while at the beginning of the year it was still £24, as compared with a yearly average of £23 in 1910, £22 6s 8d in 1909, and £20 3s 5½d in 1908. During the years in which all metal prices moved convulsively upwards, namely 1905 and 1906, zinc averaged £25 6s 8d in 1909, and £20 7s 7d in the former year and £27 1s5d in the latter. The advance of late years has been attributed partly to the regulating influonce of the syndicate on prices. Germany's consumption, calculated on the reductions of stocks at the foundries, has increased from 188,100 tons in 1909 to 191,500 tons in 1910, while the export of zinc in zinc and brass goods increased by 100,000 tons to 479,000 tons. In England the consumption for 1910 was 177,800 tons, as com-

pared with 155,500 tons in 1909, and the export of galvanized sheets increased by 100,000 tons to 595,000 tons. The consumption of the United States, which is one-third of that of the entire world, increased by 8,100 tons in 1910 to 245,000 tons. In consequence of the Zinc Foundries Union putting up the price at the beginning of the year 1910 to M47.25 per 100 kilos for ordinary brands, whereas it now demands M54.50, the prices for zinc goods also rose, and, above all, for galvanized sheets. These cost at the beginning of the present year M57.35 to M59.36 per 100 kilos. In consequence of the action of the German Zinc Rolling Mills Union the price now stands (end of August) at M62.35 to M64.35 at foundry station, according to quantity of goods ordered. As in spite of the high prices the inquiry for zinc finished goods is said to be active the consumers of the raw metal ought to give expression to a strong demand in the near future. The Zinc Foundries Union will in any case do its best not to give an impetus to the price movement, but will pursue a policy suited to the conditions of the market, in order to hinder to the best of its ability any slump on the eventuality of consumption falling off.

STATISTICS AND RETURNS

DOMINION COAL OUTPUT FOR AUGUST.

The Dominion Coal Company's August record of 415,000 tons was 22,000 tons better than any former year.

In previous years June and July were the months when big shipments were made, as the following best month's shipments in the years specified will show:

September, 1902	313,000
July, 1903	273,000
June, 1904	346,000
July, 1905	342,000
June, 1906	362,000
June, 1907	386,000
July, 1908	391,000
June, 1909	393,000
September, 1910	369,000
August, 1911	415,000

The reduction in the coal duty under reciprocity would prove a serious handicap to the company, and if the duty is lowered last month's record will stand unbeaten.

NOVA SCOTIA COAL OUTPUTS.

Nova Scotia Steel & Coal Co., Ltd.

Shipments, August, 1911	79,010
Shipments, August, 1910	100,364
Decrease, August, 1911	21,354
Shipments, 8 months, 1911	419,461
Shipments, 8 months, 1910	514,415
Decrease, 8 months, 1911	94,954

Acadia Coal Company.

Shipments, August, 1911	32,902
Shipments, August, 1910	25,360
Increase, August, 1911	7,542
Shipments, 8 months, 1911	253,519
Shipments, 8 months, 1910	168,545
Increase, 8 months, 1911	84,974

Intercolonial Coal Company.

Shipments, August, 1911	20,102
Shipments, August, 1910	21,380
Decrease, August, 1911	1,278
Shipments, 8 months, 1911	166,[illegible]
Shipments, 8 months, 1910	164,[illegible]
Increase, 8 months, 1911	2,[illegible]

Inverness Railway & Coal Co.

Shipments, August, 1911	23,[illegible]
Shipments, August, 1910	25,[illegible]
Decrease, August, 1911	2,4[illegible]
Shipments, 8 months, 1911	175,2[illegible]
Shipments, 8 months, 1910	171,5[illegible]
Increase, 8 months, 1911	3,7[illegible]

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending Sept. 15, and those from Jan. 1, 1911, to date:

	Sept. 15. Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger	.....	55,200
Bailey	.....	40,000
Barber	.....	6,000
Beaver	.....	1,340,673
Buffalo	46,410	1,907,414
Chambers-Ferland	64,060	1,023,000
City of Cobalt	106,000	663,980
Cobalt Lake	62,000	2,879,506
Cobalt Townsite	100,520	819,800
Colonial	.....	135,410
Coniagas	123,150	2,995,293
Crown Reserve	.....	1,791,680
Drummond	120,000	410,000
Green-Meehan	.....	60,000
Hargraves	.....	161,100
Hudson Bay	.....	1,066,340
Kerr Lake	60,620	1,927,709
King Edward	.....	40,000
La Rose	148,780	5,164,208
McKinley-Darragh	270,330	4,602,509
Nipissing	.....	4,406,338
O'Brien	64,010	1,072,898
O'Brien, M. J.	.....	47,000
Peterson Lake, Little Nip.	.....	58,420
Provincial	.....	151,950
Right of Way	.....	950,915
Silver Cliff	.....	106,680
Standard	.....	102,813

Temiskaming	62,220	1,244,112
Trethewey	100,800	935,220
Wettlaufer	.....	117,232

The shipments for the week were 1,328,840 lbs., or 664 tons. The shipments from Jan. 1 to Sept. 15 were 36,283,419 lbs., 8,141 tons.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending September 22, and those from January 1, 1911, to date:

	Sept. 22. Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger	.....	55,200
Bailey	.....	40,000
Barber	.....	6,000
Beaver	.....	1,340,673
Buffalo	60,860	1,968,274
Chambers-Ferland	.....	1,023,000
City of Cobalt	.....	663,980
Cobalt Lake	60,640	2,940,146
Cobalt Townsite	100,520	920,320
Colonial	.....	135,410
Coniagas	123,150	3,118,443
Crown Reserve	50,800	1,842,489
Drummond	130,000	540,000
Green-Meehan	.....	60,000
Hargraves	.....	161,100
Hudson Bay	.....	1,066,340
Kerr Lake	60,870	1,988,579
King Edward	.....	40,000
La Rose	238,480	5,402,688
McKinley Dar.	64,250	4,666,759
Nipissing	151,070	4,557,408
O'Brien	.....	1,072,898
O'Brien, M. J.	.....	47,000
Peterson Lake, Little Nip.	.....	58,430
Provincial	.....	151,950
Right of Way	56,980	1,007,895

GOWGANDA ORE SHIPMENT.

The Canadian Mining Journal has been notified that the Miller-Lake Gowganda mine has just completed a shipment of 40,000 lbs. of high grade ore by way of Charlton. Owing to the very bad condition of the Gowganda road it took three weeks to get the ore out to the railroad.

B. C. ORE SHIPMENTS.

The ore shipments and ore milled in the Slocan-Kootenay, Boundary, and Rossland districts for the week ended Sept. 9th totalled 17,255 tons, while the smelter receipts were 14,780 tons. The shipments for the year to date total 1,196,508 tons, and the smelter receipts total 1,096,008 tons. The figures in detail are:

Rossland Shipments.

Centre Star	3,476	139,458
Le Roi	36	10,274
I. X. L.	9	79
Le Roi No. 2	616	19,557
Le Roi No. 2, milled	300	10,800
Other mines	.....	19,319
Total	4,445	199,487

Boundary Shipments.

Mother Lode	5,120	213,055
Rawhide	3,555	21,085
Athelstan	277	5,415
Unnamed	509	3,052
Other mines	.....	650,313
Total	9,459	892,920

Slocan-Kootenay Shipments.

St. Eugene, milled	420	19,776
Knob Hill	236	3,277
Emerald	35	1,396
Sullivan	744	13,150
Arlington	36	65
Granite-Poorman, milledd	250	9,010
Nugget, milled	110	3,960
Van Roi, milled	800	26,649
Queen, milled	420	14,910
Molly Gibson, milled	300	2,400
Other mines	.....	9,508
Total	3,351	104,101

B. C. Copper Company's Receipts.
Greenwood, B. C.

Mother Lode	5,120	213,055
Rawhide	3,555	21,085
Athelstan	277	5,415
Unnamed	509	3,052
Other mines	.....	30,133
Total	9,461	272,740

Consolidated Company's Receipts.
Trail, B.C.

Centre Star	3,476	139,458
Le Roi	36	10,274
Queen	38	349
Granite-Poorman	30	303
Le Roi No. 2	616	19,557
Knob Hill	236	3,277
I. X. L.	9	79
Emerald	35	1,396
Sullivan	744	13,150
St. Eugene	63	4,368
Arlington	36	65
Other mines	.....	40,579
Total	5,319	232,855

B. C. ORE SHIPMENTS.

For the first time for some years the Emma mine in the Boundary, once a heavy shipper to the Hall Mines smelter, last week appeared on the list of shipping mines, 302 tons being received from the property at the B. C. Copper Company's smelter at Greenwood. The shipments during the week ending September 2nd, totalled 17,808 tons, and the smelter receipts were 15,772 tons. The totals for the year to date were respectively 1,159,891 tons, and 1,080,629 tons.

Slocan-Kootenay Shipments.

Richmond-Eureka	31	1,633
Sullivan	218	12,406
St. Eugene, milled	420	19,356
Rambler-Cariboo	32	1,115
Hewitt	31	246
Queen	420	14,490
Granite-Poorman, milled	250	8,760
Nugget, milled	110	3,850
Emerald	43	1,361

Society Girl	52	433
Idaho	34	47
Knob Hill	228	3,041
Sweetgrass	6	38
Molly Gibson	90	726
Van Roi, milled	800	25,489
Arlington	13	29
Other mines	.....	8,676
Total	2,737	100,423

Rossland Shipments.

Centre Star	3,904	135,982
Le Roi No. 2	391	18,941
Le Roi No. 2, milled	300	15,500
Le Roi	467	10,238
Other mines	.....	448
Total	5,062	176,109

Boundary Shipments.

Mother Lode	5,240	207,935
Rawhide	3,341	17,530
Jack Pot	266	19,521
Athelston	295	5,138
Napoleon	155	6,825
Unnamed	410	2,543
Emma	302	302
Other mines	.....	623,565
Total	10,009	883,359

Consolidated Company's Receipts.

Trail, B.C.

Centre Star	3,904	135,982
Sullivan	218	12,406
Le Roi No. 2	391	18,941
Le Roi	467	10,238
Richmond-Eureka	31	1,633
St. Eugene	31	1,633
Rambler-Cariboo	32	1,115
Hewitt	31	246
Emerald	43	1,361
Society Girl	52	433
Idaho	34	47
Queen	420	14,490
Knob Hill	228	3,041
Sweetgrass	6	38
Molly Gibson	90	726
Van Roi	95	930
Arlington	13	29
Other mines	.....	35,155
Total	5,763	226,937

B. C. Copper Company's Receipts.

Greenwood, B. C.

Mother Lode	5,240	207,935
Rawhide	3,341	17,530
Jack Pot	266	19,521
Athelston	295	5,1
Napoleon	155	6,8
Unnamed	410	2,5
Emma	302	3
Other mines	.....	3,4
Total	10,009	263,2

B. C. ORE SHIPMENTS.

Another Slocan property was added to this year's l producing mines last week when the Panama shipped 40 of ore to the Trail smelter. The ore shipments for the e ending September 16th totalled 18,243 tons, and for the e to date 1,194,076 tons. The smelter receipts for the week a year respectively were 13,901 tons and 1,111,262 tons.

Boundary Shipments.

Mother Lode	6,930	219,98
Rawhide	1,796	22,88
Jack Pot	365	19,88
Athelstan	335	5,75
Unnamed	486	3,53
Other mines	.....	630,69
Total	9,912	902,73

Rossland Shipments.

Centre Star	3,400	142,858
Le Roi No. 2	506	19,447
Le Roi No. 2, milled	300	11,100
Le Roi	560	10,842
Other mines	.....	457
Total	4,774	184,704

Slocan-Kootenay Shipments.

Molly Gibson	103	829
Van Roi, milled	800	27,449
Molly Gibson, milled	300	2,700
Panama	40	40
Sullivan	646	13,796
St. Eugene, milled	420	20,196
Richmond-Eureka	122	1,724
Ruth	35	420
Rambler-Cariboo	92	1,207
Queen, milled	420	15,330
Granite-Poorman, milled	250	9,260
Nugget, milled	110	4,070
Emerald	88	1,484
Society Girl	24	457
Second Relief	46	83
Knob Hill	61	3,338
Other mines	.....	5,252
Total	3,557	106,641

B. C. Copper Company's Receipts.

Greenwood, B.C.

Mother Lode	6,930	219,985
Rawhide	1,796	22,881
Silver Cliff	.....	106,680
Standard	.....	102,813

Temiskaming	40,320	1,284,432
Trethewey	64,960	1,000,180
Vettlaufer		117,232

The shipments for the week were 1,202,900 pounds, or 601 tons against 664 tons the previous week.

The shipments from Jan. 1 to Sept. 22 were 37,486,319 lbs., 18,743 tons.

Jack Pot	365	19,886
Athelstan	335	5,750
Unnamed	486	3,538
Other mines		10,612
Total	9,912	282,652

Consolidated Company's Receipts.

Trail, B.C.

Knob Hill	61	3,338
Molly Gibson	103	829
Van Roi	96	1,026
Panama	40	40
Centre Star	3,400	142,858
Sullivan	646	13,796
Le Roi No. 2	506	19,447
Le Roi	560	10,842
Richmond-Eureka	122	1,724
St. Eugene	127	4,495
Ruth	35	420
Rambler-Cariboo	92	1,207
Emerald	88	1,484
Society Girl	24	457
Second Relief	46	83
Queen	35	384
Other mines		35,767
Total	3,989	238,197

MINERAL PRODUCTION OF GREAT BRITAIN.

The production of minerals in the United Kingdom in the calendar year 1910 has been made public by the British Government.

Coal—The production of coal in 1910 amounted to 264,433,028 long tons, against 263,774,312 tons in 1909. The maximum production of coal was reached in 1907, when 267,830,962 tons were mined. The year of next largest production was 1910.

Iron Ore.—The output of iron ore in the United Kingdom in 1910 amounted to 15,226,015 gross tons, as compared with 14,382 tons in 1909. The maximum production was reached in 1882, when the output was 18,031,957 tons.

Limestone.—In 1910 there were produced in Great Britain 12,736 gross tons of limestone, against 11,811,122 tons in 1909. In 1906 the maximum output of 12,758,,588 tons was reached.

Manganese Ore.—While Great Britain is a fairly large manufacturer of ferro-manganese it is a small producer of manganese ore, its output in 1910 amounting to only 5,467 tons. In 1909 it was 2,768 tons. The maximum production was reached in 1906, when 22,762 tons were mined.

Tine Ore.—The production of tin ore in Great Britain is declining. In 1884 the output was 16,117 gross tons of dressed ore, but in 1910 the output was only 7,562 tons. In the ten years from 1873 to 1882 the average production was 14,114 tons; 1883 to 1892, 14,429 tons; 1893 to 1902, 8,741 tons; and from 1903 to 1910 it was about 7,500 tons.

Zinc Ore.—The production of zinc ore is also declining. In 1910 the output was 11,238 tons, against 9,902 tons in 1909. In early years the average was about 25,000 tons—1873-82, 25,519 tons; 1883-92, 21,931 tons; 1893,1902, 22,182 tons; and 1903-10, about 19,500 tons.

INDIAN GOLD OUTPUT.

The gold production of the mines of the Kolar Goldfield (Mysore) and two outside mines (the Hutti Nizam's and the North Anantapur) for August was 47,730 ozs., an increase of 139 ounces compared with the return of the previous month.

NEW YORK METAL MARKETS.

September 26th—

Tin, Straits, 27.87½ cents.
Copper, Prime Lake, 12.50 cents.
Electrolytic Copper, 12.30 cents.
Copper wire, 13.75 cents.
Lead, 4.50 cents.
Spelter, 6.00 cents.
Sheet zinc (f.o.b. smelter), 8.00 cents.
Antimony, Cookson's, 8.15 to 8.25 cents.
Aluminium, 19.25 to 19.75 cents.
Nickel, 40 to 45 cents.
Platinum, $44 per ounce.
Bismuth, $1.80 to $2 per pound.
Quicksilver, $46.50 per 75-lb. flask.

MINERAL MARKETS.

Acids—
Muriatic, tank cars, $1.15 to $1.55 per 100 lbs.
Nitric, $0.04 to $0.05 per lb.
Sulphuric, $0.01 to $0.01¾ per lb.
Chrome ore, 50 per cent., ton of 2,240 lbs., $15.
Fire clay, $2.50 to $5 per short ton.
Fluorspar, lump, $9 per long ton.
Fluorspar, ground, $12 to $15 per long ton.
Graphite, lump, 4 cents to 10 cents per lb.
Gypsum, short ton ground, $4 to $7.50 per ton.
Magnesite, crude, 95 per cent., $7 to $8.50 per long ton.
Molybdenite, commercially pure, 25 to 30 cents per lb.
Pyrite, lump, arsenic free, 10 to 12½ cents per unit.
Pyrite, fines, arsenic free, 8 to 11 cents per unit.
Tungsten ore, 50 per cent., $7.70 per unit.

SILVER PRICES.

	New York cents	London pence
Sept. 7	52¼	24⅛
" 8	52¼	24⅛
" 9	52⅜	24 3/16
" 11	51¼	24⅛
" 12	52¼	24⅛
" 13	52¼	24⅛
" 14	52⅜	24 3/16
" 15	52½	24¼
" 16	52½	24¼
" 18	52⅜	24 3/16
" 19	52⅜	24 3/16
" 20	52½	24¼
" 21	52½	24¼
" 22	52½	24¼
" 23	52½	24¼
" 25	52½	24¼
" 26	52½	24¼

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

COBALT STOCKS.

Amalgamated	...	...
Bailey	.02½	.02⅝
Beaver Consolidated	.45½	.46
Buffalo	...	...
Chambers-Ferland	.10	.11
City of Cobalt	.09 bid	
Cobalt Central	... offered	.01
Cobalt Lake	.25	.25¼
Coniagas	5.95	6.15
Crown Reserve	2.70	2.85
Foster	.02	.04
Gifford	.01 bid	...
Great Northern	.11½	.11⅝
Green Meehan	.01¼	.01½
Hargraves	.04¾	.05
Hudson Bay	...	...
John Black	...	...
Kerr Lake	3.65	3.90
La Rose	4.00	4.12½
Little Nipissing	.03	.03⅛
McKinley	1.56	1.57
Nancy Helen	...	...
Nipissing	7.90	8.00
Nova Scotia	...	...
Ophir	...	...
Otisse	.01	.02
Peterson Lake	.06½	.06¾
Right of Way	.05	.06
Rochester	.02¾	.03
Silver Leaf	...	...
Silver Bar	...	...
Silver Queen	...	...
Temiskaming	.39½	
Trethewey	.65	.7
Watts	...	..
Wettlaufer	.85	.9

PORCUPINE STOCKS.

American Gold	...	..
Apex	.12½	.1
Coronation	.03¼	.0
Nor. Exploration	...	..
Dobie	1.35	1.4
Dome Ex.	.68¼	.6
Foley-O'Brien	... offered	1.0
Rea	3.30	3.3
Hollinger	12.30	12.3
Monita	.12	.1
Pearl Lake	.42 bid	..
Central	2.87½	3.0
Imperial	.10½	.1
Northern	.83	.8
Tisdale	.05¼	.0
Preston East Dome	.24	.2
Standard	... offered	.0
Swastika	.35½	.3
United	.02	.0
Porcupine Gold	.41	.4
West Dome	.95	1.0
Crown Chartered	.30	.3
Eldorado	.10½	.1
Gold Reef	.16	.1
Porcupine Canada	.85	.9

NEW YORK CURB.

Braden Cop.	4½	4
B. C. Copper	3¾	4
Butte Coalition	15	15
Ely Central	.02	.04
Ely Cons.	⅜	
First National Cop.	1	1
Giroux	3⅞	4
Greene-Canadian	6	6
Nevada Hills	2⅞	3
Ohio Copper	1⅜	1
Ray Central	1¼	1
Union Mines	⅛	
Yukon Gold	3¾	3
Goldfields	5⅜	5
Nevada Cons.	16½	16
Miami	18	18
Granby	30	31
Cons. Mining & Smelting	40	45
Davis-Daly	⅞	1
Cons. Arizona	1 1/16	
Rawhide Coal	.04	.06
Ray Cons.	18½	18
Chino	18½	19
New Baltic	..	..
Inspiration	6¼	6

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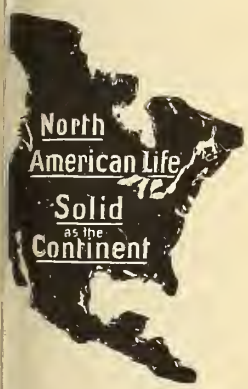

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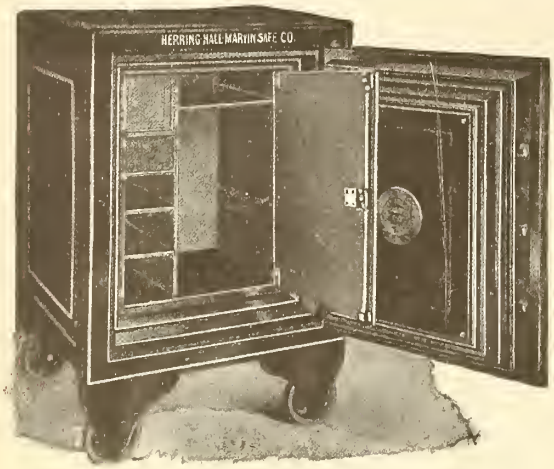

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Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mini Institute, etc.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map Canada, by G. A. Young and R. W. Brock.
1170. Summary Report of the Geological Survey for 1910.

NEW BRUNSWICK and NOVA SCOTIA

1113. Memoir No. 16. The Clay and Shale Deposits of Nova Scotia and portions of New Brunswick, by H. Ries aud J. Keele.

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1110. Memoir No. 4. Geological reconnaissance along the line of the National Transcontinental Railway in Western Quebec, b W. J. Wilson, accompanied by a map.
1064. Geology of an area adjoining the east side of Lake Timiskaming, by Morley E. Wilson.

ONTARIO

1091. Memoir No. 1, Geology of the Nipigon Basin, Ontario, by A. W. G. Wilson.
1137. Memoir No. 10 An instrumental survey of the shore-lines of the extinct lakes Algonquin and Nipissing in South-weste Ontario, by J. W. Goldthwaite.

NORTH WEST PROVINCES

1115. Memoir No. 8. The Edmonton Coal Field, Alberta, with maps, by D. B. Dowling.

BRITISH COLUMBIA

1139. Memoir 11-T Triangulation and Spirit Levelling of Vancouver Island, 1909, by R. H. Chapman.

YUKON and NORTH WEST TERRITORIES

1080. Report on a part of the North West Territories drained by the Winisk and Attawapiskat Rivers, by Wm. McInnes.
1006. Report on a traverse through the southern part of the North West Territories from Lac Seul to Cat Lake in 1902, b A. W. G. Wilson.
1130. Memoir No. 9. Bighorn Coal Basin, Alberta. by G. S. Malloch, accompanied by a map.

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1042. Mineral Map of Canada. Scale 100 miles to 1 inch.
1084. Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1133. Map 13 A Kingsport sheet, Nova Scotia, No. 84. Scale 1 mile to 1 inch.

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1155. Map 24A. Millstream Iron Deposit, Gloucester County, N.B., geological and topographical. Scale 400 ft. to 1 inch.
1156. Map 25 A. Nipissiguit Iron Deposit, Gloucester County, N. B. Geology and topography, scale 400 feet to 1 inch.

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1066. Map 18 A, Lake Timiskaming Mining Region. Scale 1 mile to 1 inch.
1112. Map 12 A. Vicinity of the Transcontinental Railway, Abitibi District, Quebec. Scale 4 miles to 1 inch.
1154. Map 23 A. Thetford-Black Lake Mining District. Scale 1 mile to 1 inch.

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1091. Map 8 A, Lake Nipigon, Thunder Bay District, Ontario. Scale 4 miles to 1 inch.

ALBERTA

1132. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.

BRITISH COLUMBIA

1135. Map 15A. Phoenix, British Columbia, topographical. Scale 400 ft. to 1 inch.
1148. Map 20A. Victoria sheet, Vancouver Island, B.C., topographical. Scale 1 mile to 1 inch.
1149. Map 21A. Saanich sheet, Vancouver Island, B.C., topographical. Scale 1 mile to 1 inch.
1164. Map 28 A, Sketch map of Portland Canal Mining District.

YUKON and NORTH WEST TERRITORIES

1089. Map 9A. Explored Routes on Parts of the Albany, Severn and Winisk Rivers. Scale 8 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 1 cents is made for maps on linen.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economi geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature re ported upon. Letters and samples that are of a Departmental nature, addressed to the Director may be mailed O.H.M.S. free of postage

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.

BRITISH COLUMBIA

The Mineral Province of Western Canada

as produced Minerals valued as follows: Placer Gold, $71,213,103; Lode Gold, $60,811,067; Silver, $31,095,602; ead, $24,645,605; Copper, $60,743,405; Other Metals (Iron, Zinc, etc.), $1,083,172; Coal and Coke, $114,012,596: uilding Stone, Brick, etc., $10,593,100; making its Mineral Production at the end of 1910 show an

Aggregate Value of $374,197,650.

In 1910 the quantity of Ore mined was 2,216,428 tons, and of coal 3,139,235 long tons. The value of Min- als produced that year was: Placer Gold, $540,000; Lode Gold, $5,533,386; Silver, $1,245,016; Lead, $1,386,350; pper, $4,871,512; Coal and Coke, $11,108,335; Other Minerals, $1,692,473, making the

Total Value for 1910, $26,377,066.

Lode mining has only been in progress for about eighteen years, and not 20 per cent. of the Province has een even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those in any other Province in ie Dominion, or any Colony in the British Empire.

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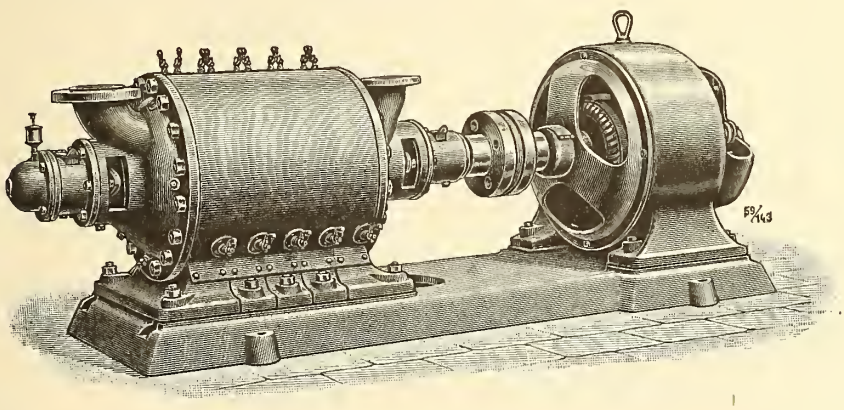

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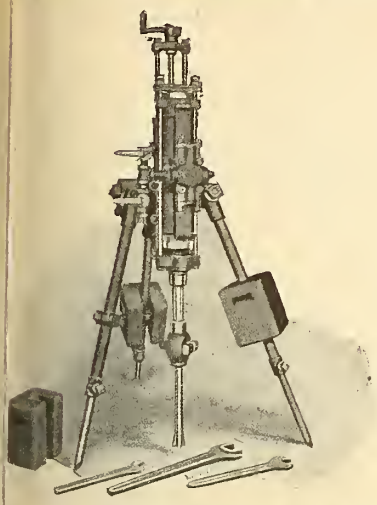

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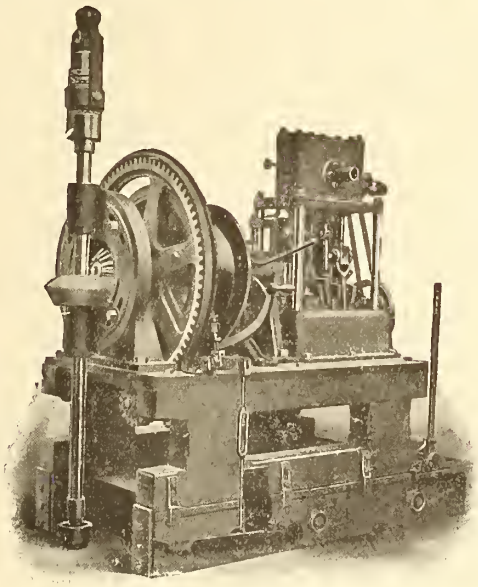

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Province of Quebec

Department of Colonization, Mines, and Fisheries.

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The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is $10.00 and it is valid until the first of January following. This certificate gives the right to prospect public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his right must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year and a fee of $10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of $10 an acre for SUPERIOR METALS when more than 20 miles distant from a railway and $20 an acre when less than 20 miles.

For INFERIOR METALS the prices are $2.00 and $4.00 an acre respectively.

The attention of prospectors is specially called to the territory in the North-Western part of the province of Quebec, north of the height of land, where important mineralized belts are known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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Gold mining in this Province offers good inducement for investment. Labor is cheap and plentiful: timber and fuel are abundant.

Large deposits of iron also are known to exist at various places in the Province; and considerable mining has been done in connection with this mineral, the ore being used locally and shipped to foreign ports.

Among the most important minerals occurring in economic quantities may be mentioned, Coal, Gold, Silver, Manganese, Leadsilver, Copper, Barytes, mineral pigments, Gypsum and Tungsten.

Licenses are issued for prospecting for Gold and Silver for a term of twelve months. The licenses are for areas 150 by 250 feet and can be obtained for 50c. an area.

Leases can be secured for $2. an area, for a term of forty years; subject to annual rental of 50c. an area.

Licenses to search over five square miles, for a period of eighteen months, for minerals other than gold and silver, cost $30,

Leases for three renewable terms of twenty years each can be obtained for $50. and are subject to a yearly rental of $30.

Royalties are as follows:—

Gold, two per cent on the gross value thereof; Copper, four cents a unit; Lead two cents a unit; Iron, five cents a ton; Tin and Precious Stones, five per cent; Coal, ten cents on every long ton sold or removed from the mine.

Copies of the mining law can b had gratis, by applying to the Department of Public Works and Mines, Halifax. Nova Scotia, or Mr John Howard, Agent General for Nova Scotia, 57a Pall Mall, London. England.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

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In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

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For reports of the Bureau of Mines, maps, mining laws, etc., apply to

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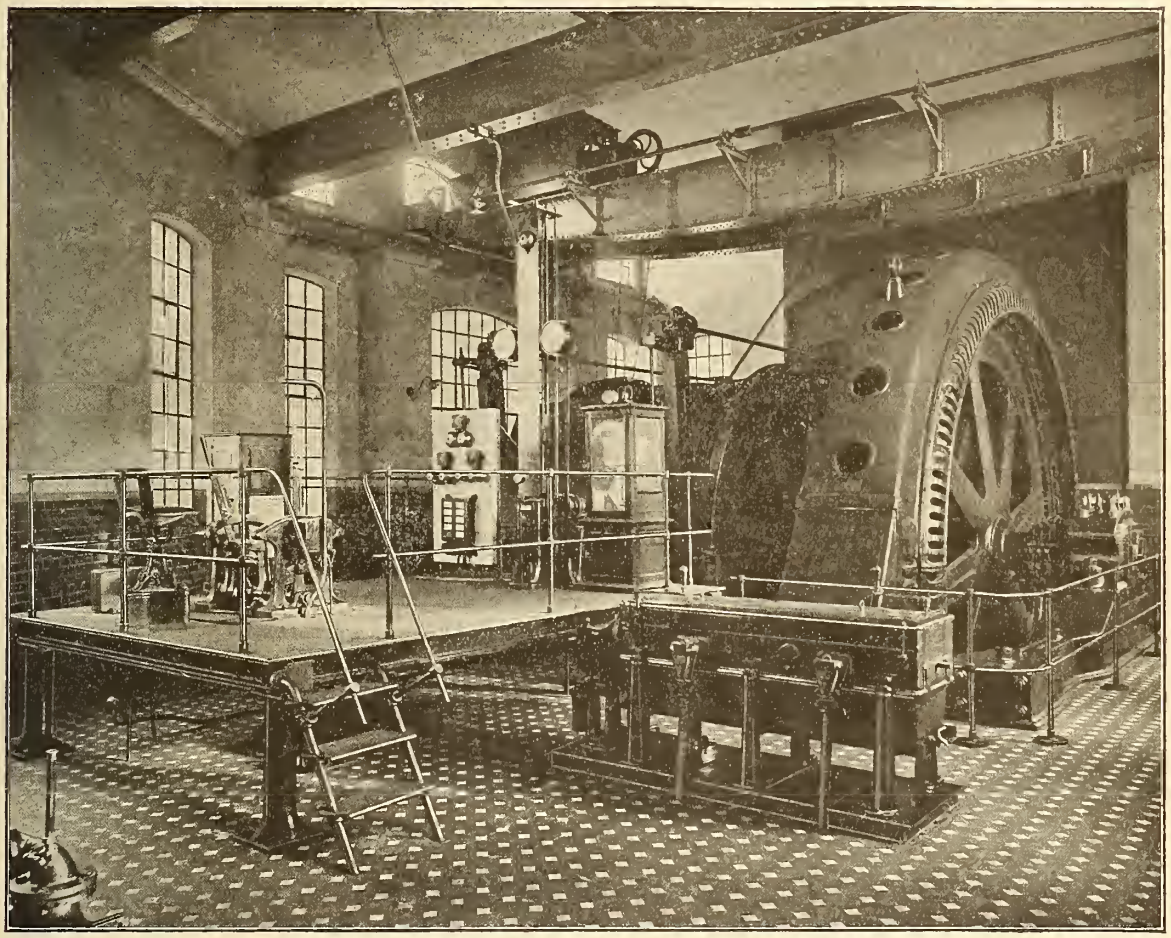

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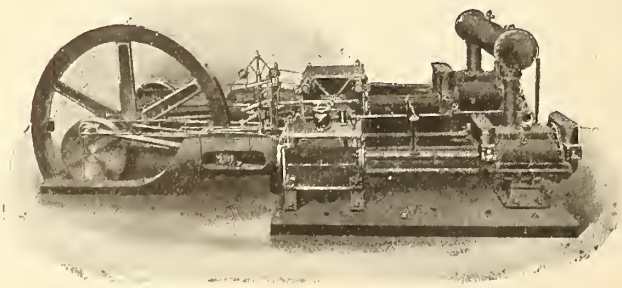

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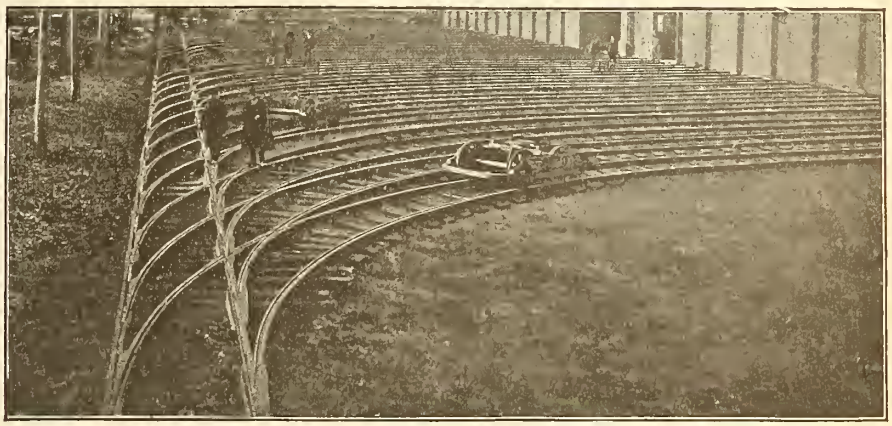

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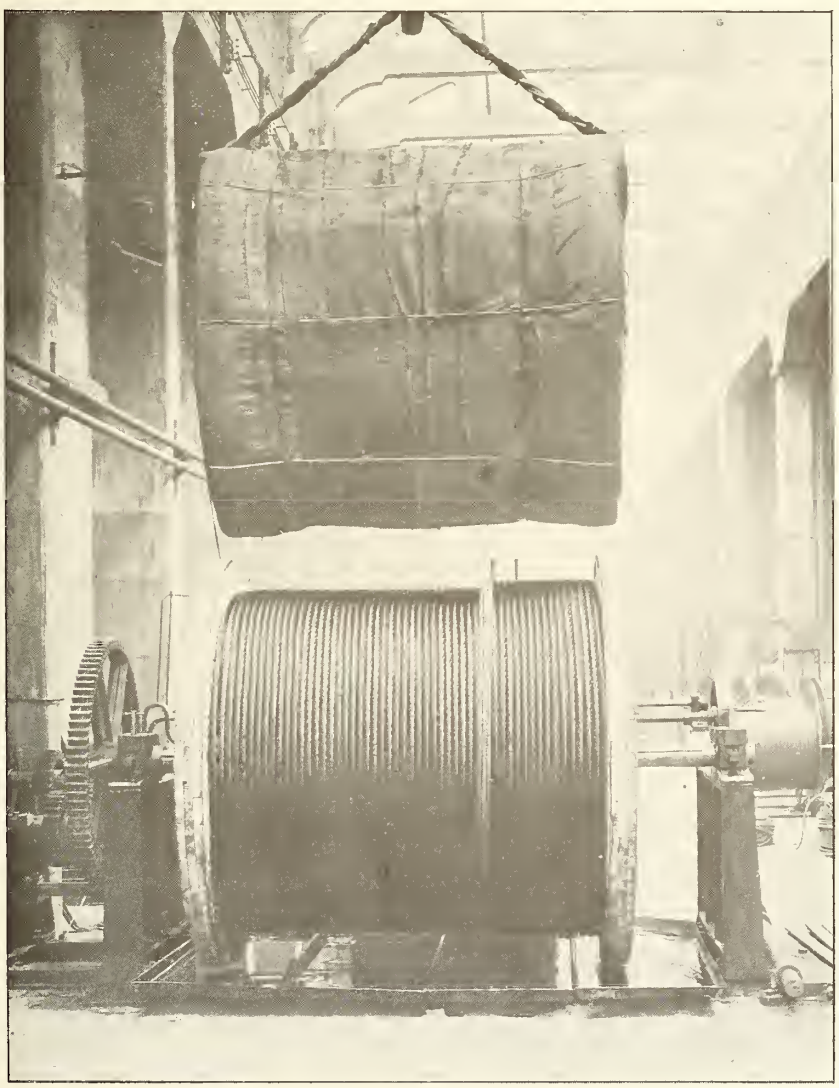

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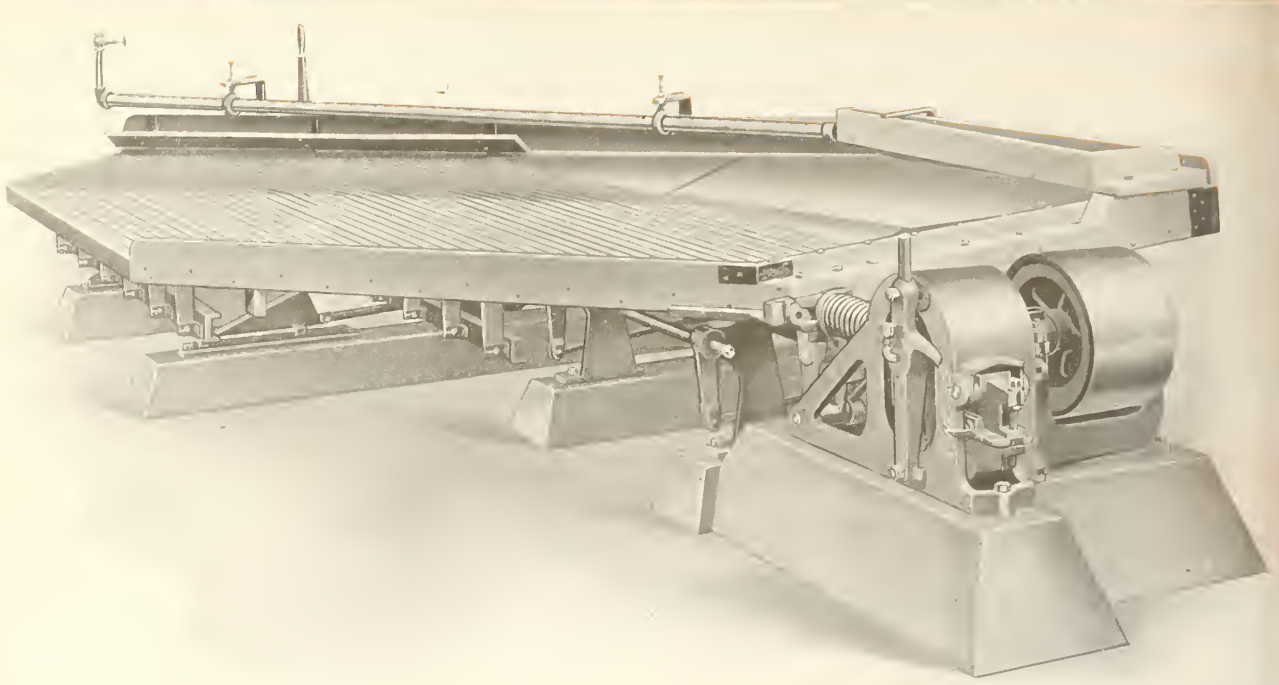

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32 TORONTO No. 2

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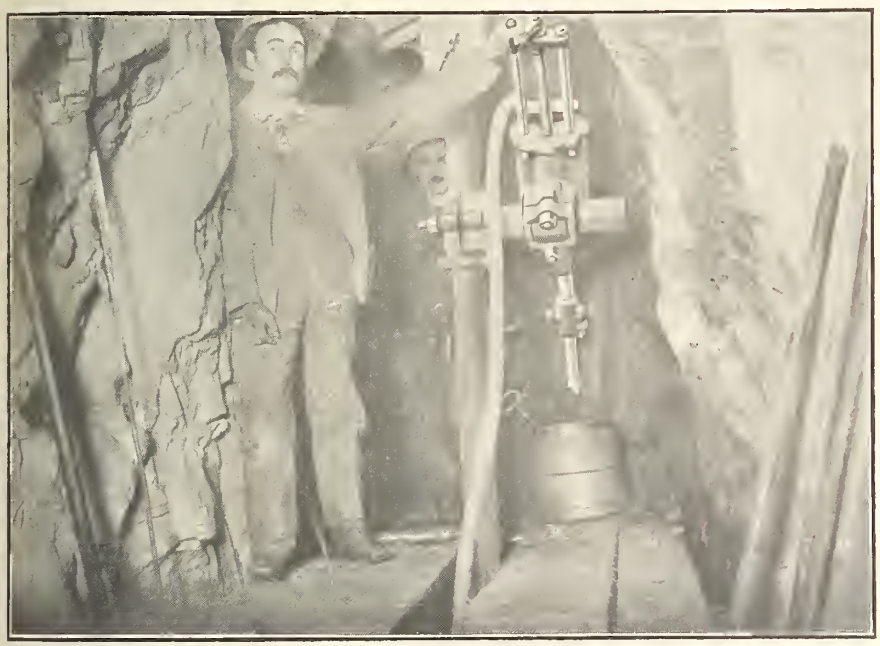

3½" Holman Air Valve Drill at Temiskaming Mine.

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May 11th, 1911.

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Master Mechanic
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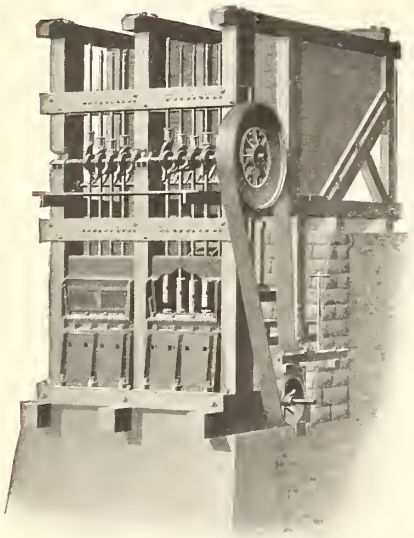
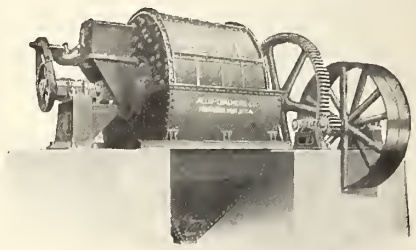


Stamp Mills
See Bulletin 1432



Ball Mills
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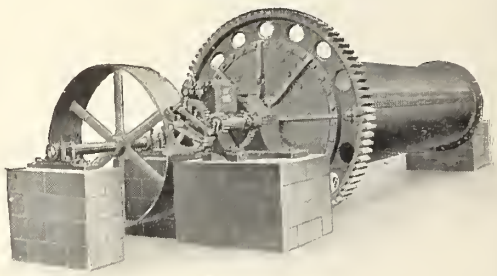

Tube Mills
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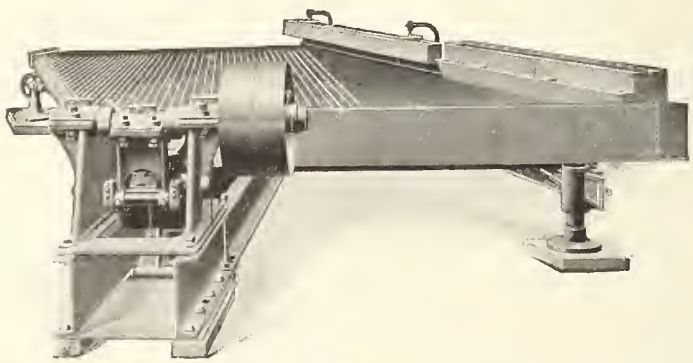

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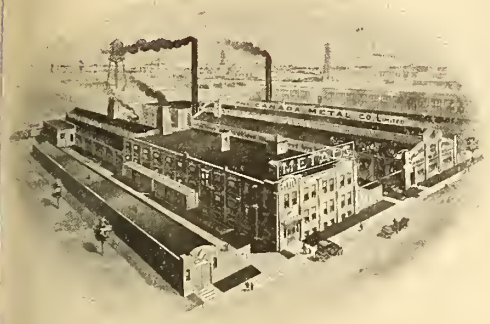

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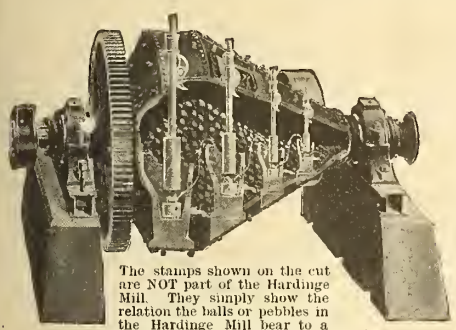

The stamps shown on the cut are NOT part of the Hardinge Mill. They simply show the relation the balls or pebbles in the Hardinge Mill bear to a number of stamps arranged for **Ideal Stage Crushing.**

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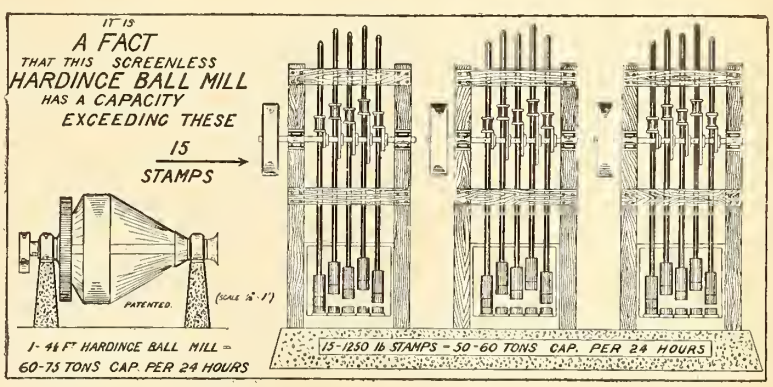
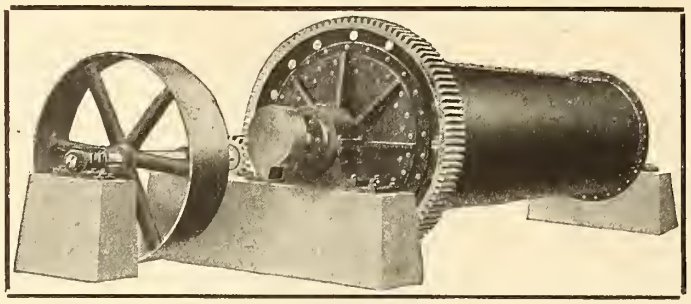


TUBE MILLS with Spiral SELF FEEDER



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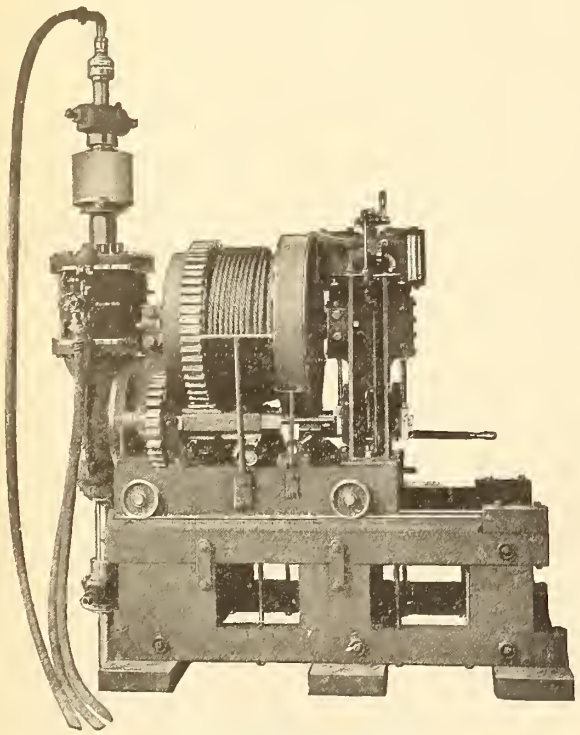

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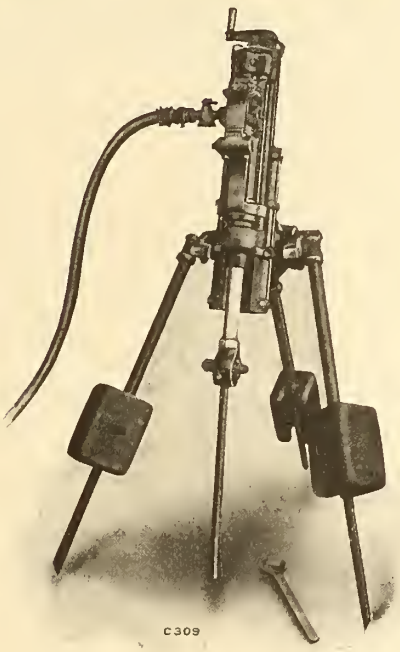

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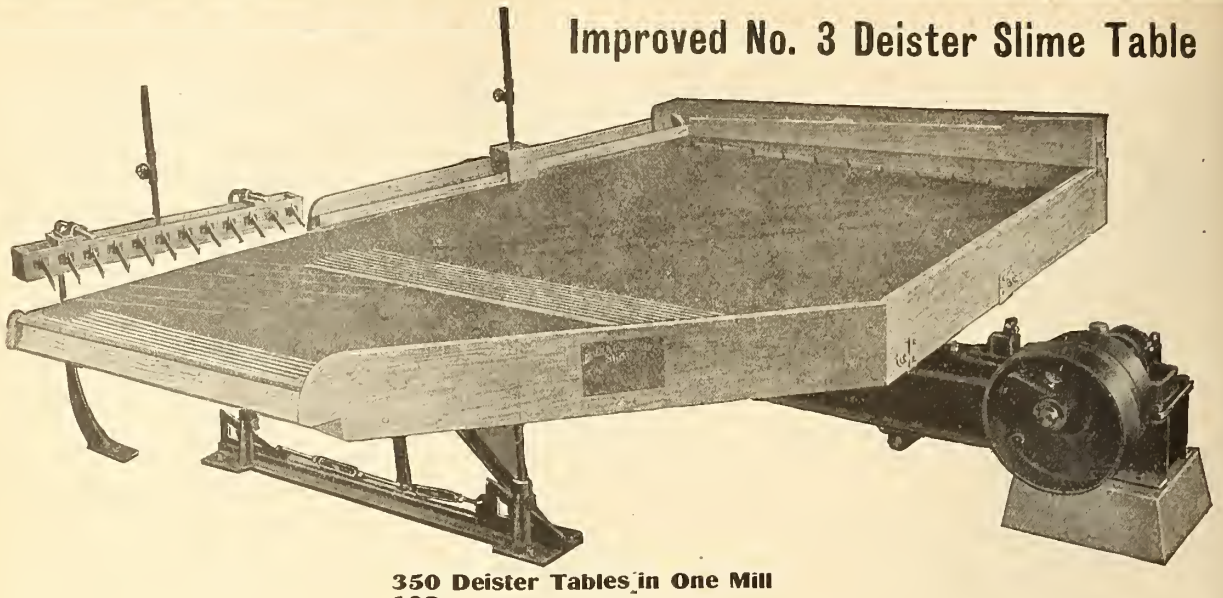

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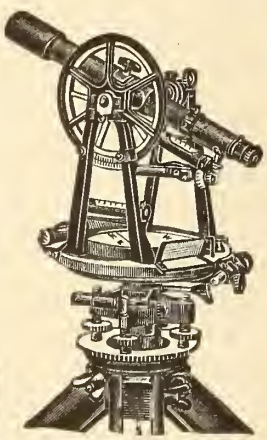

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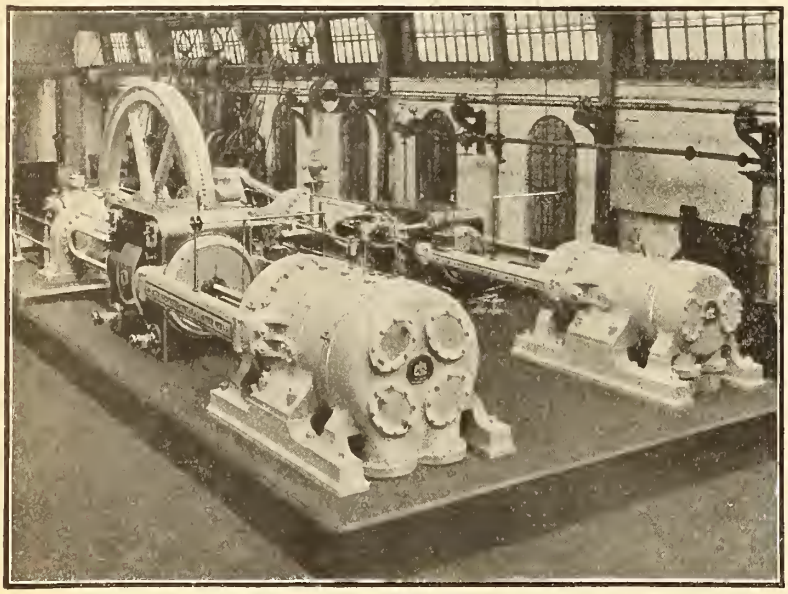

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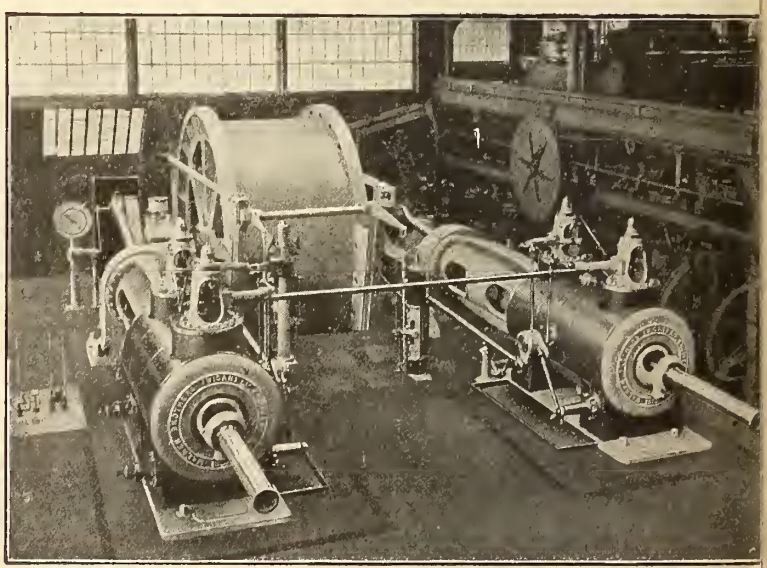

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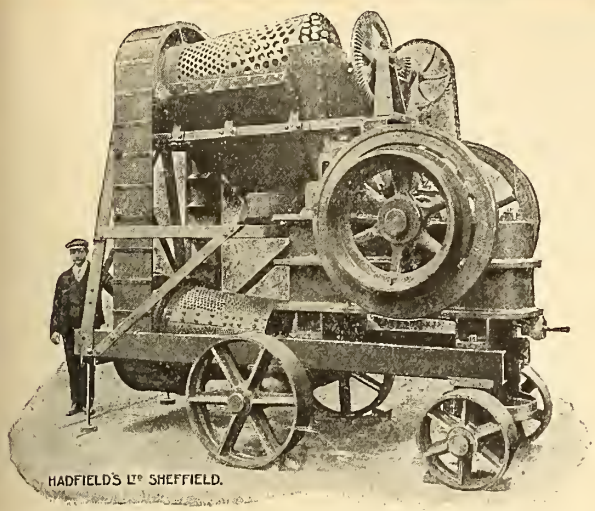

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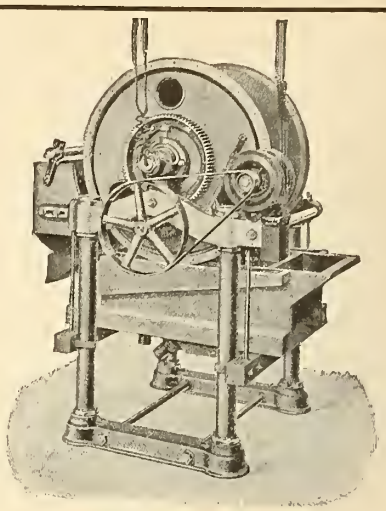

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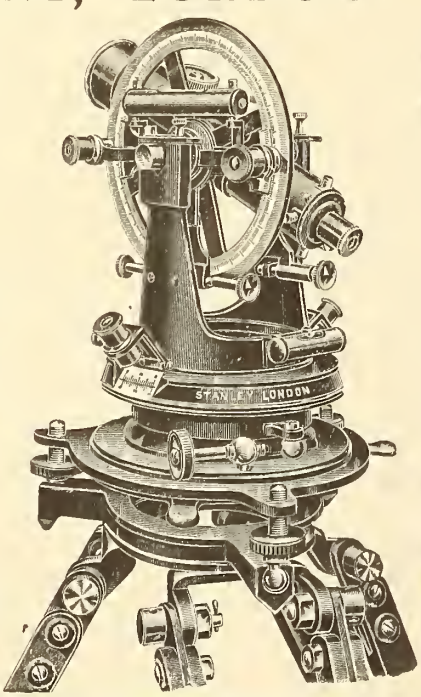

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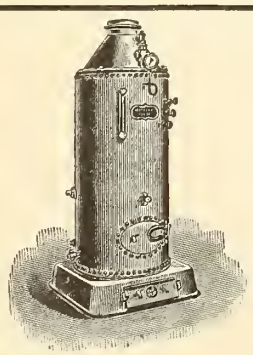

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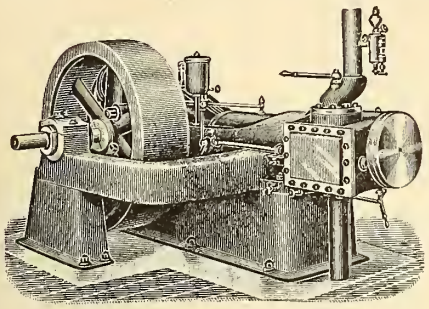

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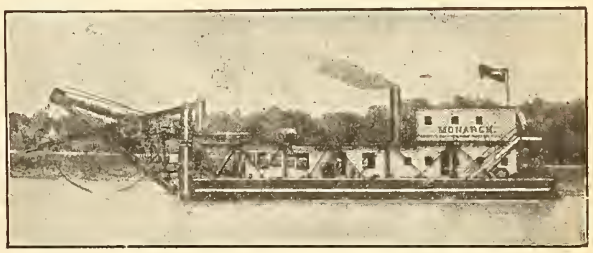

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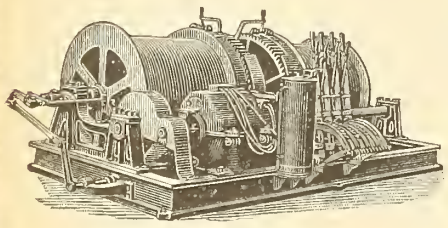

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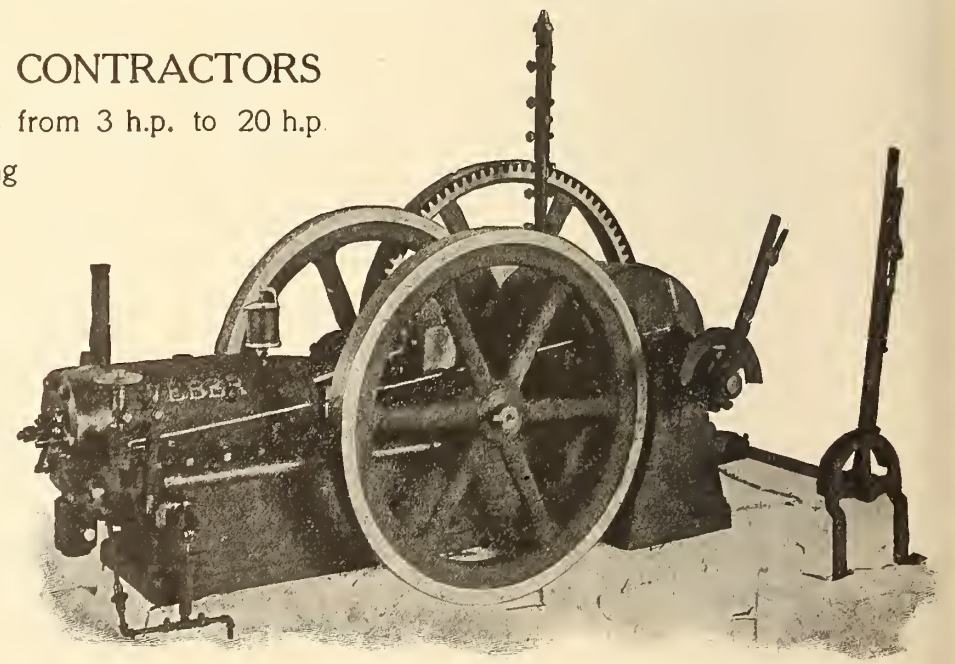

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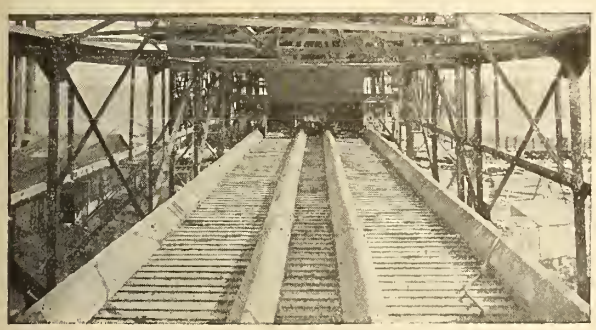

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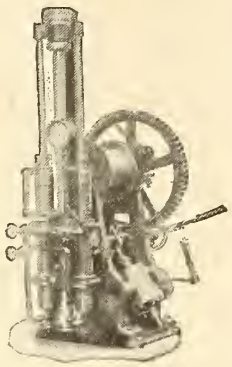

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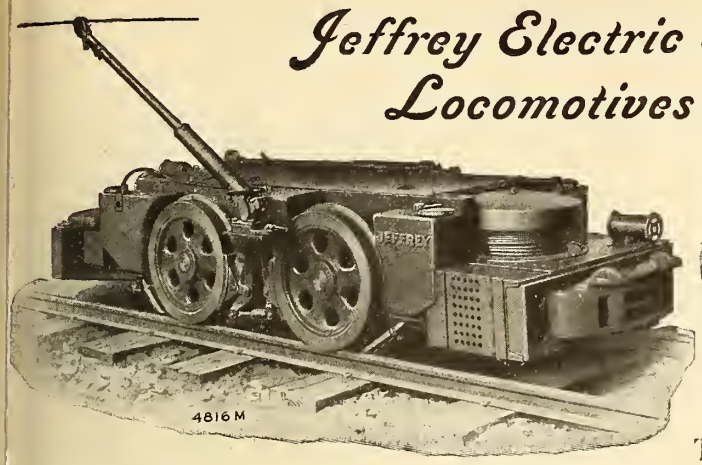

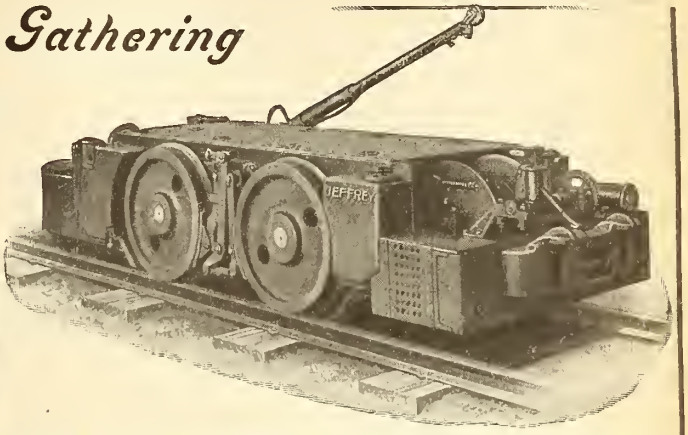

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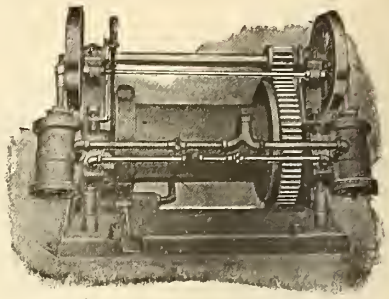

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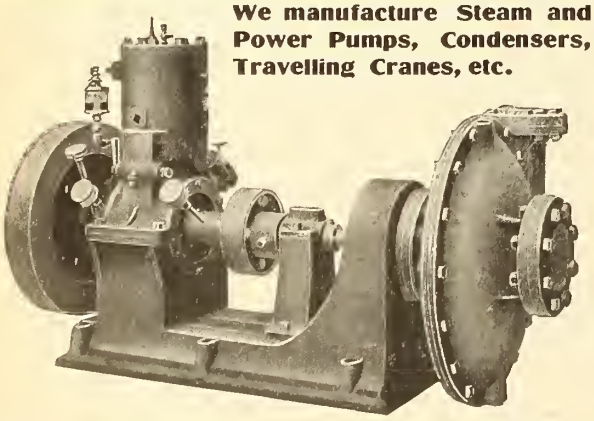

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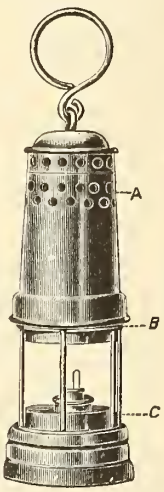

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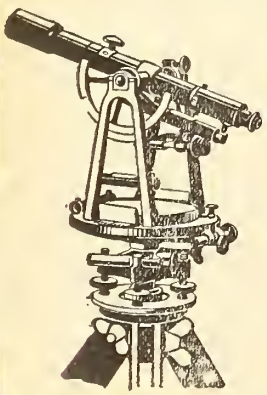

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THE CANADIAN MINING JOURNAL

VOL. XXXII. TORONTO, Oct. 15, 1911 No. 20

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

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THE TWENTIETH ANNUAL REPORT OF THE ONTARIO BUREAU OF MINES.

The twentieth Annual Report of the Ontario Bureau of Mines has just made its appearance. While its statistics are brought up only to the end of the year 1910, yet there are many pages that include information gathered as late as March of the current year. This palliates the sin of tardiness. However, we can see no reason why the special reports, many of which must have been ready months ago, could not be published as "separates."

In the 301 pages of the Report there are presented many papers of exceptional interest. Inspector E. T. Corkill's chapter on mining accidents is praiseworthily complete. Mr. N. L. Bowen's description of the Thunder Bay silver region will stir up interest in that historic mining country. We quite concur in his belief that the district is worthy of attention. Dr. E. S. Moore, who writes on the Sturgeon Lake gold field, offers a word of warning. He advises against the hasty erection of mills before ore has been blocked out. Prof. M. B. Baker, who was sent by the Bureau to investigate the lignite deposits near the Mattagami River, sums up his opinion thus: "Beyond local use, "confined to the outcrops from which a few tons might "be economically mined, it does not seem that the lig-"nite of the Moose Basin has an economic value." Other papers, all of a high order of merit, are presented. It is, however, with Mr. T. W. Gibson's statistical review that we are presently concerned.

According to Mr. Gibson's official estimate, the value of Ontario's mineral output during the year 1910 was $39,313,895, showing an increment of more than 19 per cent. over the preceding twelve months, and of 53 per cent. as compared with the year 1908. As pointed out by Mr. Gibson, only in one year, namely 1908, has there not been recorded a very substantial gain since 1905.

Although gold is still a very small item in the returns, so impressive are its possibilities that we do not hesitate to deal with it first.

In the past year, only nine mines are on record as having produced gold bullion. These are the Gilmour, in Hastings County; the Havilah, formerly the Ophir, on the north shore of Lake Huron; the Canadian Exploration Company's mine at Long Lake, on the Sault branch of the C.P.R.; the Mikado mine, Lake of the Woods; the LePage and Norwalk, Michipicoten; the Swastika, Otto Township; and the Hollinger and Dome mines, Porcupine.

The total production of these mines amounted to only $68,498. Inconsiderable as this may seem, it must be remembered that a vast change has been effected

in the status of gold mining in the last twelve months. Before Porcupine was exploited, the man who suggested spending money upon an Ontario gold prospect was looked upon as possessing more than his share of temerity. Since Porcupine has begun its spectacular appeal, every corner of Ontario is being searched. Both in the east and in the west old mines have been brought to life. Meanwhile, the pent-up energy of Porcupine itself is about to be expressed in terms of gold bars. Two years ago, the value of the annual output of gold in Ontario reached the low level of $32,445. It may be predicted with safety that in the coming year, 1912, the mines of Ontario will yield at least half a million dollars worth of the much-desired metal. Not a little of this will come from districts other than Porcupine. Gold mining will bulk large in the public eye for some years to come.

Silver, by far the largest single item in either metallic or non-metallic products, was produced to the value of $15,481,322, a figure greater by $3,016,600 than the returns for 1909. To the end of 1910, the mines of Cobalt, Gowganda, Elk Lake, and South Lorrain have sent more than ninety-four million ounces of silver to the markets of the world. During the current year an output considerably larger than that of 1910 is expected. Cobalt has not yet, apparently, reached its zenith. With sixteen concentrating plants at work, and several more projected, it is probable that the production of the camp will be maintained at a high level for a long time. During the year 1910, 305,569 tons of ore were concentrated. The concentrates produced amounted to 7,014.3 tons, carrying 7,084,740 ounces of silver. The average ratio of concentration was 43.5 to 1. It is evident that Cobalt depends in constantly increasing degree upon relatively low-grade ores. The general position of the camp is best indicated by the fact that dividends paid during the year amounted to $7,275,239.90, bringing the total during the life of the camp up to $21,802,179.58.

The Province's output of copper totalled 9,630 tons, a gain of 1,697 tons over the previous year. Of iron ore 230,656 tons were mined, a falling off of $131,901. An increase in the quantity of pig iron is reported. Last year's total was 447,351 tons, whereas in the year 1909, the figure stood at 407,013 tons. Seven electric furnaces, producing iron and steel alloys, are in operation.

Materials of construction, including brick, lime, various stones, Portland cement, and special clay products, were manufactured on a larger scale than before.

The value of arsenic produced was $70,709, an average of only 2.31 cents per pound. It is probable that the market suffers from over-production. Iron pyrites mining, of which 33,812 tons were shipped, more than held its own. Mica, thumb-trimmed, was mined to the value of $85,294. Salt was produced to the amount of 84,071 tons, a very fair gain.

Of the minor products, talc appears to be the mo important. The product of G. H. Gillespie & Co.'s m at Madoc is valued at $46,592, which figure does n by any means represent the real market value.

Feldspar is being mined in larger quantities—16,3 tons as against 11,001 tons. Corundum mining is d cidedly more active. Gypsum, quartz, graphite, a fluorspar show much increased interest.

For the benefit of the complainer, it may be me tioned that the mining revenue of the Province h fallen from $979,464.15 to $941,030.09. The reven for 1911 will be larger.

* * * *

The Report, in its entirety, is a credit to the D partment. Mr. Gibson's summary is a model of caref condensation.

THE STUDENT.

After four or five months of toying with the shov the pick, the hammer, and the drill; or the same tin spent in fighting the man-eating mosquito; or laborio months with the bucking board, the furnace, and t balance; the mining student has arrived with h "wad" to take up for another year the routine college.

He is a wiser and weightier personage than he w last spring. Physically he is tougher. Morally a intellectually he is more developed. If he is ente ing on his last year, he is prepared to look with hosti eye upon the crude sophomore and the frivolous fres man, and with critical tolerance upon his professor He has been up against the real thing, and he cham his bit. O, for next spring! Oh, for the freedom th graduation brings!

Eight months of hard work will temper this fi autumnal enthusiasm. The pale graduate that eme ges next year will need no curb. He will find that bi lets do not hang on every bush. There is room f him, but he must squeeze and push and shove.

Meanwhile let him take heart of grace. The pe centage of mining men that fall by the wayside is lo There is no need of increasing the number. Imp tience, lack of actual preparedness, and the desire f soft snaps are the three main causes of failure.

To-day the horizon of the mining man is wider, a must remain wider. Even through the four years college the student can prepare himself for broad citizenship than is implied by mere technical wor Even in the loneliest mining camp the young gradua need not rust. His interest in professional matte in general reading, in politics, and in progress shou remain unabated. Narrowness is to be avoided. is deadly.

One specific against dry-rot, one cure for the blue is letter writing. Within proper limits, a large co respondence is invaluable. The act of writing clea the mind, and exercises and stimulates the ment faculties. A regular and methodical record of wo

one, of methods used, of mistakes, and of successes, akes the days and months of early labour infinitely ore interesting and valuable. A man's career thus ecomes an organic and coherent whole, instead of a isconnected series of incidents.

* * * *

The CANADIAN MINING JOURNAL extends to the min-ng student its heartiest good wishes. May the ses-ions of 1911-1912 be more instructive than ever before.

THE ENGLISH STEEL INDUSTRY.

Bound by conditions imposed by the International teel Rail Syndicate, English rail manufacturers are acing a grave situation. The Syndicate is composed argely of Great Britain's competitors. By mutual greement, no quotations are made below certain fig-ures. In itself this is a sane arrangement. Unfor-ortunately the Syndicate does not now control the vorld's production. In the year 1907 it had practi-ally all the large producers in a solid phalanx. Since hat year, however, large independent concerns in Canada, the United States, and Russia have come into he international market. These new unfettered com-petitors have brought about a condition that imperils very seriously the steel trade of England. This will e understood when it is stated that Russia has sent ails to Ireland, and Canada has filled contracts in England. England, in other words, is prevented from poaching, but is forced to suffer it.

During the immediate past England's steel trade has been steadily losing ground. Germany, the United States, and Belgium have gained ground. Fourteen years ago England exported about 600,000 tons of steel rails; last year she exported only 435,000 tons. This is true despite the fact that English manufacturers have modernized their plants in every respect.

Present circumstances show that Judge Gary's suggestion of world-wide syndication will hardly appeal to England. The present agreement expires in March next. Until then the English manufacturer must be content to see his rivals forge ahead whilst he remains in statu quo. After the expiry of the syndicate agreement it is highly improbable that England will do anything but hoe her own row, and mind her own business without reference to her competitors.

SICILIAN SULPHUR.

Including the island of Sicily, there are in Italian territory more than 400 producing sulphur mines. Of a total annual output of crude ore exceeding 2,800,000 metric tons, Sicily is credited with more than 2,600,000.

The Sicilian sulphur occurs in argillaceous limestone, associated with gypsum and bituminous marl. The crude ore is brown or yellow in colour. The indication sought for by the miner is the presence of "boiscale," a yellow, porous, crystalline alteration product resulting from the oxidation of the sulphur and the action of the sulphuric acid thus formed upon the limestone.

The crude ore contains 25 per cent. of sulphur. Extraction is simple. The ore is burned in beehive ovens, or in "calcaroni"; or it is treated with superheated steam. Three grades of sulphur are exported, the first being practically pure, and each of the two other grades being thrown into three sub-grades—"vantaggeata," or best; "buona," or good; and "corrente," or current.

The effect of the competition offered by Louisiana is seen when it is noticed, that in 1902, the United States and Canada imported about 177,000 metric tons of sulphur from Sicily, whilst in 1909 the imports were only 16,972 metric tons.

MR. THURBER, REDIVIVUS.

An indignant correspondent, evidently a loyal friend of Mr. Thurber, writes us to the effect that we have wrought gross injustice upon that long-suffering person. The accusatory letter has been printed in full on another page. A little explanatory comment will not be out of place.

About two years ago, or more, Mr. Thurber induced some citizens of Kenora to back financially his efforts to extract more gold from ores and rocks than nature had placed there. Or, to put it more fairly, Mr. Thurber asserted that all modern methods of gold extraction, including even the fire-assay, were incomplete and inaccurate, and that he himself could obtain several times the amount ever obtained by ordinary workers. Naturally Mr. Thurber failed to substantiate his claims, although he was given every chance.

Now he has former an unholy alliance with a stock-jobbing concern in Winnipeg, and again his process has been advertised.

Our correspondent inveighs against us for our narrowness in refusing to encourage a worthy inventor. Our attitude is attributed to professional jealousy. He makes the mistake here of thinking that any inventor who works in the dark and also aids in bleeding the public can be taken seriously. If Mr. Thurber's process is revolutionary it is also patentable, so that even did we wish to misappropriate his invention it would hardly be feasible to do so. It must be confessed, however, that our time is pretty fully occupied with our various duties. Reasonable doubts exist in our editorial mind that we would swipe Mr. Thurber's secrets in any circumstances. The temptation does not touch us on a weak spot—otherwise the inventor might possibly not be safe. As matters stand, we can assure both correspondent and inventor that they can put everything on the table without danger. We shall go farther. We shall guarantee to have Mr. Thurber and all his heirs and assigns pensioned comfortably for life if he can show the goods. This is not a costly offer. Ourselves also would be furnished with a much-needed bank reserve.

ADVERTISING.

Just how far and in what manner the mining engineer should keep his name before the publie is a mueh-debated point. In times of aetivity, the engineer who has to do with companies whose stoek is being pushed finds himself subjeeted to advertising that is objeetionable. Often this eannot be prevented. The vietim is immolated upon the shrine of the stoek market.

The ease is quite different, however, when the engineer designedly exploits himself in the newspapers. Apart from all questions of good taste, the newspaper puff is immoral. It appeals only to those who have no knowledge of the standards by whieh the mining engineer is judged.

Brief notiees in the public press of movements and engagements are to be eommended. In these days it is necessary to keep one's name before the reading publie. Anything beyond this is to be frowned upon. The engineer is not a merehant selling his wares Professional etiquette forbids him to enter into eommereial, rate-eutting eompetition with his fellows. And it also should prevent him from displaying himself in type.

In Canada there is far too mueh of this form of vulgarity. Ostraeism is the only suitable penalty. The self-respeeting engineer does not need to eireulate inflated praise of his aeeomplishments.

THE TRANSLATION OF MR. COCHRANE.

It is with unqualified regret that we note the removal of the Hon. Frank Cochrane from the Ontario Department of Mines. For six years Mr. Coehrane has administered the Department of Lands, Forests, and Mines, a billet that is by no means a sineeure.

Whatever faults can be found with Mr. Coehrane's direction of mining affairs in Ontario ean be attributed to honest errors of judgment. No shadow of doubt exists that he was sineerely anxious to do his duty. Brusque, outspoken, and sometimes a trifle too ready to loek horns he undoubtedly was. These qualities may be regarded as virtues when eontrasted with the smooth adaptability of the professional politician.

During the last eleetion eampaign Mr. Coehrane displayed a genius for effeetive organization. So important a part did he play that Mr. Borden felt that not only was high reeognition neeessary, but that Mr. Coehrane should become one of his fixed advisers.

As Minister of Railways Mr. Coehrane will have a ehanee for showing what he is. While we are sorry that he was not plaeed at the head of a new Department of Mines, we ean honestly eongratulate the Premier upon having Mr. Coehrane assoeiated with him.

EDITORIAL NOTES.

The alleged diseovery of plaeer gold in Baffin's Land by Messrs. Elmsley and White has roused eonsiderable eomment. It has not yet reeeived suffieient eertifiea-tion to be taken as aeeurate.

It is the intention of the Provineial Workmen's A sociation to ask that all eoal eutting maehines run b eleetricity be removed from the eollieries of Nova Sc tia. The ground of complaint is the inferior capaci of sueh maehines as eompared with those run by co pressed air.

For the total loss of his sight, Peter Collins, an e ployee of the Britannia Mining and Smelting Co pany, B.C., was awarded $9,000. In his eharge to t jury, Judge Morrison stated that whilst an employer not an insurer of his employees, yet he must adopt a reasonable preeautions to ensure their safety. An e ployee is not an inspector of his employer's plant.

A Toronto newspaper lately printed in its "Want eolumns the following advertisement:

"Will pay for information if you know of an "one who has made money in mining. You "name not mentioned. Box — —"

This typifies the average lay mind. The easual eit zen learns his mining on the stoek exehange. H takes a prospeetus to heart. When roseate promise turn to ashes he blames the industry, instead of ehas ening himself. The advertiser, had he known augh of mining, would have known some dozens of name representing men in Toronto alone, who are reeeivin legitimately earned dividends from mining properties

Personal and General

Mr. Howard W. DuBois, managing direetor of th Quesnelle Hydraulie Gold Mining Company, has bee spending a vaeation in the Canadian Roeky Mountain Park, after having seen in full operation the big wate supply system be designed and had eonstrueted fo his company in Quesnelle mining division, Cariboo dis triet, British Columbia.

Mr. John Hopp, who operates several hydraulic pla eer-gold mines in Barkerville distriet, Cariboo, wa in Vietoria about the end of September.

Mr. W. H. Trewartha-James, of Vietoria, B.C., gen eral manager of the Tyee Copper Company, left Bri tish Columbia late in September on a business visit t the East, as far as New York.

Mr. W. L. Coulson, manager of the Canadian Col lieries (Dunsmuir), Limited, has been in the eastern States lately.

Mr. W. M. Brewer, now manager of the Matanuska Gold Mines, developing a lode gold mining property in Alaska, was down from the North reeently, on a visit to the Coast cities of British Columbia.

Mr. H. M. Ridge, a well known speeialist in the treatment of silver, lead, zine, and other base metals has left British Columbita on his return to London after having spent a week examining mines in the vicinity of Slocan Lake.

Mr. H. M. Davys, managing direetor of the Silverton Mines, Ltd., operating the Hewitt-Lorna Doone group of mines, and the Wakefield mill, in Silverton eamp, Slocan Lake, has returned to his home in England after having spent several weeks in British Columbia

Prof. John Cadman, D.Sc., professor of mining at Birmingham University, England, was at Bellevue, Alberta, a short time ago. Beside having contributed several important papers to the Institution of Mining Engineers, the professor three or four years ago was engaged in special research work for the Royal Commission on Mines.

Mr. Thomas Kiddie, Vancouver, B.C., has been making enquiries for the Government of British Columbia into the question of an intended increase in the charge for electric power, notice of which has been given copper mining and smelting companies operating in the Boundary district of British Columbia, which companies appealed to the Government against such increase in rates by the company supplying the power.

Mr. Martin Nordegg sailed from New York for Europe on October 8th.

Mr. Hector McInnes, one of the directors of the Dominion Steel and Coal Company, was in Toronto early in October.

Mr. Norman Fraser, formerly superintendent of the Michel Collieries of the Crow's Nest Pass Coal Company, was in Toronto on business on October 5th and 6th, when he left for Ottawa. Mr. Fraser is connected with Rocky Mountain Collieries, whose head office is in this city.

Mr. L. D. Huntoon, for the past seven years professor of mining and metallurgy at the Sheffield Scientific School of Yale University, has opened offices at 42 Broadway, New York, for the general practice of mining engineering. Mr. Huntoon will be remembered by many Canadian friends who met him on the A. I. M. E. excursion to Sudbury and Cobalt in the summer of 1908.

Mr. F. G. Stevens, mining engineer, 404 Albert St., Kingston, Ont., left on October 6th for Mexico. He will return at an early date.

Mr. Harold Kingsmill has resigned the office of general manager of the Rea mine, Porcupine. Mr. Kingsmill has been in charge of the Rea almost from the first. He is to take over the management of a South American mining property.

CORRESPONDENCE

To the Editor of the CANADIAN MINING JOURNAL:—

Sir,—Your excellent journal is, I believe, devoted to maters of vital interest to the mining as well as to the scientific world, and there are, I am sure, many thousands of your readers who hail its coming with delight.

A copy of your journal occasionally falls into my hands, and I must admit that I peruse its pages each time with much interest.

Your aim is, Sir, to keep abreast of the times in so far as the conduct of your journal is concerned, and for this your many readers will no doubt commend you.

But, Sir, when you mar your editorial pages with criticisms of an unwitting character, you are really slipping away from the goal towards which you strive. A newspaper's character, they say, can be determined by its editorials.

Mr. Thurber, of Kenora, has been the subject of your remarks on two different occasions, and it seems to me that had you taken the trouble to find out a little more about this much abused gentleman and his process before trying to cross swords with him, your better self would have recoiled with feelings of disgust and revulsion. [Editor's Note:—Sic.—]

You have made your journal responsible for harbouring and giving vent to sentiments which should be altogether foreign to it, which are far from being creditable to either yourself or the journal over whose destiny you rule.

Like many inventors who brought light to the wirld, Mr. Thurber is having his struggles and up-hill work. He is not being encouraged and helped along as he undoubtedly deserves to be; on the contrary, he is put down as one whose company should be shunned; as a man who is trying to foist his fool invention on a long-suffering public.

This experience, of course, has been the lot of many others who have made good, and, notwithstanding your criticisms to the contrary and your efforts to wither Mr. Thurber out of existence, I have very substantial reasons to know that the "Thurber process" will in the near future surprise not only yourself but the whole mining world. [Editor's Note:—We have no doubt on this point.]

Mr. Thurber has contented himself so far by completely ignoring his enemies; he works away quietly and unassumingly, and it is doubtless this attitude, combined with his dogged persistence and "stick-to-itiveness" which gall those jealous busybodies and slanderers who had better look to their own foul doorsteps before even attempting or daring to criticize a gentleman whose shoe strings they are unworthy to tie.

In conclusion, I would offer the remark that the attitude assumed in many parts of the country towards the Thurber Process is doubtless due to the knowledge that present-day methods of extracting gold from ores must sooner or later give way to a simpler and better one.

Can you, Sir, give your readers any plausible reason, based on scientific facts, why the Thurber Process should not fill the bill?

Yours truly,

T. SCOTT CAMPBELL.

Pine, via Vermillion, Ont.
Sept. 25th, 1911.

BOOK REVIEWS.

THE COPPER HANDBOOK, Volume X, 1910-11—A Manual of the Copper Industry of the World — Compiled and pubulished by Horace J. Stevens, Houghton, Mich., U.S.A. 1911.

Volume X., the tenth edition of the Copper Handbook, has just been received. The new issue of this work, which is considered a standard authority on the subject of copper and copper mines for the entire globe, has 1,902 octavo pages, containing nearly 1,500,000 words. In addition to the miscellaneous chapters, it lists and describes 8,130 copper mines and copper mining companies, in all parts of the world. This is the largest number of titles ever listed by any work on mining. The descriptions range from two or three lines, in the case of dead companies, wherein reference is made to detailed descriptions in past volumes at the period of their activity, up to 21 pages in the case of the Anaconda mine, which yields one-eighth of all the copper made in the world.

The miscellaneous chapters of the book, 24 in nu- ber, treat the subject of copper from all possible vie- points, there being chapters on the history, chemist mineralogy, metallurgy, brands and grades, alloys a substitutes for copper, with a copious glossary, a a chapter of statistics ending the book that conta 40-odd tables, thoroughly covering copper producti consumption, movements, prices, dividends, etc. T Copper Handbook is sold on the unique plan adopt nine years ago. The publisher sends the book mail, prepaid, to any address ordered, without advan payment of any sort, and subject to return after week's inspection. The price is $5 in a strong gre buckram binding with silk headband and gilt top, $7.50 in full library morocco. Anyone interested copper, as a producer, consumer, or investor in shar would do well to write the author and publisher, M Horace J. Stevens, Houghton, Michigan, ordering copy of the new Copper Handbook sent prepaid, su ject to approval.

Application of Electricity in the Metallurgical Industr of Italy.

[Specially abstracted for the Canadian Mining Journal from a paper by R. Catani (Rome), read before the Iron and Steel Institute.]

This paper discusses the production of steel by electricity; the smelting of pig iron by electricity; and the production of alloys of iron with other metals by electricity.

I. Production of Steel or Iron in the Electric Furnace.

In Italy steel is manufactured in the electric furnace either direct from ores or from iron products. The first experiments in the direct production of steel from ore in the electric furnace were made at Rome by Stassano in 1898.

A. Steels Produced Direct from Ore.—The problem of the direct reduction of steel from iron ores, using coke or coal as fuel, has not been solved by old methods on a commercial scale. But the results of a few years' trial with the electric furnace have surpassed expectation. In due time, it may now be affirmed with certainty, the problem of producing steel by a direct electric process will have been overcome.

In Stassano's experiments at Rome the material was first crushed, pressed into briquettes with tar, and finally treated in the electric furnace. Recent trials have shown, however, that it is equally easy to treat the ore in a fine state or in lumps, and hence briquetting can be dispensed with. Because he adhered too closely to blast-furnace practice, both in regard to the shape of the furnace and the process itself, the first experiments of Stassano led to no practical results. The first furnace used at Rome, 1898 to 1899, was a shaft furnace in which, instead of having tu eres, electrodes were provided for conducting electr current. The ore was arrested by means of a gratin at a distance of about 20 centimetres above the ele tric arcs.

Finally Stassano adopted a furnace of the heart type. The principal characteristics were that it wa roofed over, and long electric arcs played between th mass of the charge and the arch of the furnace. Th arcs swept the surface of the slag without passin through it. The heat, therefore, passed indirectly int the bath by radiation. The electrodes had a high den sity, and were held in water-cooled supports. Th furnace was completely closed in, and the gase evolved were collected and carried off.

Some Stassano furnaces are fixed, others can be ro tated. In some the only rotary movement is that o tilting towards the side of the tapping hole so as t facilitate tapping. Others can be rotated on the vertical axis so as to stir the bath. Single-phase cu rent with one or more pairs of electrodes or three phase current can be used. Stassano's experiments fo the direct production of steel may be divided int two groups, namely, those performed during 1898-190 the results of which were published in March, 1902 and those the results of which were published in 190

In the first trials only hematite ore of first-clas quality, from the island of Elba, was used.

The analyses of the ore, charcoal, pitch, limestone and product follow:—

Ore.	Per cent.
Fe_2O_3	93.02
MnO	0.619
SiO_2	3.790
S	0.058
P	0.056
CaO+MgO	0.500
Moisture	1.720

Quantity used per 100 kilogrammes of steel produced: 165.8 kilos.

Charcoal.	Per cent.
C	90.42
Ash	3.88
Moisture	5.70

Quantity used per 100 kilogrammes of steel produced: 26.5 kilos.

Pitch.	Per cent.
C	59.20
Hydro-carbons	40.50
Ash	0.27

Quantity used per 100 kilogrammes of steel produced: 20 kilos.

Limestone.	Per cent.
CaO	51.21
CO_2	43.43
MgO	3.11
Al_2O_3 } Fe_2O_3 }	0.50
SiO_2	0.90

Quantity used per 100 kilogrammes of steel produced: 119.1 kilos.

Average product.	per cent.
Fe	99.7
C	0 10
Mn	0.10
Si	0.10

Quantity used per 100 kilogrammes of steel produced: 100 kilos.

Altogether there were produced only 125.6 kilogrammes of steel. The loss of iron was about 8 per cent. The consumption of energy averaged 4187 kilowatt hours per ton of product, and the mean efficiency of the furnace was 48 per cent. The electrode consumption was estimated at 12 kilogrammes per ton produced.

The industrial importance of the process was insignificant, as only first-class material could be used, the cost of preparation was excessively high, and the energy consumption prohibitory.

In the second series of his experiments, Stassano used an ore of the following composition:

	Per cent.
Fe_2O_3	68.70
Mn_3O_4	3.23
SiO_2	17.15
Al_2O_3	2.
CaO	1.
MgO	5.67
P	0.15
S	0.12
(Fe	48.09)

The ores were again crushed and briquetted, but with a 25 per cent. solution of silicate of soda instead of with pitch. Steels of good quality were obtained, the analyses of the product of charges Nos. 2 and 4 being given herewith:

	Charge No. 2.	Charge No. 4
C	0.26	0.80
Mn	0.21	0.30
Si	0.03	0.22
P	0.010	0.015
S	0.040	0.045

In this second series of experiments, in which only four charges were worked, particulars were not given either of the total production or of the consumption of electrode, or of the composition of the limestone and the charcoal. The furnace was of 200 horse-power, with three-phase current, and the average consumption of electric energy was 4,250 kilowatt hours.

The charges were as follows:—

	Kilogrammes.
Ore	100
Limestone	35
Charcoal	24
Aqueous solution of silicate of soda	8
Carbide of calcium	5

Assuming that the loss of iron was the same as before, namely, 8 per cent., the consumption of material per ton of steel produced would have been:—

	Kilogrammes.
Ore	2250
Charcoal	540
Limestone	787
Silicate of soda	180
Carbide of calcium	112

In addition, it is calculated that, in these last experiments, the furnace consumed, for every ton of steel produced, about 50 cubic metres of water for cooling the holders of the electrodes.

B. Steels from Iron Products.—With the electric furnace, however, the general practice is to use pig iron instead of ore, in which case the material can be charged into the furnace in either the liquid or the solid state. The following table shows the approximate power consumption when different materials are used.

Kilowatt hours necessary for producing a ton of steel

	Kilowatt hours.
From cold pig iron	1500
From liquid pig iron	1100 to 1200
From cold pig iron and cold scrap	900 to 1300
From liquid pig iron and cold scrap	600 to 1000
From cold scrap	300 to 900

Refining.

	Kilowatt hours.
Steel of crucible quality from liquid iron	200 to 300
Ordinary electric steel from liquid form	120
Mixer	50

1. Cold Charging. — The raw materials consist generally of pig iron, scrap, ore, and additions.

The first installation of the Stassano furnace was made at the Royal Artillery Works at Turin, by the Italian Ministry of War in 1903. The furnace is of 200 horse-power. Subsequently the Stassano Electric Furnace Company established an electric steel works at Turin. Following are the general specifications:

No. of furnaces	2	2	2
Horse power	100	200	1000
Volts	75	100	150
Amperes	1000	900	2700
Kind of current	Single-phase	3-phase	3-phase

Three-phase current at 21,500 volts was supplied by the Societa Anonima Elettricita Alta Italia, and this

was stepped down by special transformers to 75, 100, and 150 volts for the furnaces of 100, 200, and 1000 horse-power respectively. The single-phase furnaces of 100 horse-power were shunted, on a single-phase circuit. The current supplied to the furnaces amounted to about 350 kilowatts from December to March, and to 800 kilowatts from March to December, while the total power of the furnaces was 2,600 horse-power= 1910 kilowatts. The Turin works of the company manufactured chiefly parts of railway carriages, wagons, and automobiles. The company went into liquidation in 1909. Some of the furnaces of the Turin plant have been transferred to the works of the Elba Company at Portoferraio and some to the Milan Steel Works.

The Stassano furnace installed at Portoferraio now works with cold charges; but it is probable that the company will soon adopt liquid charging for the production of high-quality steel. The installation at Milan is not yet in operation.

Heroult furnaces are installed in Italy at the works of the Mannesmann Tube Company, formed by the amalgamation of the Mannesmann Tube Works at Dusseldorf and of the Metallurgical Company of Rome. The works are situated at Dalmine in the district of Sabbro, Province of Bergamo. Three-phase current is delivered at the central station at 12,000 volts, where it is transformed to 550 volts. There are two furnaces in which open-hearth steel scrap is melted. Both furnaces are in operation.

One Girod furnace is in course of construction at the steelworks at Cornigliano Ligure of the Giovanni Ansaldo Company. It is three-phase of 350 kilowatts at 50 cycles, with a capacity of 4 to 5 tons. The material is charged cold, the maximum potential between phases being 70 volts. The furnace is intended for the manufacture of special steels only. When operated with liquid charges the production will be increased by about 40 to 50 per cent.

Electric furnaces may be charged either with liquid pig or with steel from the converter, or the acid or basic open-hearth. With liquid steel a simple refining process only is required, and, by the removal of occluded gases, the quality is much improved.

The first furnace worked with liquid charges in Italy was the Kjellin furnace installed at the works of the Giovanni Andrea Gregorini Steel and Iron Foundry Company at Castro on Lake Isco. It is now working on liquid steel taken from a 4-ton open-hearth furnace, which supplies to the electric furnace 1400 kilogrammes of metal at each heat. The steel supplied has the following composition

Carbon, 0.08 to 0.10; silicon, 0.03 to 0.05; sulphur, 0.010 to 0.020; phos., 0.008 to 0.015; mang., 0.18 to 0.35.

The final product contained: Carbon, 0.60; silicon, 0.25; manganese, 0.12.

The recarbonization was effected by adding pig iron. The furnace is tapped every 2½ hours, yielding at each heat 1400 kilogrammes of steel. Thus the daily production amounts to about 15 tons. The steels produced, whether hard or soft, are always very malleable.

The Kjellin furnace in question is a simple induction furnace taking 300 kilowatts. It is supplied with single-phase current at 25 cycles. When working on cold charges the production is about 10 tons daily, the energy consumption being 690 kilowatt hours per ton of steel produced. The patent furnace lining of the Poldihutte is used, which lasts for about 120 hea. High speed steel can be manufactured carrying 25 p cent. of tungsten and 6 per cent. of chromium.

II. Production of Pig Iron in the Electric Furnac

In the Canadian experiments conducted by Dr. P gene Haanel, and in the successful industrial effo of Swedish manufacturers, ordinary grades of iron o were used. In Italy experiments have been carri out by Carcano for the production of pig iron fr pyrites residues. Purifying, enrichment, and a glomeration are necessary to prepare pyrites residu for treatment in the blast-furnace. The material oft carries more than 4 per cent.

The residues treated by Carcano in the electric fu nace contained:

Silica	From 7.9	to 12.25	per ce
Iron.....	From 47.0	to 60.3	per ce
Alumina	From 6.9	to 18.80	per ce
Sulphur	From 2.01	to 4.25	per ce

The residues were charged in their powdery con tion. It was endeavoured to work with the most bas slag possible, with a certain percentage of manganes so as to ensure a sufficiently strong desulphurizing e fect. Generally, manganese is found to be a satisfa tory desulphurizer. In the experiments raw materi containing up to 4.25 per cent. sulphur yielded a p iron running between 0.015 and 0.058 per cent. su phur in the presence of from 2.17 to 2.54 per ce manganese. Various types of electric furnace of di ferent powers were used. The furnace tried by Ca cano in 1908, which gave the most favourable result was of a capacity varying frob 200 to 300 horse-powe It was aclosed furnace with neutral hearth supplie with single-phase or three-phase current with aut matic charging, and with recovery of the carbon mo oxide evolved during the reactions. That gas w used to prevent deoxidation of the pyrites residue The energy consumption per ton of pig produced ave aged 2100 kilowatt hours in a furnace of 180 kil watts and using residues containing 50 to 55 per cen of iron in the form of ferrous oxide. The lower end of the vertical electrodes rested on the slag, so tha the furnace worked as a surface resistance furnac and the slag was of very high temperature, muc above that of the bath. By this means it was possibl to obtain highly fluid slags sufficiently basic in cha acter.

Too many data are lacking to make it possible t present a practical estimate on the economic aspect o the process.

III. Ferro-Alloys.

The chief metallurgical products manufactured i the electric furnace in large quantities are ferro-a loys. Such alloys as ferro-manganese and ferro-sil con low in silicon, were known before the introductio of electric smelting; but with the electric furnace i is possible to produce alloys with a very much lowe carbon content than before. The production of suc alloys as high grade ferro-silicon, ferro-chromium, fer ro-tungsten, is practicable only in the electric furnace and these are manufactured either from the ores them selves, or direct from the metals, or from the metal and ores together. The only ferro-alloy electrically manufactured in Italy on an important scale is that o ferro-silicon, of which 628 tons were produced in 1909 Some experiments in other directions may be briefly mentioned.

A. Ferro-Alloy from Ores. — The author of this pa- r has made experiments for the purpose of studying e economic possibility, under given conditions, of oducing ferro-silicon by smelting silieates of iron or n ores too highly silieeous for treatment in the ast-furnaee: also east iron or pig iron that has been jeeted on aeeount of its high sulphur or phosphorus ntent. The eleetrie furnace used was speeially modi- d by the author. It was marked by the absenee of y kind of flexible eonductor. A minimum quantity current passed through the eonduetors and through e eleetrodes; a minimum spaee was taken up by the nduetors; and water-eooling was eonfined to those rts of the furnace above the plane of the eleetrie es. These furnaees have a high total efficiency, and n be adapted to the manufacture of ealeium car- ide. With alternating eurrent the power factor ap- proaches as near as praeticable to unity. The current supplied is of 12,00 amperes at 42 volts 25 eyeles.

B. Ferro-Alloys from Metallurgical Products.. The greater part of the ferro-silieon manufactured in Italy is produeed from quartz and scrap iron. The first works in Italy that manufactured on an industrial seale were those of the Societa Elettroehimica at Bussi. The produetion in 1907 was 175 tons; in 1908, 808 tons; and in 1909, 606 tons.

In 1909 the Piedmontese Company for the Manufacture of Carbide of Caleium and Allied Products produced 22 tons of ferro-silicon. The electric furnace used for smelting ferro-silicon is absolutely identical with that used for the produetion of earbide of ealeium, and works with the same eurrent at the same pressure.

RESEARCH WORK ON CERTAIN NOVA SCOTIAN GOLD ORES.

By Ora Willis Knight, M.Sc., D.Se., Bangor, Maine, U.S.*

(Continued from Oetober 1st issue.)

Arsenopyrite, pyrrhotite, pyrite, and other preeipi- ants of gold are generally distributed throughout raetieally all of the bedded veins, and well defined late partings whieh are also eapable of precipitating old exist above and below the quartz of these bedded eins, as well as often mingled with the quartz, so it s quite evident that any gold passing through the edded veins in solution should have been preeipitated herein sooner or later. Over a hundred assays made y me on material taken from bedded veins, at con- iderable distanees from fissures, have failed to show he presenee of gold in paying quantities, the gold alue found being from 40 to 67 eents per ton of ore. The conclusion seems eertain that the bedded veins so sampled, all being on or near antielinal axes, had not served as trunk channels for gold-bearing solutions.

A number of assays made of ore taken from near fissure veins, but on bedded veins, gave gold values ranging from $1.50 up to hundreds of dollars per ton of ore, indieating that better gold values were present near the fissure veins whieh are eommonly known as "angulars" in Nova Seotia.

As there seems to be a well developed opindion among the miners of the province that the presenee of troughs in the wall above the vein, or the presence of the so-called barrel rolls of quartz are indieations of pay-ore and are generally eonsidered infallible, I wish to say that samples taken in several plaees where these conditions were prominent gave assay returns averaging 67 eents in gold to the ton of ore.

Although, of eourse, it is possible that in eertain districts there are bedded veins whieh were aetually trunk ehannels for gold-bearing solutions, it is my purpose to elaim that the fissure veins or angulars, or in other words veins eutting aeross the strata either in extent or in dip, were the main trunk ehannels for the gold-eontaining solutions. Fissure veins passing aeross quartzite formations would encounter the conditions most favourable to precipitation of gold at such places as they either passed through slate formations, passed through or interseeted bedded veins, passed through quartzite containing pyrites, or other preeipitating gold or solutions themselves bearing gold and eapable of precipitation by the material in the fissures entered.

Where a fissure vein, earrying gold-containing waters, intersected a bedded vein full of precipitating material there would be formed a pay-shoot, often extensive, along the general line of intersection, or sometimes merely a loeal enrichment of nuggety gold, according to existing eonditions. Under sueh eonditions extensive pay-shoots were formed in many instances, and doubtless extend to great depths along the line of interseetion.

The interseetion of a fissure with a bedded vein, under eonditions highly favourable to the precipitation of gold, may result in so completely throwing down the gold along the area of eontaet that there is not sufficient gold left to be precipitated and form pay-shoots at the intersections of the fissure with other veins more or less vertically above it. Under sueh conditions no profitable body of ore would exist above sueh a pay-shoot, but at a suffieient distance one way or the other along the fissure, where the dip of the bedded vein would take it down and out of the field og influence, other pay-shoots would be formed on other bedded veins.

Similarly where fissures passed through slaty strata or other formations capable of eompletely precipitating gold, the gold would form more or less extensive pay-shoots along the line of interseetion, and no pay-ore would oeeur beyond until other preeipitating ageneies are passed through.

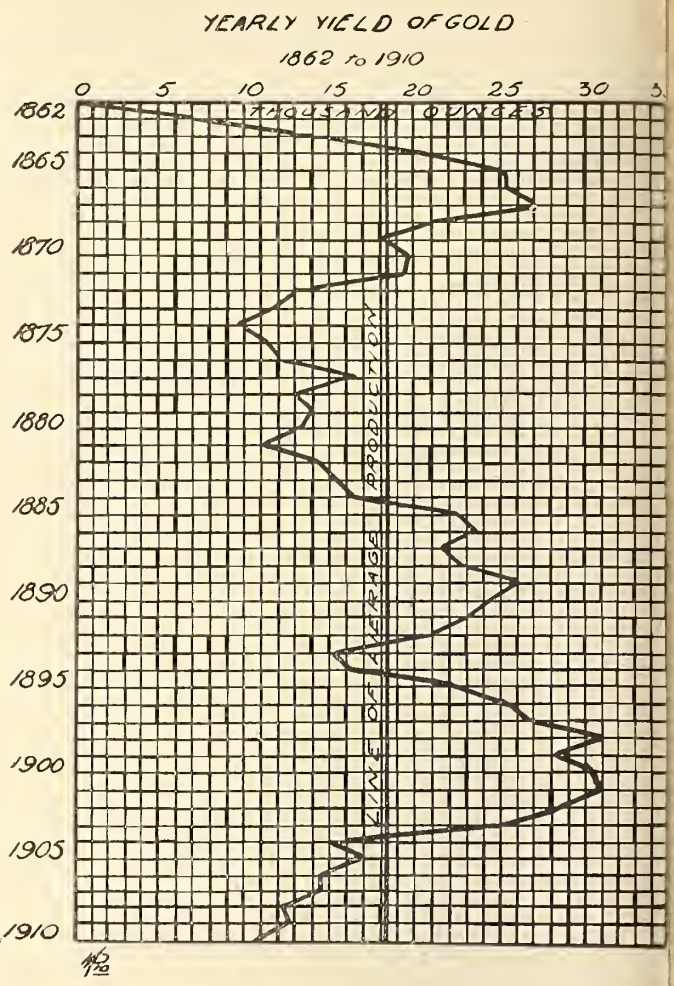
Where fissures were intersected by other fissures at various angles, the one earrying gold-containing solu-

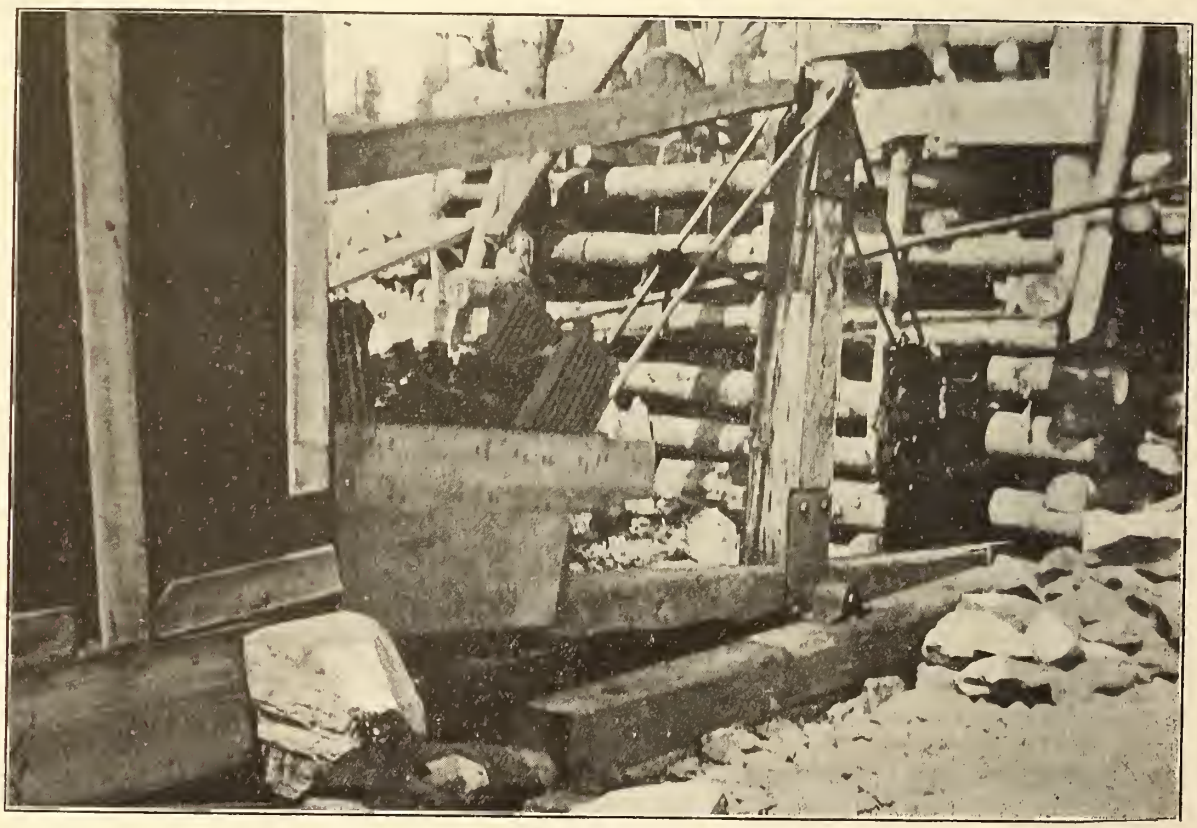
*Abstraet of paper read before the Mining Soeiety of Nova Seotia.

tions and the other precipitating solutions, then pay-shoots would be formed along the line of their intersection. The extent, width, and richness of these would be dependent upon the relative length and width of the fissure through which the gold was passing which was connected with the precipitating fissure, and upon the respective volumes, strength of flow and richness of the solutions passing from one into the other.

A small fissure, less than half an inch in width, may at its intersection with a bedded vein give hundreds of ounces of gold in a small space on the bedded vein near the intersection. As an illustration we may mention the Ross vein in the Holman mine which at its intersection with a half-inch fissure yielded very many ounces of coarse gold, while elsewhere in the workings this vein has yielded practically no pay-ore until very recently at its intersection with another fissure where I am told by Mr. Holman that Mr. Ross, who is now at the mine, reports that it contains some fine gold. This vein carries a considerable percentage of metallic sulphides, much intermingled slate, and other precipitants of gold wherever it has been exposed, but except as noted, has yielded no paying quantities of gold. The small fissure (angular) intersecting it where the gold was taken remained unnoticed for nearly a year until discovered by me, and its probable influence on the vein pointed out.

During the years of erosion and the action of atmospheric and aqueous agencies upon the rocks of the Meguma series, it is very certain that some gold had been dissolved, carried down through crevices, joint-planes, and open fissures, and finally deposited on various bedded veins beneath, forming small pockets or bonanzas of gold.





Cornish Pump at a Nova Scotian Camp.

There are probably several instances known in Nova Scotia where pay-shoots along bedded veins, dipping more or less steeply, have been followed over 1,000 feet down on the incline. These pay-shoots often dip at an angle one way or the other along the vein, and this angle of dip of the pay-shoot has often been between 30 deg. and 45 deg. It may be argued that these instances are seeming exceptions to my assertions, but I am inclined to believe that the bedded veins were not the trunk channels of the gold-bearing solutions, for if they had been we would expect the pay-shoots to be more nearly vertical. The more reasonable conclusion to me seems to be that gold-bearing solutions entered through very narrow fissures, extending to great depths and in contact with the bedded veins for a very considerable distance along the line of dip of the existing pay-shoots. The gold was precipitated in the bedded veins near the point of entrance to them and along the line of the fissure through which they entered. Failure to discover such fissures is merely negative evidence, for like the angular intersecting the Ross vein, they have probably never been looked for, and it is possible that at the present time all trace of them may have been obliterated by subsequently exerted pressure.

As far as my studies have gone in connection with the gold districts visited by me in the Province, the conclusions reached point to the fact that in those districts characterized by well developed anticlinal folds (and some of them by domes as well) the bulk of the gold deposition is directly traceable to the influence of fissure veins, through which the gold was originally brought in solution. At places in the quarzites where I found the veins carrying pay-values in gold, there was in every instance strong evidence to prove that the gold was brought in through a neighbouring fissure; and furthermore places shown me where very rich ore was said to have been taken in the past were all near fissure veins. In these instances, at distances from the fissures where pay-ore had ceased to exist, the vein contents were otherwise identical, save in gold value, and in every instance minerals capable of precipitating gold were present.

Instances sometimes may exist where a fissure comes up to a bedded vein, turns and follows along it for a greater or lesser distance, finally turning again and passing upward. In such a case a pay-shoot would probably be formed along the vein between the point of entrance and the point of departure of the fissure vein, and until sufficient mining had been done to ascertain the truth of the matter it might appear that such a vein was a seeming exception to my conclusions.

It seems evident to me that too little work has been done in developing the various fissure veins, especially the small but nevertheless true fissure vems locally called "angulars" in Nova Scotia. It may be well to explain that the term angular vein as used in Nova Scotia is synonymous with the term "fissure vein" as used by western miners, while western miners generally use the word "angular" to designate any small, generally not extensive, lateral branch, stringer, or feeder of a fissure vein.

It would be my preference in developing a mine in Nova Scotia to sink the shaft at the intersection of a fissure vein with a bedded vein, preferably, of course, at such an intersection as is known to carry pay-value in gold. Where possible the shaft should be carried down on an incline coinciding with the dip of the intersection of the two veins. In such a case the hanging-wall of the fissure will serve as the hanging-wall of the shaft, while that of the bedded vein may be in many instances made to serve as what might be termed

Montagu—Veteran Miner standing behind remains of stamp battery foundations.

the "hanging side wall" of the shaft, but in some cases the angle of dip might necessitate doing otherwise. At various levels reached, drifts can be run along the fissure vein to its intersection with other bedded veins, either known or supposed to exist, and pay-shoots located at such intersections can be stoped up on. Again, where, as is very often the case, parallel fissure veins are known to exist nearby, a drift can be run on the bedded veins at different levels to the intersection with such fissure and pay-shoots stoped up on, etc.

We may say that as a general rule the nearer to the horizontal a bedded vein runs where cut by a fissure vein, the coarser and more nuggety any gold found will be.

Where a bedded vein dips at an angle from the horizontal, some coarse gold will be deposited at the intersection, while much finer gold will be found scattered down the bedded vein to a greater or lesser distance, according to whether its dip is slight or extreme.

Some fissures will give good deposits of gold at their intersection with each of several superimposed bedded veins, while in other instances deposits will be found only at a few of such intersections and intervening ones may be unprofitable to work.

Although there is probably a future time coming when the low-grade slates, conglomerates, and quartz veins will be worked at a profit, I will not dwell on their possibilities in this paper.

In concluding, I wish first to express my admiration of the very complete, accurate, and valuable work done by Mr. E. R. Faribault in mapping the various mining districts, veins, and geological formations of Nova Scotia. The mining industry of the province owes very much indeed to his genius and indefatigable work. Finally, I wish to put myself strongly on record as not being in accord with the conclusions of an eminent mining expert and geologist who was once paid a very liberal sum for his report regarding the future possibilities of extensive deep-mining in Nova Scotia. On the contrary, I believe that the province has a great future before it, and that with ample capital and intelligent development of its mines, Nova Scotia will take its right place among the great mining camps of the world.

Sampling of High Grade Cobalt Silver Ores.

[Editor's Note.—The following article was not available for our last issue. It supplements fully the very brief description then given. Our readers are referred to the last issue for illustrations of the equipment. Only the flow-sheet is here reproduced. The preliminary notes touching the history of the enterprise are most interesting.]

In 1907 Messrs. Campbell and Deyell formed a partnership as mining engineers, and in April of that year took over the business of Mr. C. M. Tilkie, assayer, of Cobalt, operating it on a small scale in conjunction with the practice of engineering. It soon became evident from the trend of events that a sampling plant was positively required in Cobalt; but certain investigations made had resulted in the conclusion that it would be impossible for a custom sampler to obtain sufficiently accurate results from this ore. The result of experiments in the small laboratory of Messrs. Campbell & Deyell encouraged them in attacking the problem, with the result that in November, 1909, the present company was organized with the old assay and sampling business as a nucleus, and construction on the present sampler commenced.

In June, 1910, the first lot of ore was sampled and after a few weeks of experimenting it was demonstrated beyond question that it was practicable to check on repeated valutions of this ore. It must be understood that the hand methods used to that date did not give sufficient moral security to the interested parties and that the two smelters who had mechanical samplers did not attempt to make more than one valuation of a car. This allowed of no check. The present plant is almost entirely mechanical. The points at which the ore is touched by the workmen being subject to careful supervision by representatives. From the time the ore is crushed till four separate and independent samples of the car are obtained, no human being has access to the ore.

The capacity of the plant is about 30 tons per day. This, of course, varies considerably above and below, according to the nature of the ore which is either coarse or fine, dry or wet, hard or soft, free from or full of arsenides, and with varying quantities of metallic silver; thirty tons of ore yielding on occasions as much as two tons of metallic silver from the ball mill screens.

The figures to show the amount of ore that has been sampled are not to hand; but it suffices to say that the machinery has been working day and night ever since the plant was first turned over, except, of course, the usual stoppages for repairs. The patronage of the larger mines has been secured; but, unfortunately, a few of the smaller ones are tied up with contracts with smelters and in other ways prevented from taking advantage of the sampler. It is confidently expected that these few will be taken into the fold in the near future.

In the following article the writer has not touched on the storage of ore, for which there is ample capacity, nor the grading of ores, which has proved to be an important branch of the business, nor the marketing of the ore and bullion: these are lengthy subjects and can be dealt with at a future date if found of sufficient interest.

The following are a few of the reasons why there should be a sampler in Cobalt:

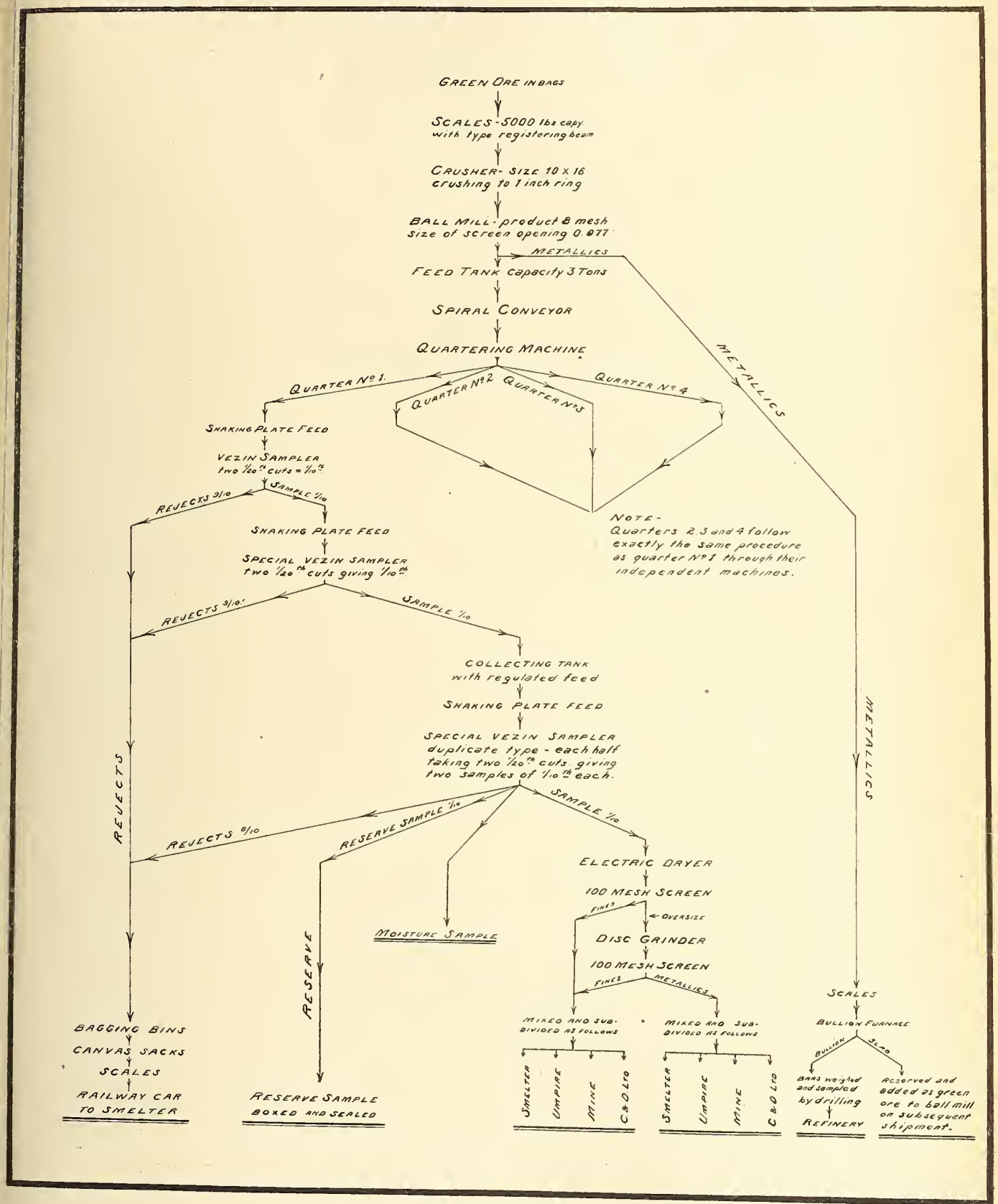
The mines are assured of a neutral and disinterested valution of their product.

The machines give an automatic sampling which, to the greatest possible extent, eliminates the personal equation.

The ore is marketed at the point of production and its contents and value known almost at the mine's mouth. In this way the most advantageous market may be chosen.

Mines having different grades of ore may sample each lot independently and blend them to make a desirable product for the smelters.

The smelter having its representative at the plant may, at the discretion of the mines, determine the


GREEN ORE IN BAGS
SCALES - 5000 lbs capy with type registering beam
CRUSHER - SIZE 10 X 16 crushing to 1 inch ring
BALL MILL - product 8 mesh size of screen opening 0.077
METALLICS
FEED TANK capacity 3 Tons
SPIRAL CONVEYOR
QUARTERING MACHINE
QUARTER No. 1.
QUARTER No. 2
QUARTER No. 3
QUARTER No. 4
METALLICS
SHAKING PLATE FEED
VEZIN SAMPLER two 1/20th cuts = 1/10th
REJECTS 9/10
SAMPLE 1/10
SHAKING PLATE FEED
SPECIAL VEZIN SAMPLER two 1/20th cuts giving 1/10th
REJECTS 9/10
SAMPLE 1/10
NOTE - Quarters 2, 3 and 4 follow exactly the same procedure as quarter No. 1 through their independent machines.
COLLECTING TANK with regulated feed
SHAKING PLATE FEED
SPECIAL VEZIN SAMPLER duplicate type - each half taking two 1/20th cuts, giving two samples of 1/10th each.
REJECTS
REJECTS 8/10
RESERVE SAMPLE 1/10
SAMPLE 1/10
MOISTURE SAMPLE
ELECTRIC DRYER
100 MESH SCREEN
FINES
OVERSIZE
DISC GRINDER
100 MESH SCREEN
FINES
METALLICS
METALLICS
SCALES
BULLION FURNACE
BULLION
SLAG
BARS weighed and sampled by drilling
REFINERY
Reserved and added as green ore to ball mill on subsequent shipment.
BAGGING BINS
CANVAS SACKS
SCALES
RAILWAY CAR TO SMELTER
RESERVE
RESERVE SAMPLE BOXED AND SEALED
MIXED AND SUB-DIVIDED AS FOLLOWS
SMELTER
UMPIRE
MINE
C & O LTD
MIXED AND SUB-DIVIDED AS FOLLOWS
SMELTER
UMPIRE
MINE
C & O LTD

tenor of the various lots of ore and so bid intelligently.

The mine may store the ore, knowing its exact value and contents, and await a desirable market.

Certificates of sampling and valuation may be cashed at the local banks and the value in the raw product realized a few days after it is mined.

Four independent and separate samplings are made on each lot of ore, the reasonable concurrence of the assays on which, put the accuracy of the sampling beyond question.

Custom Ore Sampler—Cobalt.

The ore is delivered to the plant, from the mine, in railroad cars at the mill siding, or else in wagons. It is contained in jute or canvas sacks, each of which weighs, when full, approximately 100 pounds. The bags after being loaded on trucks are trammed into the mill, being weighed at the door on a Fairbanks type registering scale. The tram and ore sacks are subsequently weighed and this tare deducted, and the net green or receiving weight obtained. The ore is either placed in locked bins, or if to be sampled immediately, is elevated (electric elevator), still in bags, to the second or crusher floor. Here the bags are opened and the ore shovelled over a 1-inch grizzly, the oversize going to a 10-inch x 16-inch Buchanan crusher, which reduces it to 1½-inch ring.

The discharges from both crusher and grizzly pass to a cylindrical steel tank with conical bottom, and is thence discharged automatically to the ball mill by an adaptation of the Challenge feed. The ball mill reduces the 1½-inch product continuously and passes it over a spiral screen (8 mesh), thereby discharging the "throughs" into a steel hopper-bottom car and returning the oversize to be reground. Necessarily each lot of ore has to be crushed and sampled separately, and requires a complete clean-up of the mill and the machinery after each lot has passed.

After the ball mill receives the last portions of ore from the crusher tank, the presence of metallics becomes evident from the nature of the ball mill discharges. When it is adjudged that the metallics have been freed from the brittle ore and the mill is discharging a product composed mostly of pellets of silver, a section of the screen is removed allowing the metallics to be discharged in their unreduced form, into a suitable receptacle. These metallics are, at the discretion of the mining company, either bagged, weighed, and shipped to the smelter; or else they are taken to the bullion department and are there melted and cast into ingots. Samples are taken by drilling the ingots. It is usual to ship the bullion by express to the London or United States markets.

To return to the No. 8-mesh product that has been discharged from the ball mill into hopper bottom cars: this is occasionally held in reserve in a steel hopper tank until required for further treatment; rarely it is bagged; usually the car is trammed, directly it is full, to the elevator, elevated to the top of the mill, and there discharged into the sampler feed-tank.

From this point the ore is treated entirely by machines until four separate samples, of about 15-lb. each, are obtained.

The sampler tank discharges its burden into a steel pipe fitted on the inside with a spiral band of steel. This spiral conveyor is rotated by a chain drive, the ore having the combined motion of advancing in the pipe and being tumbled over. This last motion, which gives a mixing action, while not equalizing the whole tenor on the ore passing through, cuts out the sharp lines of difference and enables the sampling machines following to have a uniform product discharged to them during each of their revolutions.

From the spiral the stream of ore is fed by a spout to the quartering machine, which in each of its revolutions takes four equal sections of the ore stream. Each of these quarters is separatedly led by a pipe to a shaking plate, which equalizes the intermittent discharges and delivers a constant stream to the No. A Vezin sampler, which takes a one-tenth cut from the stream (2 1/20 cuts per revolution). The reject falls directly by a pipe to the reject bin. The sample (1,500 pounds) is taken by a second shaking plate and thence to No. B Vezin sampler, which, as before, takes a one-tenth cut. The second reject is also led to the reject bin; and the sample (150 pounds) caught in a sealed sample safe. At the completion of the run all the machines are brushed down and the sample taken to No. C Duplicate Vezin sampler. Here a shaking plate delivers a stream of ore to two double revolving vanes that extract, each, one-tenth sample (15 pounds) depositing each into a separate receptacle and the reject into a third. One sample is boxed, sealed, and stored as a reserve; the other is taken to the finishing room; the reject goes to the bagging bin, or is held over until the next shipment from this particular mine, as are also the mill sweepings and the rejects from the finishing room.

From the bagging bin the ore is drawn off into canvas bags, which are tied, weighed, and shipped to the smelter.

Up to this point the fine product from the ball mill has been automatically mixed, quartered, and each of the quarters independently sampled by machines until eight samples of the lot (two from each quarter) are obtained.

To follow the samples further: on reaching the finishing room the sample is weighed and dried in an electric oven for six hours at a temperature of 100 deg. C.; the moisture is thus incidentally ascertained. The dried product is sereened through 100-mesh and the oversize ground in a Braun disc pulverizer to pass the same mesh. It is at this point that the metallic silver in the ore is again in evidence. The small pellets that pass through the ball mill screen are flattened out, or are rolled into spheres by the discs These metallics, No. 2, are disced until clean as required, or are freed from impurities on the buckboard; the product from all operations either passing through the 100-mesh or being held on it as clean metallics. The metallics are mixed by coning on glass, divided into the requisite number of packets, and sealed. The fines are placed in an Abbe pebble mill, from which the pebbles have been removed, and the jar is rotated slowly for half an hour. After mixing, the fines are carefully removed from the jar, placed on the glass table, flattened out with a spatula and sections taken, packeted, and sealed for each of the parties interested.

In this way, the ore after passing the ball mill screens is divided into four equal portions, each quarter after treatment resulting in a sample each of fines, and metallics. The combined assay values of these two products give one valuation on the ball mill fines. The mean of the results is considered to be a fair valuation of this product. The maximum allowable difference between any of the four valuations is one per cent. Just recently several improvements have made, and it is hoped to reduce this extreme variation limit to about one-quarter per cent. of the total assay value. The mean of the four valuations, of course, reduces

ıe probable variation from the actual value of ore ›t to about one-quarter per cent.

In estimating the total value of the car of ore samp-›d, the amount in ounces per ton of the ball mill fines ; multiplied by the exact tonnage of same, giving the ›tal ounces. The total number of the fine ounces ob-ained from the ball mill metallics is added to this gure, and the result multiplied by the present market rice of silver, giving as a net result the prevent value f the shipment.

Silver Lead and Zinc Deposits of Slocan

Mr. O. E. LeRoy, of the Geological Survey of Can-da, who has during two or three years last past close-y studied the geology and mineralogy of the Slocan district, delivered an address on this subject before the neeting of the Western Branch of the Canadian Min-ng Institute, held at New Denver, Slocan Lake, B.C., ›n September 13. He entitled his contribution to the ›roceedings, "Notes on the Silver-lead and Zinc De-›osits Occurring in the Slocan Slates and Associated Granites." He said:

"The area now under consideration lies between Slocan and Kootenay Lakes, including Four-mile ba-sin to the south, and Whitewater to the north.

"The rocks consist of the Slocan series, comprising interbedded slates, quartzites, and sandstones intruded by certain phases of the Nelson granites, in the form of batholiths, bosses, dikes, and sills, with some later intrusions of basic dikes.

"The vein fissures cross the strike of the formation as a rule, or in cases strike with the formation and cut the dip of the rocks at varying angles. They vary in length from a few hundred to 2,000 feet or more, with widths ranging up to 150 feet. The strike is usually east or west of north, though in some instances it is east and west. The dip varies from 20 deg. to vertical. The fissures terminate in different ways, the most common being the fraying or feathering out on a sharp turn in which the vein peters out along the strike of the formation. In the granite the fissures fol-low the most prominent lines of jointing. The ore-bodies range up to 400 feet or more in length. and up to 40 feet in width, with depths of several hundreds of feet. They are composite and consist of a series of lenses of ore—galena or zincblende — either pure or mixed, lying in lines or "en echelon." As one lens of galena peters out another commences a short dis-tance from it. The paystreak as a rule favours the hanging wall.

"The ores are popularly classified as wet and dry. Wet ores consist essentially of galena with a gangue of siderite; dry ones of silver-bearing minerals usually low in lead, with quartz gangue.

The chief metallic minerals are galena, zinc blende, and grey copper (freibergite), with minor amounts of pyrite, chalcopyrite, ruby silver, argentite, and native silver. In the oxidized zinc, sulphate of lead occurs occasionally, and more rarely linarite or sulphate of lead and copper. The gangue minerals are siderite, quartz, and calcite.

"In the normal type, siderite is first in deposition, followed in turn by zinc blende, galena, and grey cop-per; with yellow copper, pyrite, and quartz toward the closing period. The rule, however, has many ex-ceptions, and the method of deposition is very compli-cated. The value varies from 7 to 75 per cent. lead, and 20 to 200 oz. silver per ton. Gold occurs in many of the ores—from $1 to $7 per ton.

"The developments of the last year are very en-couraging and give strong hopes that the ores occur at far greater depths than has hitherto been considered probable. While the depth at which pay-ore will be found will vary in different parts of the area, encour-agement is taken from the healthy appearance of the veins in the best-developed mines.

"Many of the properties now lying idle, and with no ore reserves, offer favourable blocks of ground for judicious prospecting with which, no doubt, some of them would be found capable of being made produc-tive. Owners of idle properties should be willing to accept a fair sum for their holdings, or to offer liberal conditions for leasing, bonding, or purchase, in order to encourage the expenditure of the capital requisite for the development of such properties, for they would thereby add to the prosperity of the community and impart to the life of the district a healthier tone than has characterized it of late years."

(Note.—Fuller particulars of the Slocan district are contained in Mr. LeRoy's annual reports, printed in the "Summary Report of the Geological Survey for 1909 (pp. 131-133), and 1910 (pp. 123-128," respec-tively).

Lucky Jim Zinc Mine, Slocan, B.C.

(Notes by A. J. Becker, Superintendent.))

The zinc deposits of the Lucky Jim mine occur as a replacement of the lime by a zinc solution.

The ore occurs in a lime dike, which traverses the slates in a direction E. 6½ deg. S., with a dip of 45 deg. S. The slates of the foot wall are very silicious, badly mixed with hard blue lime and iron sulphides. The slates forming the hanging wall are the ordinary Slocan slates. This lime dike varies in thickness from 10 to 200 feet, and the orebodies depend largely on the thickness of the lime dike. The lime dike is frac-tured by fissures taking the usual Slocan course, namely, northeast by southwest, and where these frac-tures are found cutting the lime the deposits of zinc occur. The fractures sometimes extend through the slates, but so far we have failed to find any zinc ore outside the lime dike, although lead ore has been found in these fractures outside the lime dike and in the slates.

So far we have two known orebodies, about 500 feet apart. On the surface of one there is a large deposit of ore, this forming quite a "glory-hole" and extend-ing down to our lower explored level, but decreasing in size owing to the lime dike lessening in thickness, with the ore, however, extending from the foot to the hanging wall slates. The second orebody is 500 feet east of the first orebody; near the surface this showed ore from the slate on the foot to that on the hanging wall, but the dike here showed reverse conditions to that in which the other orebody occurs, for its small-est part is at the surface while it gradually increases in thickness until, on the No. 4 level, it is 180 feet wide. Now this fracture near the surface, and as far down

as No. 4 level, is accompanied by lesser fractures, and these are sometimes filled with paying ore. On the No. 5 level these smaller fractures consolidated into one huge deposit of zinc ore, in places mixed with lead ore, all the lime between the main fracture and the lesser ones having been replaced by zinc.

It is noteworthy that the ore does not always occur in the fractures, but sometimes on either side of the fractures, as a replacement, while the fractures themselves are barren.

From my observation thus far, I am positive these zinc deposits depend upon the depth of the lime dike, and since the lime dike is cut by a deep canyon much lower than our present workings, there appears to me to be a good future for the Lucky Jim mine.

Development.—The mine has been developed by 8 adit tunnels. In the No. 4 (Geo. Hughes tunnel), a winze was sunk 108 feet on the dip of the vein; much of the zinc ore shipped by Mr. Hughes was taken out of stopes opened from this winze. No. 5, which was started from a point 200 feet vertically below No. 4, reached the first orebody at 360 feet from the portal of the adit. This orebody is here 22 feet wide. At 425 feet farther on the second orebody was entered; this proved to be 91 feet in width. In the middle of it there occurs about ten feet of ore badly mixed with iron, and then about six feet of silver-lead ore; after that the ore is all zinc. The total length of No. 5 is between 900 and 1,000 feet. An aerial tramway was erected from the portal of No. 5 down to the Kaslo & Slocan Railway track, alongside which ore bunkers were built, but both tramway and bunkers were destroyed by fire last year, just before they were fully completed.

No. 6 adit was started at an elevation of 27 feet above the railway track. It is now in about 925 feet. We expect to reach the first lime dike within 100 feet from the present face, and afterwards to have to drive through about 75 feet of lime to reach the ore.

Progress in Coal Prospecting

J. A. Wentz, Charlton, Ia.

There are four commonly known methods of prospecting coal lands, which show the same number of successive steps in the development of the art of obtaining exact knowledge as to the commercial value of a given formation. In order of general value they are as follows:

First, sinking of shafts or driving of slopes on the coal vein.

Second, drilling test holes with the churn or percussive drill.

Third, drilling core holes with chilled shot or saw-tooth bits.

Fourth, drilling with the diamond core drill, using the double-tube core barrel.

The first method, which consists in exploring the vein by shafts or other workings, is necessarily slow and prohibitive in cost. The second is cheap and rapid, but the records obtained thereby are naturally unreliable. The samples taken from holes drilled by this method consist of chopped-up particles representing the contents of the hole, the various strata of which are necessarily more or less intermingled, so that determination of the condition of the coal as to purity, and of the character of the overlying and underlying strata, is mere guess work. The third method, that of drilling with chilled shot, or saw-tooth bits, is an improvement over the second, but leaves much to be desired in the matter of drilling speed and condition of the core. The apparatus does not lend itself to the use of devices by which the core is extracted carefully, and does not operate with the precision and smoothness required to prevent the core from being broken up by vibration.

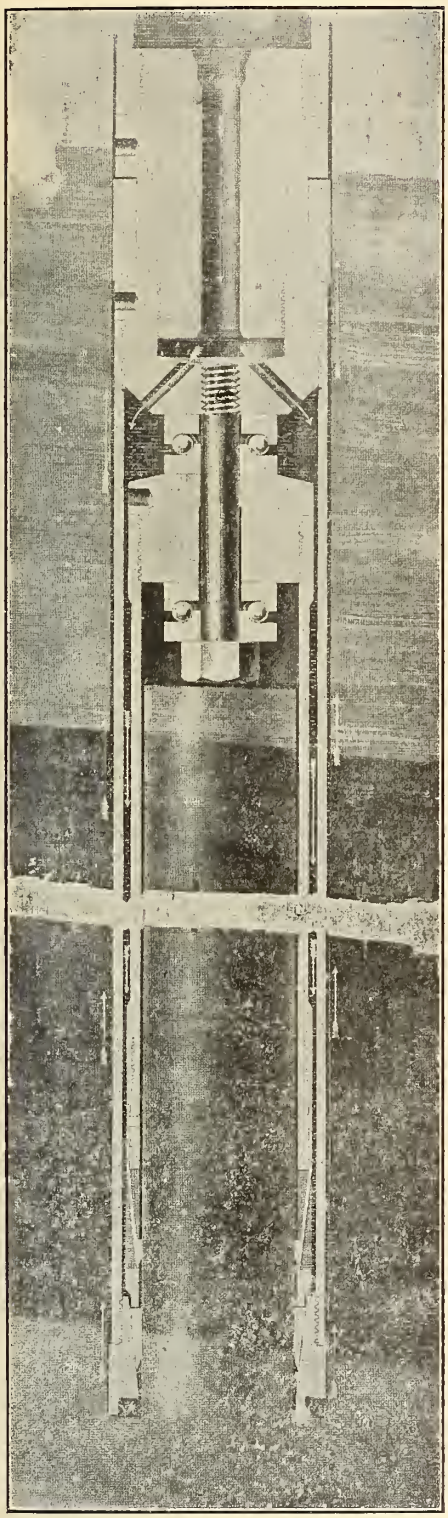
In order to secure even half-way results with machines of this type, it is necessary to use tools taking out a very large core from four to six inches in diameter. This involves a rate of progress and a cost for labour, which increases the price per foot of drilling to an unprofitable degree.

The necessity for obtaining the most perfect records possible is apparent, when it is remembered that large amounts of capital must be expended in the purchase of lands, building of railroads, installation of mechanical equipment, driving of workings, and building of houses, before a coal property can be put on an operating or dividend-paying basis.

It is a fact, accepted almost universally by mining engineers, that the highest development obtained in this art in the diamond core drill, including the double-tube core barrel, which is shown in operation in the accompanying cut. The principle on which this apparatus works is as follows:

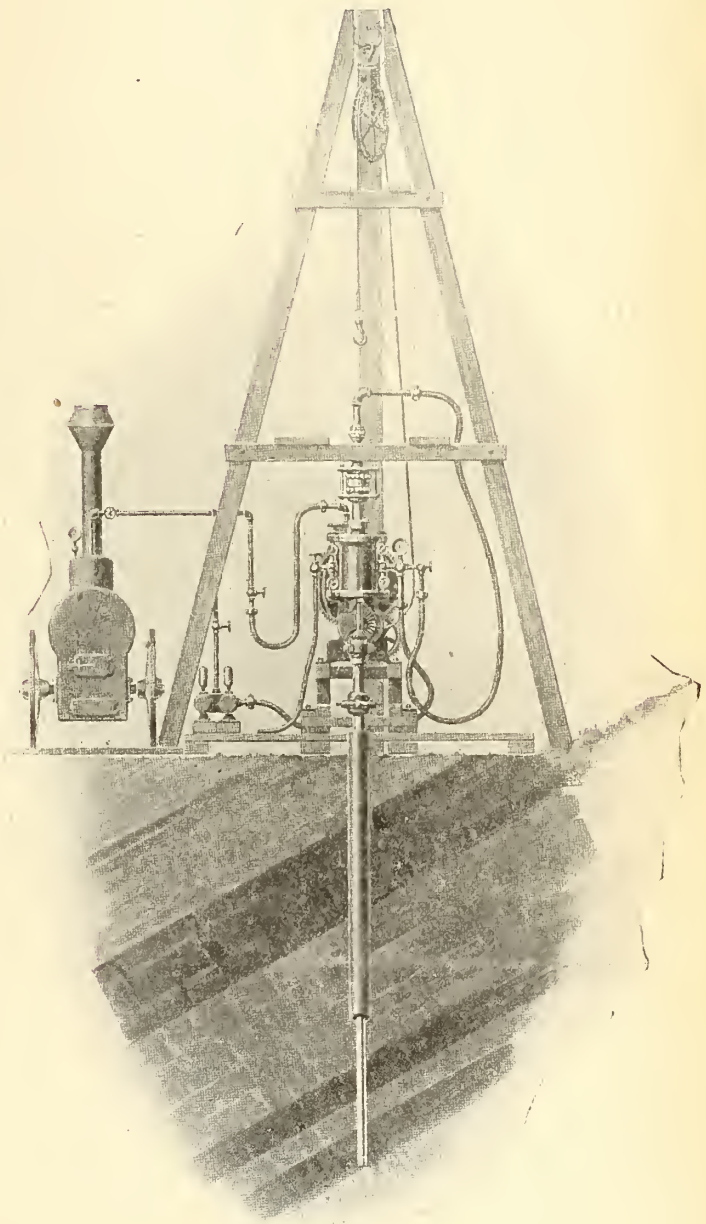
The drilling crown or bit is faced with black diamonds or carbon. This bit is placed at the end of a tube or core barrel, which is of peculiar construction. As implied in the name already mentioned, this core barrel consists of two tubes, an inner and an outer member, the inner one being suspended on especially designed ball-bearings, to make it free of the rotation of the outer tube. The outer tube is made to fill closely the hole and to rotate without vibration. Between the inner and outer tubes is a space through which water is forced, which emerges under the bit, carrying away the cuttings. Close to the bit is placed an automatic device which grasps the core, bringing it to the surface, when the core barrel is lifted.

The core barrel is connected to the drill on the surface by the required number of drill rods, made of hollow steel tubing, in exact ten-foot lengths, by means of which the depth of the hole at any given time is accurately measured. The bit, core barrel, and rods are rotated by means of a suitable engine, and are fed downward by hydraulic pressure regulated by finely graduated valves. The hoisting and lowering of the rod is accomplished by means of a derrick, or tripod, carrying a sheave wheel and a rope, which is wound upon the drum forming a part of the drilling machine. The entire apparatus is designed in strict accordance



Double Tube Core Barrel Passing Through a Coal vein. The arrows indicate the course of the wash water.

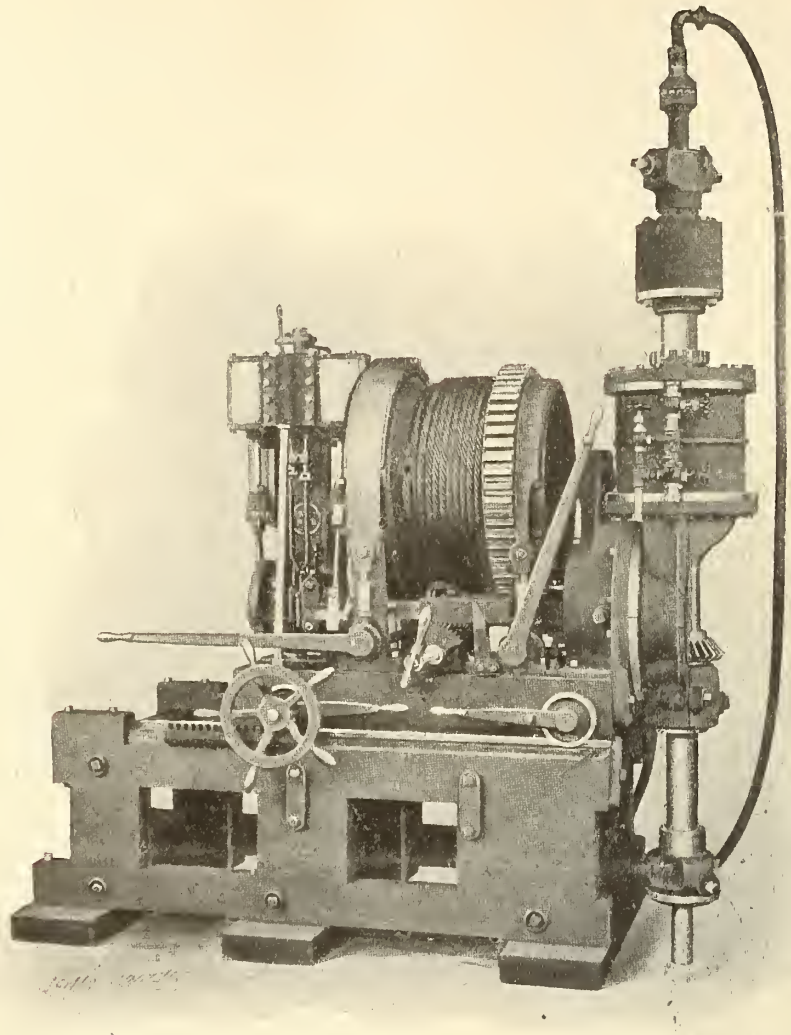
th engineering principles, and every detail of materials and construction in these machines receives the reful attention of the manufacturers. "Built like watch" was the criticism of a recent purchaser of e of these drills. The cores are two inches in diameter, a dimension fixed upon after extensive experience. The cores extracted, even in friable formations, e practically complete, showing only a minute loss



Arrangement of typical Diamond Drill Outfit.

from abrasion, and are a perfect record of the formation existing at the point drilled. They are placed in suitable cases for preservation. Vertical sections of the core may be taken for analysis, as required, the remaining portions being preserved.

The method described is equally applicable to prospecting for any other mineral, and is especially desirable when cores are liable to be broken or ground up by ordinary drilling. In addition to securing reliable records, diamond drills are much more rapid, than any other coring drill, owing to the small diameter of the hole bored, and to the readiness with which the diamond bit penetrates any strata encountered.



Diamond Prospecting Core Drill. Single cylinder hydraulic feed.

While the writer has used various types of diamond drills, as well as other core drilling machinery, most of his experience has been with those manufactured by the Sullivan Machinery Company, of Chicago, and it is to this apparatus that reference is made in the above article.

The Department of Mines in Nova Scotia owns and operates several diamond drills and also some shot drills of the Davis Calyx pattern.

These drills are leased to mining companies, principally coal mining concerns, and the results as to progress and cost are very carefully recorded by the government officials; so that a definite comparison of the work and cost of operation of these two types of machines is available. Such a comparison is very interesting, as it is seldom that the two patterns of pros pecting drills are used in the same formation.

The following table is made up from the records o the Department of Mines for several years past, an throws an interesting side light on the relative propo tion to the whole cost of the cost for diamonds, an the cost for shot. The writer has only figured out th cost of labour and management for one year, 1909 in this year, this item for the diamond drills average 58 cents per foot, and $1.17 for the shot drills.

Table 2 appeared recently in the Engineering an Mining Journal, with the exception of the last co umn, which shows a hole 1,217 feet deep, bored by th diamond drill.

Table 1.

	1907	1908	1909	1910	3 yea
Footage all drills	6273	7905	5576	5222	6234
Footage by diamond drills		2962	3378	4498	....
Footage by Calyx drills		3412	2198	724	
Cost foot for all borings	1.23	1.06	1.405	.99	1.05
Cost foot diamond drills	.73	.845	.59	.93	.85
Cost foot Calyx drills	1.71	1.34	2.166	1.44	1.64
Carbon cost per foot	.029	.077	.037	0.67	
Cost shot per foot Calyx drill	.47	.056	.055	.02	

In the year 1910, the footage on which diamond drilling was based, represented 6/7 of the total work done and the footage on which the shot drilling wa based represented the other 1/7.

Comparison of Hole Boring Costs.

	1 Diamond	2 Diamond angle of 45 deg.	3 Diamond	4 Calyx Shot	5 Diamond
otal depth of hole, fefet	463	125	285	559	1217
ize of core, inches	2	15/16	15/16	6	2
astest hourly rate, feet	5⅓	3.75	...	6⅓	5.14
verage hourly rate, feet	1.93	1.00	0.92	1.27	1.2
OST PER FOOT FOR—					
Labour	$0.131	$0.306	$0.392	$0.326	$0.120
Management	.356	.500	.295	.358	.304
Fuel	.056	.032	.026	.311	.057
Light, oil, waste, etc.	.007	.006	.010	.024	.008
Carbon wear	.048	.048	.053	....	.115
Shot consumption	....	....	....	.019	....
Gravel consumption	....	....	....	.005	....
Lumber	.054	....	....	.081	.017
Casing pipe	.030	.032	.004	.018	.009
Freight and truckage	.058	.244	....	.279	.061
Blank bits	.003	.004	....	.020	.004
Core barrels and lifters	.032	....	....	....	.026
Laying water pipe, etc.	....	....	.025	....	....
Total cost per foot	$0.775	$1.172	$0.805	$1.441	$0.724

Prospecting Three Centuries Ago.

(Continued from September 1st issue.)

Mark now the fact that Mr. Plattes was by no means devoid of empirical knowledge. In giving further guidance to the prospector, he commands him to "goe "to the bare Rocks, and there to find out the clifts, "cracks, and cranies: this done, to goe to the toppe: "or till you finde some grasse growing right on the "top of the said Cranies, and then to observe diligent- "ly, the kind of that Grasse, and how it differeth from "other Grasse, ordinarily growing in the same Moun- "taine; not onely in forme, but also in colour, which "colour showeth the greatest difference in the heat of "Summer for the subteraneall Vapours issuing out of "the Orifice of Mines, and differ from those which issue "out of the more solide places in the Mountaines."

The next step is to see if there be any "marcasites" visible. These, it is explained, are usually of divers colours "and seldome good for any thing, yet they are "strong signes of Mineralls within, being themselves "the spume or frothe of the better Mettalls, breathed "forth, even as Drinke breatheth up his Yest or Froth "to the Superficies."

"Marcasites," evidently is a generic name for all metallic sulphides and arsenides, for "these if they "be put in an ordinary fire, they will turne blacke, and "yeeld a smell of Brimstone, Arsnicke, Antimony, or "some other thing, commonly called or knowne by "the name of middle Minerall."

Behind all this quaint vagueness there are glimmerings of practical common sense.

Naturally, Mr. Plattes believed firmly in the divining rod, virgula divina. "The operation with the Virgula "divina is thus to be performed: some observe a set "day and houre with certain words and Ceremonies "at the cutting up of the same, which I have found to "bee little to the purpose." In fact, the excellent Plattes tried the rod successfully in any and all circumstances. He concludes, therefore, the reason of this attraction "to bee of Kin to the Load-stone, "drawing Iron to it by a secret vertue, inbred by na- "ture, and not by any conjuration, as some have fond- "ly imagined."

Should it serve any good purpose, our author declares himself prepared to show more experience of that kind than any man in England.

Tight little England did not mark the limits of Mr. Plattes' ambition. The "new Plantations," New England, Virginia, Bermudas, we are assured, offer high chances to the prospector, chances of "more gaine in "one yeare, than their Tobacco and such trifles would "yeeld in their whole lives.'

Because lead is one of the most common metals found in "these Northerne Countries," Chapter 3 takes up the melting and refining of that metal. Regardless of protests from the careful housewife, the reader is instructed to build a grate fire in the chimney-corner. After filling the improvised grate with "Char-coales "Kindled, in the middest thereof set your melting Pot, "with one pound of Lead-oare, and foure ounces of "filings of Iron mingled together, and so blow to it "strongly with a paire of good hand-bellows." The resulting metal is hammered free of slag, and is then assayed and refined. The first test consisted in roughly cupelling two ounces of the lead on a "peece of good Oake-wood," over a fire "about so strong as "to roast a Pigge." In three-quarters of an hour the silver button is to be expected. This is weighed, and

the number of ounces to the "Tunne of Lead" calculated therefrom. Lead that does not yield eight or ten pounds of silver to the ton, is not worth refining.

To make his cupel, or "Test," the ingenious Plattes secures an iron ring about four inches wide, two deep, and a quarter of an inch thick. This is his mould. Then he calcines mutton-bones and beef bones, crushes them fine, "then with a little beere or water tempers a small "part thereof like pappe" so that it will "remaine "clammish, betwixt powder and paste."

For melting-pots "you may bee at choise whether "you will buy the same at the Gold-smiths, or Potters "in London, which sell Flanders melting Pots, or "make them your selfe."

Chapter 4 proves excellent Plattes to be an expert in the metallurgy of tin. "As for the refining of it, I "am sure it cannot be done by any artifice; for I sup- "pose that I have tryed more experiments about it, "than any 10 men in England. . . . but the more I "tryed the worse I sped." Resorting to the expedient of melting equal parts of gold and silver with the tinne, he found that "all was vaine, for the Tinne poisoned "and consumed some of my rich Mettalls." "Refining," in the terminology of the day, embraced the extraction of "royall mettalls" from base metals. Mr. Plattes, confessing his inability to accomplish this, supplies readers with a way of enriching themselves without running any risk "to damnifie themselves in "any manner of value that is considerable." His hint consists in recommending men of quality to set apart a portion of their leisure for the purpose of prospecting.

As the melting of iron cannot be carried on in the chimney-corner, the reader is told "to learne the prac- "tise thereof in every Country almost where he shall "come." Gold, we are informed, can be extracted out of any iron, but the process is so costly that it "satis- "fieth no man."

Copper ore is to be treated like lead ore, except for the absence of iron filings. Refining, also, is done by cupelling with lead. We are warned that "in the "refining of strange Minerals, as Marcasites, and espe- "cially those which the Minerallists call by the name "of Divells Dirt," the test may become foul. It must then be thrown away.

Silver associated with lead ore is subjected to the same simple process. When the silver ore is strongly mixed with spar and stony substances, it is crushed, washed until "the greatest part of the terestreity and "filth" has disappeared, dried and treated with a liquid amalgam of lead and quicksilver.

For the extraction of gold simple amalgamation in a "little Bucket of Iron" is commended, "Quick-sil- "ver being the most friendly mineral to the royall "mettalls."

The method of purifying gold is set worth in Chapter 9. In this the author deplores the enhanced cost of living.

"Cinabar naturall, Antimony, Auripigment, Arsen- "ick, Talcum, Muscovy glasse, Emery and many other "things" are touched on in Chapter 10.

The subject of the next chapter is "the waies to find "out Pit-coales." Neither in extremely fertile nor in barren ground is the mineral to be sought, but "in "ground that is proane to beare wood and thornes. . . . . of an indifferent fertility." . . "Also the said grounds are proane to bring forth large Cattell, "and well horned." We can thus see the disciples of Plattes scouring the country for long horned kine as a preliminary to opening a coal mine.

Chapter 12, the last, is in part an excursion into th realm of botany. On the second last page, however, given an inventory of the equipment needed by th prospector. Thus it runs: "He will neede nothing bu "two or three Pipkins, two or three Urinalls, an Iro "Picke-Axe well steeled, a spade, and a Crow of Iron "if he will be at the charge thereof."

And with this last quotation we must leave Mr Plattes. His book deserves longer and fuller atten tion than it has been possible to give it. No matte how ludicrous some of his statements seem in the ligh of to-day, his was a courageous soul. Peace be with him and his pipkins!

—J. C. M.

Zinc Investigation Progress Report

On July 20 the secretary of the Western Branch of the Canadian Mining Institute wrote to the Director of Mines, Ottawa, requesting that any available information relative to the progress made in connection with the Zinc Investigation and experiments be sent to him in time for submission to the general meeting of the branch of the Institute, convened for September 13th, at New Denver, B.C. Too late for presentation at the meeting he received from Dr. Haanel a copy of a progress report received by the director from Mr W. R. Ingalls, of New York, consulting engineer in this connection. It has not, however, been deemed advisable to incorporate in Mr. Ingalls' report any details of the special experiments and tests which have been made. Mr. Ingalls' report to the director follows:

"In compliance with your request for a report upon the progress of the Zinc Investigation now being conducted by the Canada Department of Mines, I beg to present the following:

"The general plan of the investigation was fully outlined in my report to you under date of January 28.1911, to which I beg to refer you. Since that time work has been prosecuted, especially in the field of electric smelting, this having been done in the metallurgical laboratory at McGill University, Montreal, under the immediate direction of Dr. Alfred Stansfield. A large number of experiments have been made with several forms of furnaces, certain of which have been of rather elaborate construction, and with a variety of raw material.

"Our early experiments were directed chiefly toward a discovery of the metallurgical conditions that have heretofore prevented a satisfactory condensation of zinc as molten spelter. While I cannot say that these experiments have afforded us a complete explanation of these conditions, they have taught us a good deal, but in spite of the knowledge acquired, we have been so far unable to master the difficulties.

"We have, indeed, produced some small quantities of spelter and in certain experiments have condensed a fairly large proportion as molten metal, but we have not yet been able to do that at will.

"Our experiments have thrown light upon the principles of furnace design and have led us to condemn several types that we have tried. Our work has indicated that in order to achieve any material improvement over the ordinary practice of zinc smelting, it is necessary to abandon certain features of the latter and contemplate continuous charging of the ore and reduction material and discharging the residuum with-

t interfering with the process of distillation. These nditions introduce a multitude of perplexing diffilties that can be worked out only by tedious experientation.

"At the request of the secretary of the Canadian ining Institute, and with your permission, I prented at the meeting of the Institute in Quebec, in arch, 1911, a paper on 'The Problem of Mixed Sulide Ores,' (copy of which I attach to this report) iat concisely summarizes the state of the art in the eatment of such ores and the natural obstacles that lock procedure in certain directions.

"A careful scrutiny of the work on the treatment f such ores that is being done by other metallurgists nd investigators has been maintained, and I have xamined numerous proposals that have been present-d with more or less detail, both through your office nd to me directly, but I have not discovered anything ave one that in my opinion holds out any promise of uccessful adaptation to the conditions existing in Brish Columbia. I am conducting correspondence repecting this, but as to inaugurating experiments upon t, I am disposed to hold them in abeyance pending furher progress in our electric work.

"I regard the electric work as being of particular nterest as an exploration in a virgin field of unknown ossibilities. Doubtless with the same idea a great leal of work in this field is being done by numerous nvestigators in both Europe and America. I have been informed within a few weeks that there are now wo electro-thermic zinc smelteries in operation in Scandinavia, viz.: one at Trollhattan, Sweden, using bout 7,000 h.p., and one in Sarpsborg, Norway, using bout 4,000 h.p. Operations at these works were inaugurated five or six years ago, but according to my nformation the results were for several years commercially unsatisfactory, and it is only recently that it has been claimed to have become possible to make spelter from ore upon an industrial scale. The companies operating these works maintain absolute secrecy respecting them, and I have not been able to learn any details as to their operation.

"Apart from the work in Scandinavia, as to the commercial success of which no information is available, the electric smelting of zinc ore is, in spite of all claims to the contrary, not only still in the experimental stage, but is in the infancy of the experimental stage. Even if the metallurgical difficulties can be overcome, which is possible, I am of the opinion that no one, except perhaps the Scandinavians, is yet in a position to make any reliable estimate of commercial advantage or commercial results in any way. It is, however, well worth while to determine the possibilities and publish the results for the general benefit, unveiling so far as possible the secrecy that is likely to be maintained as to the investigations in this field by private interests, having always in mind, of course, the hope that our work may develop a process that will be commercially applicable to the treatment of the zinc ores of Canada."

(Note.—Mr. Ingalls' paper on "The Problem of Mixed Sulphide Ores," is far too long for reprinting here. Those who have access to files of The Engineering and Mining Journal, of New York, can find it in the issue of that journal of July 29, 1911, pp. 211-213. Members of the Canadian Mining Institute may find it in the C. M. I. Quarterly Bulletin for June, No. 15, pp. 23-30).

BOUNTY ON LEAD MINED IN CANADA.

The following figures, obtained by Mr. E. Jacobs, for submission to the meeting of the Western Branch of the Canadian Mining Institute, held lately, show the amounts paid during several periods to July 1, 1911, and the balance unexpended at that date, of the 2,500,000 originally voted by the Dominion House of Commons for the payment of bounty on lead mined in Canada:

Total expenditure (under first Lead Bounty Act),) during period ended June 30, 1908	$700,390.04
Paid during fiscal year ended March 31, 1909	274,447.50
Paid during fiscal year ended March 31, 1910	343,099.08
Paid during fiscal year ended March 31, 1911	249,370.38
Paid during three months ended June 30, 1911	49,713.32
Total amount paid as bounty on lead	$1,617,020.32
Add amount appropriated for zinc ore reduction experiments	50,000.00
	$1,667,020,32
Balance still available as at July 1, 1911	834,979.68
Total amount voted	$2,500,000.00

Industrial Section

WIRE ROPE.

The manufacture of wire ropes of exceptionally large size and high breaking stress has made such great strides of late years that a brief description of some recent examples in this important branch of manufacture may prove of interest to our readers.

Wire ropes may not loom very large in the mind of the ordinary lay reader, but it is well known to all those who are engaged in operating our mines, lumber camps, engineering, and contracting in all its branches, that wire ropes play a very important part in the successful working of all these industries.

The old-established firm of Thos. & Wm. Smith, Ltd., of Newcastle-on-Tyne, England, has for many years past done a large and increasing business in all classes of wire ropes throughout the Dominion of Canada, and the following particulars of some exceptionally large ropes that it has recently completed will serve to show what results can be obtained from the products of a really live wire rope works.

Our illustration shows the largest warship hitherto launched for the British navy, the Dreadnought cruiser "Princess Royal," recently launched from the Barrow Yard of Messrs. Vickers, Ltd. Owing to the ex-

ceptional length and launching weight of this vessel, Messrs. Vickers naturally went very closely into the question of launching checks, and the contract for these important ropes was finally awarded to Thos. & Wm. Smith, Ltd. The ropes were 8 inches in circumference, having a total length of about 5,000 feet, and whereas the British Admiralty specification for this size of rope calls for a breaking stress of 170 long tons, Messrs. Smith were able to give a guarantee of 200 long tons for these ropes. A test piece was cut off each coil and sent to a public testing house, and it is a wonderful testimony to the excellence of the material and manufacture of these ropes that the testing machine was unable to break a single one of the test pieces, although the full stress of 200 long tons was applied in each case for two minutes. A still higher breaking stress was recently obtained by the same firm from a 7¾-inch circumference flexible plough steel wire rope, which they supplied to the War Department for a heavy gun dipping crane at Woolwich Arsenal. This rope was 1,896 feet long, and a test piece submitted to a public testing works broke at a stress of 246 long tons—a truly remarkable result for a rope of this size. A still larger rope was also supplied a short time ago by Messrs. Smith to the Aukland Harbour Board. This rope was 9½ inches circumference, and was tested at a public testing house under Admiralty inspection, breaking at a stress of 348 long tons, which is within two tons of the limit of the largest testing machine in Great Britain. It is true that such large ropes as those we have mentioned have seldom if ever been used in this country up t the present, but the requirements of engineers ar growing more exacting every day, and it is comfor ing to know that whn called upon, up-to-date wir rope manufacturers in the Old Country can still mee any demands that may be made upon them.

Amongst the more important orders for the Dom inion recently fulfilled by Messrs. Smith may be men tioned a large slope rope for one of the most import ant companies in Nova Scotia, which was 20 000 fee long by 1⅛-inch diameter and weighed 22½ long tons and a hauling rope for an aerial cableway in Britis Columbia which was 38,000 feet long by 1-inch dia meter, and weighed 27 long tons.

Westinghouse Officials

At a meeting of the Board of Directors of the Westing house Electric and Manufacturing Company, held in New York on August 1st, the following officers were elected:—

Chairman of the Board of Directors—Robert Mather.

President—Edwin M. Herr.

Vice-Presidents—Loyall A. Osborne, Chas. A. Terry, Harry P. Davis.

Acting Vice-Presidents—Henry D. Shute, George P. Hebard.

Comptroller and Secretary—James C. Bennett.

Treasurer—T. W. Siemon.
Auditor—F. E. Craig.

Mr. E. M. Herr is elected to succeed Mr. Edwin F. tkins, who has been president of the company since ıne, 1910, and who declined re-election.

Mr. Herr has been first vice-president of the company ace 1905. He has announced the appointment of Cal-ert Townley as assistant to the president.

Edwin M. Herr, who was elected president of the Vestinghouse Electric and Manufacturing Company at meeting of the Board of Directors held in New York ugust 1st, has been the first vice-president of this com-any, and in charge of operation of same at East Pitts-urg since June 1, 1905.

Mr. Herr was born in Lancaster, Pa., May 3, 1860. pon completion of a common school course, he was iven the position of telegraph operator on the Kansas acific Railroad, with which company he remained for vo years. He was promoted from the construction ain service to the position of station agent.

In 1881 he entered the Sheffield Scientific School of ale, graduating in the class of 1884, and worked as an pprentice in the shops of the Pennsylvania Railroad ompany at Altoona, Pa., during the two summer vaca-ons.

From 1884 to 1885 he was an apprentice at the West ilwaukee shops of the Chicago, Milwaukee and St. aul Railroad. He then went to the Chicago, Burling-n and Quincy Railroad Company as a draughtsman in he mechanical engineer's office, and afterwards became ssistant engineer of tests, and was promoted from this osition to engineer of tests on this road at Aurora, Ill.

From 1887 to 1889 he was superintendent of telegraphy, and from 1889 to 1890 was division superintendent of this road.

From 1890 to 1892 he was division master mechanic of the Chicago, Milwaukee and St. Paul Railroad at West Milwaukee.

From 1892 to 1894 he was superintendent of the Grant Locomotive Works at Chicago.

From 1895 to 1897 he was superintendent of motive power and machinery of the Chicago and Northwestern Railroad. From June 1, 1897, to September 10, 1898, he held the same position with the Northern Pacific Railroad.

On September 10, 1898, he became assistant general manager of the Westinghouse Air Brake Company at Wilmerding, Pa. He was promoted to the position of general manager on November 1, 1899, which position he held until June 1, 1905, when he was elected first vice-president of the Westinghouse Electric and Manufacturing Company.

Mr. Calvert Townley was for many years connected with the Westinghouse Electric and Manufacturing Company, at first in Pittsburg, and later as manager of its Boston office, and as special representative in New York City. He comes to the company directly from the New York, New Haven and Hartford Railroad Company, where for the past five years he has been closely identified with the electrification of this road.

Mr. Harry P. Davis has been with the Westinghouse Company for twenty years, and for the last few years has held the position of assistant to first vice-president and manager of engineering at the East Pittsburg Works.

SPECIAL CORRESPONDENCE

ONTARIO.

obalt and Gowganda.

Much above the average were the shipments of ore from obalt for the week ending September 22, when thirteen mines nt out 18 cars, of which 11 were high grade. The total eight was 1,181,790 pounds, or 590.89 tons, as compared with 3.67 tons the preceding week. During that week Nipissing nt out bullion worth $22,670, and the Temiskaming sent t 7 bars valued at $3,600. For the week ending September 9th the shipments were slightly heavier than for the week efore. Nineteen cars of ore were despatched by 12 mines, the e totalling 1,200,525 pounds in weight, or 602.26 tons. Of is 10 cars were of high grade, and with the other shipments uring September all above the average, this week's will make eptember the record month for the first nine of this year.

obalt and Gowganda.

Sinking on the main shaft of the Temiskaming has com-enced from the 575-foot level, the object being to attain a epth of 650 feet, where the eighth mine level will be cut. The haft is now down over 600 feet and but a short time will be ecessary to reach the required depth. The new vein at 575 eet, cut 10 feet west of the shaft, is producing some high rade ore.

During the month of August, the Buffalo mill made a much etter recovery than was the case in the preceding month, nd the grade of ore treated was higher than in July. In ugust 144,446.06 ounces of silver, shipped previously, were aid for. Following is the mill report:

Mill run .....hours	592½
Ore milled ....tons	3,093.5
Ounces recovered	94,041
Mill expenses	9,439.76

A shipment of 51,066 pounds of high grade ore was made last week from the Miller Lake-O'Brien at Gowganda, the ore being hauled over the summer road. This operation, ordinarily taking slightly over a week, required three weeks for completion.

During the fiscal year ending August 31, the Temiskaming and Hudson's Bay Mining Company shipped 676.32 tons of ore. The average assay was 1,191.10 ounces to the ton, a total of 805,572.88 ounces of silver. The new mill treated 11,109.6 tons of ore. Manager Young, in his report, says that the ore in sight assures equally good results for the coming year.

Last week gold bullion was shipped from the Gold Pyramid and the American Eagle, in Munro Township, the former sending out 70 ounces, valued at $1,400, and the latter 120 ounces, worth $2,400. Shipments of bullion have previously been made by the Gold Pyramid and the Detroit Syndicate properties.

During the week ending September 30th bullion shipments were made by the Nipissing on two separate days. One consignment was of 53 bars, valued at $28,400, and the other of 59 bars, valued at $30,800, total value $59,200.

At the 75-foot level of the McKinley-Darragh, exploration work in an abandoned working has led to the discovery of a rich vein. About 30 feet of drifting has been done on this ore body and high values are being secured.

This week saw the completion of the new shaft house and hoist house at the Gould Consolidated. Two drills are at work underground and the new shaft, which was commenced during the summer, has reached a depth of over 90 feet. The first station will be cut at 100 feet and the shaft may be continued to the 200-foot level.

Mackenzie and Mann have sent a large force of men into the West Shiningtree district, northwest of Gowganda, to work on their newly acquired claims there, purchased for a large sum from Gosselin, and although little is heard of the section, there is still a steady rush into the new field, and every day reports come out of new rich finds. A gang of 20 men has gone in to work on the Eplett-Caswell property and men are also working on the claims of the Sudbury Syndicate, bought from a man named Thomas, and situated on the shores of Cow Moose Lake. The Canadian Northern is cutting a good road in, and the journey in from the end of the steel is now but a half day's canoe trip.

Porcupine and Swastika.

Extensive exploration work is being done on the property of the Pike Lake Gold Mines, at Swastika, and some good free gold showings have been uncovered. A drill is now down about 50 feet and at 60 or 70 feet it is expected to strike the main vein. Little but surface work and testing has been done so far. The main vein, which is from 4 to 25 feet wide, has been traced for several hundred feet and a hexagonal ore body now being stripped of overburden is over 30 feet wide in places. It is made up of schist and quartz stringers.

Considerable development work is being accomplished on the McAulay-Brydge claims in Bristol township, recently purchased by the Cartwrights, of Cobalt and Porcupine. No. 1 shaft on the western end of the big dyke is now down about 20 feet, and in the shaft there is a 5-foot vein of solid quartz in addition to a smaller vein on the north wall. The other shaft is down the same distance near the eastern end of the claim. A gang of 30 men is employed in prosecuting this work, and a diamond drill is working.

A new vein carrying a spectacular showing of free gold has been opened up on the LaPalme property in Whitney township. The vein averages 6 feet wide and has been uncovered for nearly 200 feet. This is the 23rd vein opened on this property in which free gold has been found.

Within three days, three spectacular strikes were made on the Lucky Cross property at Swastika, and development work is being pushed at as rapid a pace as possible. A number of very promising veins have been opened and the ore bodies are proving to be of great size. These free gold showings were found while sinking, shot after shot bringing out rich samples.

On the south side of the lake a new shaft has been started on the Plenaurum property, and a depth of nearly 20 feet has now been reached. A boiler has been installed and a headframe erected so that when the compressor arrives it may be set in operation and work carried on at full capacity with as little delay as possible. A depth of over 50 feet has been attained in the main shaft.

Last week saw the starting of the plant at the Swastika mine. The outfit includes a 10-drill compressor and boiler, and four large machines are in use underground. The new main shaft has been timbered to 100 feet, and last week the drills started on the raise from the 200-foot level from the old shaft to reach the 100-foot level of the new or main shaft. At the present time, at the 200-foot level, a drill is driving on the main lead and the original values are still being encountered in the vein. A force of 65 men is engaged under Capt. John Reddington, formerly of the Coniagas, and superintendent of the Cobalt Provincial.

A 40-stamp mill is to be erected on the McIntyre, on which property over $250,000 will be expended. Five shafts are to be sunk on this property, and three of them are now well under way. The big 12-drill compressor is runn and work in shafts No. 1 and No. 4 is being pushed at rapid pace. It takes many men to work with 12 drills, a President Freeman, who has just returned to New York af visiting the property, says that from now until the first next year underground work will be prosecuted at the rate 2,000 feet per month.

Four shafts are to be sunk on the West Dome, which n has its camp buildings almost completed. The shot drill now drilling the last hole that will be sunk, and shaft No. where so many lives were lost in July, is being pumped o Work is now going on in three shafts. In all portions of t property tests have been made with the core drill to a dep of 400 feet and the results have been highly pleasing to t management.

Last week underground work on the Preston claim of t Preston East Dome was resumed for the first time since t fire, two shafts having recently been pumped out. At the foot level of the other shaft unwatered, 50 feet of cross-c ting and drifting has been accomplished. A new shaft h been started on the Preston vein and the shaft on the E Dome claim is down 30 feet.

Free gold has been found on the claims of the Sociate Min Limited, located in Deloro. In addition to the showings gold in the free state, high assays have been received fr other veins opened up. These claims are owned by a compa of yeung Americans, who have a force of nine men enga in development work.

Excellent progress is being made in the rebuilding of t structures destroyed at the Dome mines. New camp buildin of brick veneer are being erected and large numbers of m are busy in the reconstruction of the power plant, mill, a cyanide plant. Supplies are coming in rapidly on the Dome siding and approximately 300 men are on the payroll. So of the machinery damaged by the fire has been repaired, b considerable new equipment was found necessary.

No. 2 shaft at the Hollinger is now down 100 feet and will be continued as quickly as possible to the 200-foot lev Not until the Pearl Lake extension of the T. & N. O. is co pleted will the heavy machinery be brought in, so that it w be some time in December before development work is ca ried on on the scale contemplated. The sleep camps and se eral cottages are being erected on the Timmins townsite.

High assays have been obtained from drill cores on the Pea Lake property, and a main shaft, 13 by 5 feet, is to be sun in a spot calculated to tap several large ore bodies. This sha will go to 400 feet before any cross-cutting is done, and wi be about 350 feet north of a line connecting B shaft and sha No. 2.

There is another rush in progress to McArthur townshi where rich finds were made earlier in the summer. This tim the rush has been caused by the free gold discoveries on Mc rison's and on Hull's claims. Some very rich samples hav been brought out, and these properties are being developed o a fairly large scale.

A deal has just gone through in Montreal by which th Crown Chartered has taken over the Davidson property o which it had held an option for several weeks past. Th Davidson claims, 5 in number, adjoin the Crown Charter and are located in North Tisdale. At a depth of 70 feet en couraging values are being encountered, and this addition o 200 acres should prove a valuable acquisition.

Cobalt Ore Shipments.

Following are the ore shipments from Cobalt for the wee ending September 22nd, in pounds:

La Rose	238,480
Nipissing	151,090
Coniagas	123,150
Cobalt Townsite	100,520

McKinley-Darragh	64,250
Kerr Lake	60,870
Right of Way	56,980
Trethewey	56,980
Crown Reserve	50,800
Temiskaming	40,320
	1,181,790

Following are the shipments for the week ending September 29th, in pounds:

La Rose	278,780
Cobalt Lake	183,450
McKinley-Darragh	120,600
Drummond	120,000
Cobalt Townsite	65,100
Nipissing	63,980
Chambers-Ferland	63,900
Hudson Bay	53,000
Right of Way	61,500
Kerr Lake	60,930
Beaver	60,785
Coniagas	58,500
	1,200,525

BRITISH COLUMBIA.

Mining is progressive in several districts of British Columbia, notably on Vancouver Island and in Nicola Valley, of the coal mining parts of the province; and in Slocan, Sheep Creek, Hedley, and Coast camps, among the metalliferous mines. The Hedley Gold Mining Company has declared another five per cent. dividend on its issued capital of $1,200,000, this being the third distribution of $60,000 this year by this company. In Rossland camp, the War Eagle mine is continuing to produce much ore of good grade, while others of the Consolidated Company's mines in that locality are also doing well. The Le Roi No. 2 is regularly maintaining its normal output, with results that admit of the occasional payment of a dividend.

There does not appear to be any immediate prospect of a settlement of the strike of the coal-mine employees in the Crow's Nest Pass district. It is stated that the companies concerned are endeavoring to obtain men to work in the mines, but the only colliery reported to be producing and shipping coal in the district is that of the Corbin Coal and Coke Company.

Slocan.—The construction of the railway spur from the Canadian Pacific Railway at Three Forks to Bear Lake, on the divide between Slocan and Ainsworth mining divisions, is being pushed on while the weather continues favourable for outdoor work. Meanwhile preparations are being made at both the Lucky Jim zinc mine and the Rambler-Cariboo silver-lead mine to ship ore in considerable quantity when the new railway shall be completed.

Mines in the Cody section of Slocan district are expected ere long to again ship ore. In the Noble Five mine, both silver-lead ore of good grade and silver-zinc ore containiug a high percentage of zinc have been developed during recent months. There is also a probability of the Surprise mine again shipping ore soon, for the long raise from the 1,100-foot level up 850 feet to the bottom of the old workings will probably be completed before winter shall set in. Development work is being done on both the Reco and Sunset mines, also in the vicinity of Cody Creek, while near Sandon the Ruth-Hope and Richmond-Eureka groups are being operated.

Similkameen.—From a recent number of the Similkameen Star it is learned that the deal for the Voight group of mineral claims, situated on Copper Mountain, near Princeton, is practically complete. Representatives of the British Columbia Copper Company have been endeavouring to get titles cleared, before undertaking development work. Prospecting shafts are being sunk to bed rock in ground situated at the forks of the Similkameen and Tulameen Rivers, and held under placer mining lease. Work is being done on the Lucky Pair group, in Whipsaw Creek camp, a few miles up the Similkameen from Princeton. Development work is also in progress on mineral claims in several other camps in the district, these including Copper Mountain, Roche River, Fivemile, and Coquihalla Pass.

The Princeton Coal and Land Company is employing fully 100 men at its coal mine at Princeton, and is shipping up to 200 tons of coal per day. Facilities for mining on a larger scale are being provided, and it is stated a screening and dry-cleauing plant is to be put in, so that a thoroughly marketable grade of coal may be produced continuously. A preliminary small shipment of coal has been made from the Columbia Coal and Coke Company's Coalmont mine, situated between Granite Creek and Collins Gulch, about 15 miles up Tulameen River from Princton. Here the adit being driven to cut the coal at the depth of about 1,200 feet on the incline, is in 1,600 feet; it should be in coal when driven 500 feet further. Mr. Geo. L. Fraser, manager of the company, who had been visiting the eastern States in connection with ordering coal-handling plant and machinery, has returned to Coalmont, where the construction and equipment of the tipple and other facilities for the shipment of coal will be energetically proceeded with.

Not much information has lately been received relative to mining operations in the Tulameen district above Otter flat, but it is understood the company organized by Mr. Chas. F. Law, of Vancouver, is prospecting its gold-platinum-bearing gravel deposits, preliminary to taking steps for the recovery of these metals in commercial quantity.

Nicola Valley.—An important development has lately taken place on the property of the Nicola Valley Coal and Coke Company, Middlesboro, Nicola Valley. The company's chief coal-mining operations have heretofore been in what is known as Coal Gully Hill. A few months ago the directors authorized the expenditure of between $90,000 and $100,000 in additional plant, machinery, buildings, and other surface improvements and in further development underground. Included in the programme of progress was diamond-drilling, and a contract was let to the Sullivan Machinery Company to drill about 4,000 feet of holes in various parts of the property. For prospecting underground, the company purchased a small diamond drill. Since then the Sullivan Company has been engaged in drilling on lower ground than that in which the company has been mining, and this work has been done in what had previously been regarded as probably uon-productive ground. The result has amply justified the expenditure, for, first, what was thought to be an extension of No. 4 seam was encountered, size and character of coal being similar to that mined from No. 4; next, a second seam, believed to be an exsion of No. 5, has been passed through by the drill, and now the bore is being deepened with the expectation that No. 1 seam, which lies beliow No. 5, will be found as well. Where the drill passed through No. 5 there was 7 feet of coal in the core, but this is not the right-angle thickness of the seam, for the hole had been drilled diagonally; where mined, though, No. 5 contains 5 feet of good coal. Nos. 4 and 1 are both larger seams where mined in the developed part of the property, so it is to be expected they will also be larger where now found.

The contract time within which the new tipple at Midddlesboro was to be completed expired on October 1st, but the contractors required a short time longer to get it into running order. Nos. 4 and 5 mines have been connected by means of a rock tunnel, so that all coal from No. 4 can now be hauled out through the haulage way of No. 5 mine. The recent additions to plant and machinery include a complete coal-screening tipple with picking conveyors, slack conveyors, and car hauls,

capacity 1,000 tons per 10-hour day; a 50-ton raw coal per hour Stewart coal-washing plant, and storage bins of frame construction with the requisite foundations; a box car loader; and all machinery in tipple and washery necessary to receive, handle, and load out into box cars mine-run coal at the rate of 100 tons per hour. As indicating the progress this company has made in production, the following figures showing yearly output of coal are quoted: In 1908, 25,600 long tons; in 1909, 62,210 tons; in 1910, 141,487 tons. Production figures for the current year are not at present available, but it is known they show a substantial advance over those of last year, while a still greater increase may be looked for now that coal-handling facilities up to 1,000 tons per 10-hour day have been put in.

Howe Sound.—While little information has been published lately concerning the operations of the Britannia Mining and Smelting Company, it is stated by men believed to be well-informed that this year's developments in the company's mines, situated on Britannia Mountain, in the vicinity of Howe Sound, are the most satisfactory yet experienced by the company during the course of several years' persistence in developing its mines and proving the value of the orebodies occurring in them. No particulars have been obtained, but it is understood that ore of higher grade than that mined in earlier years has been found in considerable quantities, and that production has been enlarged accordingly. The further statement is made that the mines are now being worked on a profit-earning basis and the outlook is correspondingly encouraging. No other copper-mining enterprise yet undertaken in the Coast district of British Columbia has been conducted under similar conditions, long decidedly discouraging to those who found the large amount of money that has been expended in extensively exploring this property, so that the news of eventual success will be generally received with much gratification, and the abundant success of the Britannia company be earnestly hoped for.

Vancouver Island.—Efforts have been made to secure capital to work the hydraulic placer-gold mine at the mouth of Sombrio and Lost rivers, on the southern coast of Vancouver Island. This enterprise was undertaken in 1909 and continued in 1910 by a syndicate known as the Sombrio Mining Partnership, which acquired five hydraulic and four creek mining leases. The ground covered by the leases, as described in the last Annual Report of the Minister of Mines, consists of a large deposit of gravel formed at the mouth of the Sombrio River, at which point it is probable the old channel of Lost River also came out, although the latter stream now finds its way into the sea through a new channel, two miles to the eastward, out through the rim-rock of the older channel. is stated that the quantity of gold-bearing gravel availab here is large. Immediately back of this gravel delta the hil rise rapidly. These hills are composed of schists, greenstone conglomerate, sandstones, and shales, with heavy deposits gravel that at one time filled the river valleys, which we evidently gouged out by glacial action. Into these grave beds the present streams have cut deeply, depositing their d tritus—and probably the gold—in the delta comprised with the leases. The water supply is furnished by the Sombrio an Lost Rivers, the former estimated as having a flow of 40 cubic feet a second, and the latter 700 cubic feet; this wate has been brought on to the ground in a flume, under a hea of 200 feet. A good dump for tailings, into the sea, is avai able for all time. It is estimated that the gold content of th gravel is about 15 cents per cubic yard. The partnership ha put in 4,900 feet of steel rivetted pipe, of different sizes—1,40 feet of 24-inch, 1,000 feet each of 22, 20, and 16-inch, and 50 feet of 9-inch; also 300 feet of flume, with suitable head gates, and two 4-inch giants. Mine buildings consist of large cabin, cookhouse, blacksmith shop, office, stable, etc. accommodation having been provided for 20 men. The tota outlay has been about $35,000. The partnership attempted t hydraulic the gravel, but as the deposits were covered by heavy growth of timber and underbrush, these caused unex pected obstacles to the work, which was eventually suspende until such time as additional capital can be obtained to pro vide means for the removal of this forest growth.

Texada Island.—Mines on Texada Island are not now so pro ductive as in several recent years, except in the case of the Marble Bay mine, owned and operated by the Tacoma Stee Company, which has increased its production of gold-copper ore. Much development work has been done during this year in the mines of the Cornell-Copper Queen group, but the output of ore was smaller while this work was being carried out. The Little Billy and other mines on the island are expected yet to become productive, for it is known that in several there are ore-bodies that give promise of proving well worth working if the requisite capital to open them sufficiently shall be obtained. The big iron property, owned by the Puget Sound Iron Company, has not yet been sold, although negotiations looking to its purchase have been carried on. Smelting copper ore, with oil for fuel, in the blast furnace at Van Anda is expected to become practicable on a commercial scale after furnaces shall have been built to meet the special conditions the demonstrations made during recent months have shown to be requisite to successful operations.

GENERAL MINING NEWS.

ONTARIO.

Porcupine, Out.—Camp building at the West Dome is proceeding with rapidity, machinery is being installed, and from now on the management will mine.

Four shafts will be sunk on the property and every effort will be put forth in carrying on the work of development as rapidly as possible. But one more hole will be bored by the shot drill, and in a few days' time work on the No. 1 shaft will be commenced. This shaft, where the terrible loss of life occurred in July, has been filled with water since the catastrophe that resulted in the tying up of operations for so long a period, but it will be pumped out and sinking resumed.

Prospecting operations have been satisfactory, and during the winter all efforts will be confined to underground workings. In all portions of the property tests have been made with the shot drills to a depth of 400 feet.

Toronto, October 6.—With a view to realizing on the Keeley mine, which has been practically idle since the disastrous failure of the Farmers Bank, the liquidator, Mr. G. T. Clarkson, has prepared several plans on which tenders will be called for in the course of a few days.

The first proposition will be in the nature of a bonded lease, an option on the property being offered provisionally on a certain sum of money being paid over and an undertaking given that an adequate sum will be expended yearly in development work, the bank working in as a partner until the whole of the option has been taken up. The other proposition, and the one that finds more favour, is the selling of the mine outright.

Cobalt, October 10.—Thorough prospecting operations on the rethewey have resulted in the opening of another new vein shaft No. 2. This vein is not large, but it carries high alues. It was found in the southeastern corner of the claim. here cut, the vein shows about two inches of smaltite and iver, the latter ruuning in the neighbourhood of 3,000 ounces the ton.

Porcupine.—The shaft on the Rea at Porcupine has nearly ached the 300-foot level.

If values still are found at the depth consistent with those gher up, the shaft will immediately be sunk to 400 feet.

Shaft No. 2, 175 feet west of the main shaft, is down to the 0-foot level, and is connected with the main shaft by a rift along the main wall. The main vein has been uncovered r over 400 feet, and is fairly wide. Trenching is being done ong the west end of a large ridge in an effort to locate more eins.

Porcupine, October 9.—At 55 feet in the shaft the main ein of the Dobie has been cut. At this point the vein is dip- ng to the north and values are exceptionally high. Manager harles Watson says that the values have not been deter- ined by assays. A few feet deeper it is expected that au- her vein will be encountered.

ALBERTA.

Blairmore.—At Blairmore there are upwards of forty men orking at the mines and the daily output of coal is consider- oly over a hundred tons. The management report that they an get all the help required and that every day there are ap- lications for work from experienced miners. The number at ie Blairmore mine of the West Canadian Collieries will be ncreased as soon os sufficient accommodations have been pro- ided.

At Frank there are several miners working and considerable al is being mined. More men will be added in the near fu- re and the daily output will be greatly increased.

At the Davenport Company's mine at Burmis there are forty en working and the daily output of coal at that camp is over ne hundred tons.

The mines at Passburg and Police Flats, which are owned by ie Leitch Collieries, are working full swing. There are at resent 125 men working at these miues and they are shipping etween two hundred and three hundred tons of coal per day.

Lethbridge, Oct. 11.—Every local in District 18, United Mine Vorkers of America, is represented at the miners' conveution ere to-day to consider the strike situation. At the noon ad- ournment nothing definite had been decided on. It is stated hat the men have practically decided to accept the Gordon ward as to wages, and the only thing they are now holding ut for is the recognition of the check-off system, which, in hort, means the recognition of their union. Whether they will tick out for this or not is not known, and the subject forms he main part of the discussion at the convention. President White, of the International Uuion, is present, and, it is be- eved, will have some settlement made before he leaves for ndianapolis.

BRITISH COLUMBIA.

Phoenix, B.C., Oct. 5.—The opening up of the Standard mine t Silverton has resulted in the operation of the Alpha and the nacortes properties which were prospected by the Standard's our tunnels, which traversed the other's property. James Mc- Vaught, of New York, who is the principal owner of the lpha and Anarcortes, has just paid the mine a visit, with the bject of making suitable arrangements with the Standard ompany to permit of his ore being shipped through the Stand- rd's tunnel and over the latter's tramway.

Vancouver.—Nine thousand dollars was the jury's verdict for Peter Collins in the suit against the Britannia Mining & Smelting Company, for the loss of the sight of both eyes in an explosion at the mines. "An employer is not an insurer of his employees," said Mr. Justice Morrison to the jury, "but he must adopt reasonable precautions which will ensure the safety of his employees. You must also remember that au em- ployee is not an inspector of his employer's plant." S. S. Taylor, K.C., appeared for the plaintiff.

The steamer British Empire is here from Prince Rupert with 500 tons of concentrates from the Portland Canal Mining Com- pany's conceutrating plant for the Tacoma smelter. The Bri- tish Empire has been given a contract to carry fortnightly ship- ments of concentrates from the canal to Tacoma and this is the first trip.

UNITED STATES.

Salt Lake City, Utah, Sept. 20.—With but one shift operating the 30-ton mill at the old Ima mine in Idaho, during the past three weeks, 12 tons of tungsten concentrates, worth $400 a ton, or nearly $5,000 for the run, has been turned out and will be shipped to Denver.

The Ima was opened up about 10 years ago. It now has 3,000 feet of development work.

The mill is turning out about 1,200 pounds of concentrates in each eight-hour shift. This is 20 in one, and runs 65 to as high as 73 per cent. tungsten.

The Ima is situated 55 miles northerly from Mackay, up the Blackfoot branch. It is 25 miles from Ledora, on the Gilmore line, but an inaccessible mountain lies between. Al- ready a wagon road is being constructed across this mountain, which will cut the wagon haul charge in two. At present this costs from $12 to as high as $20 a ton.

Boston, October 7.—The abandonment of the proposed mer- ger of the Calumet & Hecla Mining Company with nine sub- sidiary Michigan companies was officially announced before the close of the stock market yesterdey.

Cripple Creek, Colo, Oct. 7.—From the portal of the Roose- velt deep drainage tunnel there is at this time, as in the last six months, a flow of 5,800 gallons pouring out each minute, which permits a recession throughout the camp of about six feet a mouth. The water has receded considerably in every mine during the last six months.

Goldfield, Nev., Oct. 7.—Preliminary estimates of the pro- duction made by the Consolidated Mines Company in Septem- ber, just issued by J. F. Thorn, the general superinteudent, placed the output at 26,766 dry tons, with an estimated net recovery of $650,000, operating costs amouutiug to $225,000, and net profits of $425,000. The average gross value of all ore treated was approximately $24.50 per ton.

Nevada.—The total value of the mine output of gold, silver, copper, lead, and zinc in Nevada in 1910, according to V. C. Heikes, of the United States Geological Survey, was $34,152,- 148, as against $30,072,932 in 1909, showing an increase of $4,079,216, or over 13.5 per cent.

The total production of gold in 1910 was 913,265.05 fine ounces, valued at $18,878,864, a gain of $2,638,991, or 14 per cent. over the 1909 productiou. Of the gold output 7,854.70 fine ounces came from placers (mainly in Nye Couuty), 880,- 180.93 ounces from siliceous ores, 21,230.87 ounces from copper ores, and 3,998.55 ouuces from lead, zinc, copper-lead, and lead-zinc ores. Siliceous ores yielded over 96 per cent. of the entire gold production. From bulliou in gold and silver mills were recovered 728,139.67 fine ounces, concentrates pro- duced 76,696.62 fine ouuces, and crude ore shipped to smelters contained 100,574.06 fine ounces.

Colorado.—The total value of the miue output of gold, sil- ver, copper, lead, and zinc in Colorado in 1910, according to

Charles W. Henderson, of the United States Geological Survey, was $33,673,879, against $33,907,140 in 1909, a decrease in value for 1910 of $233,261.

The production of gold showed a decrease of 71,505.20 fine ounces and of $1,482,278 in value; the output of silver, a decrease of 393,035 ounces and of $34,186 in value; the production of copper, a decrease of 2,632,511 pounds, and of $3[illegible] 205 in value. The output of lead, however, showed an increa[illegible] of 3,903,483 pounds and of $243,921 in value; and the p[illegible] duction of zinc (figured as spelter), a notable increase of [illegible] 879,388 pounds and of $1,397,487 in value.

COMPANY NOTES

CALUMET AND HECLA.

Directors Review Contest—Announcement of Plan Followed by Much Hostile Litigation—The Various Suits in Detail—Laurium Vote Purposely Held Back.

To the Stockholders of the Calumet & Hecla Mining Company:

Your directors submit the following statement in regard to the proposed consolidation of the Seneca Mining Company, Ahmeek Mining Company, Allouez Mining Company, Osceola Consolidated Mining Company, Centennial Copper Mining Company, Tamarack Mining Company, Laurium Mining Company, La Salle Copper Company, Superior Copper Company, and Calumet & Hecla Mining Company, which consolidation they have decided must now be abandoned.

On January 2nd, 1911, the directors of the several companies named caused to be sent out notices of special meetings of the stockholders, to be held on the 7th, 8th, and 9th days of March, to consider the question of the consolidation of those companies upon terms stated in circular letters sent with the notices of the meetings. Just prior to March 7th Godfrey M. Hyams brought suit as a stockholder of the Osceola Company in the United States Circuit Court, and obtained a restraining order forbidding the carrying through of the consolidation until a hearing should be had. Informal votes were taken at the meetings, and the result showed that the stockholders of the several companies favoured the consolidation, and the meetings were adjourned to the 24th, 25th, 26th, 27th, and 28th days of April, on which dates they were adjourned to the 1st, 2nd, 3rd, 4th, and 5th days of May.

A second suit was brought in the Circuit Court of Michigan for the County of Ingham by Charles M. Turner and others, also as stockholders of the Osceola Company, and later a third suit was brought by Frederick W. Denton as a stockholder of the Ahmeek Company in the Circuit Court of the State of Michigan for the County of Houghton, and similar orders obtained. On or about May 1st Waldemar A. Chadbourne, as special administrator of the estate of Thomas L. Chadbourne, intervened in the Denton suit.

The stockholders of all the companies except the Laurium Company then voted for the consolidation, and the meeting of the Laurium Company adjourned without action, so that the companies would not be so irrevocably committed that they could not be disentangled, if the opponents of the consolidation should be able to defeat it by interposing so much delay that it would become practically impossible to carry it into effect.

Hearings were had in each of the three suits mentioned, resulting in a denial of the application for a temporary injunction by Judge Swan in the Hyams suit and by Judge Streeter in the Denton-Chadbourne suit, and the granting of a temporary injunction in the Turner suit, Judge Wiest holding, contrary to the opinions of Judge Swan and Judge Streeter, that the questions involved in deciding whether the terms proposed were fair, were too difficult to be determined upon affidavit, and that, although the authorized capital stock of the new company was fixed at $10,000,000, inasmuch as the property with which it would begin business would have a value larg[illegible] in excess of $10,000,000, the consolidation would be a violat[illegible] of the statute which fixes a maximum limit of $10,000,[illegible] upon the capital stock of mining companies.

After the decision by Judge Streeter in the Denton-Ch[illegible] bourne suit, that case was taken by the complainants to t[illegible] Supreme Court of Michigan by a petition for a writ of ma[illegible] damus, and a restraining order issued pending the decision [illegible] the court.

On August 10th a fourth suit was brought by John F. Ja[illegible] son as a stockholder in the Ahmeek Company in the Unit[illegible] States Circuit Court, and a restraining order obtained, and [illegible] order to show cause why a temporary injunction should n[illegible] issue was made, the hearing on which is now pending.

Your directors are advised by counsel that they cannot sta[illegible] when final decisions either for or against the proposed co[illegible] solidation may be had.

The consolidation was proposed to the stockholders of t[illegible] several companies because through a consolidation, and on[illegible] through a consolidation, could certain large economies in ope[illegible] tion and the greatest conservation of mineral resources be o[illegible] tained. It has, however, been manifest from the beginni[illegible] that delay in carrying out the consolidation would alone, [illegible] of sufficient length, compel the abandonment of the plan. O[illegible] method of operating should be adopted if the properties are [illegible] be managed as one large enterprise, and another method if t[illegible] properties are to remain as single units. In fairness to t[illegible] individual properties the decision as to which method is to [illegible] adopted cannot be delayed beyond a certain time. In voti[illegible] for the consolidation, some date had to be fixed as of whi[illegible] the consolidation should take effect. From this date all div[illegible] dends upon the stock of the consolidated company had to [illegible] equalized, and, if the consolidation could not be put in[illegible] operation and if the savings therefrom could not be made, the[illegible] then payment of such equalizing dividends on the consolidate[illegible] stock allotted to the now unprofitable mines would shortly pu[illegible] a serious and unfair burden on certain of the profitable com[illegible] panies. The date fixed from which this equalization shou[illegible] take place was March 15, 1911.

Moreover, since the proposed plan of consolidation was sub[illegible] mitted to the stockholders, the work incident to the vario[illegible] suits has taken such a large part of the time of the officers [illegible] the company as to amount to a serious interference with the [illegible] work in operating the properties, and further continuation [illegible] the litigation promises to involve even greater sacrifices [illegible] time.

Because of the great advantages that would result from [illegible] consolidation your directors have felt it their duty to th[illegible] stockholders of all the companies to go on with the plan unt[illegible] it became entirely clear that it should be abandoned. Th[illegible] time, in the opinion of your directors, has now arrived, an[illegible] they have therefore, instructed Messrs. Shaw, Agassiz, an[illegible] Flagg, as proxies of this company, to vote against the consol[illegible] dation at the meeting of the stockholders of the Laurium Com[illegible]

pany called for November 16th, 1911, and have instructed the officers of this company to take such steps as may be necessary to wind up the present litigation.

In the course of the litigation sensational statements have been made, in affidavits and elsewhere, attacking the value of the property of this company. These statements have been made by persons unfamiliar with the conditions and operations of this company and are without foundation in fact. They need cause the stockholders no uneasiness. The further study of the subject made necessary by the allegations in the several bills of complaint has confirmed your directors in the belief that the valuation of this company's property as compared with the valuations placed upon the properties of the other companies was conservative and fully borne out by the actual conditions.

The statements that have been made attacking the value of the property of certain of the other companies have not changed the opinion of your directors as to the wisdom of this company's continuing as a stockholder in the various mines. Every effort will be made to secure the best results from the individual properties.

Copies of the several bills of complaint and the answers thereto will shortly be on file at the office of the company and open to inspection by the stockholders of all the companies.

Quincy A. Shaw,
Rodolphe L. Agassiz,
Francis W. Hunnewell,
Francis L. Higginson,
James MacNaughton.

Boston, October 6th, 1911.

HILLCREST DIVIDEND.

The regular 1¾ per cent. dividend has been declared on Hillcrest Collieries, preferred.

It is payable on October 14th to holders of September 30th.

Some time ago some of the directors had apparently made up their minds that no dividend would be paid, although there was sufficient money in the treasury to meet it.

As is well known, the company has been tied up for months as a result of the strike, but once the labour troubles are over it is figured that the concern will be a good money-maker.

CROWN RESERVE DIVIDEND.

Crown Reserve has declared the usual monthly dividend of 2 per cent., with 3 per cent. bonus, payable November 15th to holders of October 31st.

TEMISKAMING-HUDSON BAY'S ANNUAL REPORT.

For the fiscal year ending August 31st, the Temiskaming and Hudson's Bay Mining Company shipped 676.32 tons of ore, with an average assay of 1,191.10 ounces to the ton, a total of 805,572.88 ounces. Of this amount 214.08 tons were estimated as high-grade ore with an average assay of 2,417.87 ounces, while the balance of 462.24 tons is classed as low grade, with an average assay of 587.88 ounces to the ton, which latter figures are rather high for low grade shipments from the camp. In addition to this 16,884.47 ounces of bullion was sent away from the property.

During the year the new mill, which was running since March, treated 11,109.6 tons of ore. The table of concentrates produced is as follows:

	Tons.	Silver contents.
Jigs	153.18	168,271.40
Sands	146.99	111,267.70
Slimes	109.01	35,681.70
Nuggets ..lbs.	240	2,400.00

The average assay a ton of this mill production was 776.23 ounces, and the total value was $147,409.36.

In concluding his report to the directors at the annual meeting Manager Horace G. Young says: "I may say that your properties are in good order. There is sufficient ore in sight to warrant an equally good production this year as the one just ended."

ONTARIO EXPLORATION STATEMENT.

Canadian shareholders of the Northern Ontario Exploration Company, Limited, have been supplied by the secretary of the company in London, with a copy of the balance sheet at June 30th last and the profit and loss account from the registration of the company on January 17th to the same date.

The covering letter states that since June 30th options at par have been exercised on 9,100 more shares of the stock, and that the balance of the unissued capital (280,571, one-pound shares) is under option to the subscribers of the original working capital, also at par. Also since June 30th the company has taken a $25,000 interest in the Poreupine Veterans Exploration Company and other important deals are under negotiation.

It will be noted that no general information is vouchsafed as to the identity of large shareholders. The full statement is as follows:—

Balance Sheet, June 30th, 1911.

Dr.			
To Share Capital—Authorized—			
400,000 shares of £1 each	£400,000	0	0
Issued—			
110,325 shares subscribed and fully called up	£110,325	0	0
Less calls in arear	8,932	10	0
	£101,392	10	0
Sundry creditors—			
London	£ 2,531	10	5
Ontario	1,541	19	7
	£ 4,073	10	0
Profit and Loss—			
Balance as per Account, subject to provision for Management Commission	63,021	12	4
	£168,487	12	4
To Contingent Liability on shares held	£ 56,177	10	0
Cr.			
By shares in companies at cost	£ 86,011	7	10
By buildings—			
Canada	1,561	17	1
By Debtors—			
London	£ 30,407	15	9
Ontario	19,927	9	1
	£ 50,335	4	10
By cash at Bank—			
London	£ 25,921	16	10
Canada (Montreal)	4,657	5	9
	£ 30,579	2	7
Dr.	£168,487	12	4

To General Expenses, London and Ontario:
London—

	£	s.	d.
Directors' fees	759	13	6
Salaries and office rent	143	4	3
Cables	141	14	0
Law charges	109	13	10
Stationery and printing	100	10	8
Miscellaneous charges	92	15	3
	£1,347	11	6

Ontario—			
Office rent and salaries, travelling expenses; printing and stationery, cables, postage and miscellaneous charges	628	16	4
To advertising	957	8	5
To interest	148	10	7
To preliminary and formation expenses	1,203	8	6
To balance carried to balance sheet	63,021	12	4
	£67,307	7	8
Cr.			
By profit on sales of shares	67,211	19	3
By exchange and commission	82	0	11
By transfer fees	13	7	6
	£67,307	7	8

LAKE SUPERIOR CORPORATION.

The Lake Superior Corporation has issued its annual report for year ending June 30th, 1911. It shows that the yearly operations of the subsidiary companies resulted in a surplus of $1,200,216, subject to depreciation and other charges.

The output of the steel plant was very satisfactory and compares with 1910 as follows:

	1910	1911
Pig iron	$ 53,528	$170,359
Steel rails	201,615	208,283

The production is the highest ever attained, despite certai difficulties. The entire programme of new construction, a originally planned having been carried out, the directors d not contemplate for the moment moving to any great extent i the direction of making further capital expenditure, excep what must be incurred to put the finishing touches to wha they believe to be one of the best equipped and well balance plants on the continent. The outlook is decidedly encouragin

GLOBE AND PHOENIX.

The Globe and Phoeniix issues an interim report for the hal year to June last, at which date the ore reserves were estimat ed at 179,000 tons, of a gross value of £1,356,238. The min would appear to be developing satisfactoriily, and during th half year the substantial gross profit of £181,868 was secured The machinery is working satisfactorily, with the exception o the sands plant, but this has been closed down pending th erection of a new roasting plant, which is to cost £34,500. Mr Piper's concluding remarks are: "From the report you wil see that the prospects of the mine leave nothing to be de sired, and that substantial profits are assured for some years.' Under these circumstances we can only congratulate the hold ers of Globe and Phoenix.

STATISTICS AND RETURNS

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending September 29th, and those from January 1, 1911, to date:—

	Sept. 29. Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger	.....	55,200
Bailey	.....	40,000
Barber	.....	6,000
Beaver	60,785	1,401,458
Buffalo	.....	1,968,274
Chambers-Ferland	63,900	1,086,900
City of Cobalt	.....	663,980
Cobalt Lake	183,450	3,123,596
Cobalt Townsite	65,100	985,420
Colonial	.....	135,410
Coniagas	58,500	3,176,943
Crown Reserve	.....	1,842,489
Drummond	120,000	660,000
Green-Meehan	.....	60,000
Hargraves	.....	161,100
Hudson Bay	63,000	1,129,340
Kerr Lake	60,930	2,049,509
King Edward	.....	40,000
La Rose	279,380	5,682,068
McKinley Darragh	120,600	4,787,359
Nipissing	63,980	4,621,388
O'Brien	.....	1,072,898
O'Brien, M.J	.....	47,000
Peterson Lake, Little Nip	.....	58,430
Provincial	.....	151,950
Right of Way	61,500	1,069,095
Silver Cliff	.....	106,680
Standard	.....	102,813
Temiskaming	.....	1,284,432
Thethewey	.....	1,000,180
Wettlaufer	.....	117,232

The shipments for the week were 1,200,125 pounds, or 600 tons, against 664 tons the previous week.

The shipments from Jan. 1 to September 29 were 38,687,44 pounds, or 19,343 tons.

B. C. ORE SHIPMENTS.

The ore shipments for the past week totalled 17,629 tons and for the year to date 1,237,708 tons. The smelter receipts for the week ending September 30th and year to date are respectively 15,122 tons and 1,039,444 tons.

Boundary Shipments.		
Mother Lode	5,290	230,933
Rawhide	3,111	25,975
Jackpot	314	20,641
Athelston	249	6,300
Unnamed	629	4,665
Other mines	.....	630,792
Totals	9,593	919,306
Rossland Shipments.		
Centre Star	3,837	150,353
Le Roi No. 2	334	20,273
Le Roi No. 2, milled	300	11,700
Le Roi	558	11,979
Other mines	.....	467
Totals	5,029	194,772
Slocan-Kootenay Shipments.		
Van Roi, milled	800	29,049
Molly Gibson, milled	300	3,300
Sullivan	247	14,350
St. Eugene, milled	420	21,036
Richmond-Eureka	31	1,821
Silver Cup	31	383
Rambler-Cariboo	28	1,267
Hewitt	34	280

Queen, milled	420	16,170
Granite-Poorman, milled	250	9,760
Nugget, milled	110	4,290
Emerald	50	1,568
Knob Hill	286	3,852
Other mines	.....	6,524
Totals	3,007	113,630

B. C. Copper Company's Receipts.
Greenwood, B.C.

Mother Lode	5,290	230,933
Rawhide	3,111	25,975
Jackpot	314	20,641
Athelston	249	6,300
Unnamed	629	4,665
Other mines	.....	10,112
Totals	9,593	298,626

Consolidated Company's Receipts.
Trail, B.C.

Centre Star	3,837	150,353
Le Roi No. 2	334	20,273
Sullivan	247	14,350
St. Eugene	61	5,621
Le Roi	558	11,979
Knob Hill	286	3,852
Richmond-Eureka	31	1,821
Van Roi	32	1,122
Rambler-Cariboo	28	1,267
Hewitt	34	280
Emerald	50	1,568
Ferguson	31	383
Other mines	.....	37,536
Total	5,529	250,405

B. C. ORE SHIPMENTS.

The ore shipments for the week ending September 23rd totalled 16,952 tons, making the total for the year to date 1,113,281 tons. The smelter receipts were 15,560 tons for the week and 1,126,208 tons for the year to date.

Boundary Shipments.

Mother Lode	5,658	225,643
Rawhide	2,983	25,864
Athelstan	301	6,051
Unnamed	498	4,036
Jack Pot	441	20,327
Other mines	.....	630,702
Total	9,881	912,623

Rossland Shipments.

Centre Star	3,658	146,516
Le Roi No. 2	492	19,939
Le Roi No. 2, milled	300	11,400
Le Roi	579	11,421
Other mines	.....	457
Total	4,029	189,733

Slocan-Kootenay Shipments.

Sullivan	307	14,103
St. Eugene, milled	420	20,616
Richmond-Eureka	66	1,790
Rambler-Cariboo	32	1,239
Queen, milled	420	15,750
Granite-Poorman, milled	250	9,510
Nugget, milled	110	4,180
Emerald	34	1,518
Hope	32	546
Evening	6	50
Knob Hill	228	3,566
Van Roi, milled	800	28,249
Arlington	37	102
Molly Gibson, milled	300	3,000
Other mines	.....	6,706
Total	3,042	110,925

B. C. Copper Co.'s Receipts.
Greenwood, B.C.

Mother Lode	5,658	225,643
Rawhide	2,983	25,864
Jack Pot	441	20,327
Athelstan	301	6,051
Unnamed	498	4,036
Other mines	.....	10,612
Total	9,881	292,533

Consolidated Co.'s Receipts.
Trail, B. C.

Evening	6	50
Knob Hill	228	3,566
Van Roi	64	1,090
Arlington	37	102
Centre Star	3,658	146,516
Sullivan	307	14,103
Le Roi No. 2	492	19,939
Le Roi	579	11,421
Richmond-Eureka	66	1,790
St. Eugene	65	5,560
Rambler-Cariboo	32	1,239
Emerald	34	1,518
Hope	32	546
Granite-Poorman	79	463
Other mines	.....	35,353
Total	5,679	243,262

SILVER PRICES.

	New York. cents.	London pence
Sep. 27	52⅝	24¼
" 28	52⅝	24¼
" 29	52¾	24⅝
" 30	52¾	24⅝
Oct. 2	52½	24¼
" 3	52½	24¼
" 4	52½	24¼
" 5	52¾	24 5/16

NEW YORK METAL MARKETS.

October 6th—
Tin, Straits, 40.3 cents.
Copper, Prime Lake, 12.45 cents.
Electrolytic Copper, 12.25 to 12.37½ cents.
Copper Wire, 13.50 cents.
Lead, 4.35 to 4.40 cents.
Spelter, 6.10 cents.
Sheet zinc (f.o.b. smelter), 8 cents.
Antimony, Cookson's, 8.12½ cents.
Aluminium, 19.25 to 19.75 cents.
Nickel, 40 to 45 cents.
Platinum, $48.50 per ounce.
Bismuth, $1.80 to $2 per pound.
Quicksilver, $46 per 75-pound flask.

MINERAL MARKETS.

Acids—
Muriatic, tank cars, $1.15 to $1.55 per 100 pounds.
Nitric, $0.04 to $0.05 per pound.
Sulphuric, $0.01 per pound.
Chrome Ore, 50 per cent., ton of 2,240 lbs., $15.

Fire Clay, $2.50 to $5 per short ton.
Fluorspar, lump, $9 per long ton.
Fluorspar, ground, $12 to $15 per long ton.
Graphite, lump, 4 cents to 10 cents per pound.
Gypsum, short ton, ground, $4 to $7.50 per ton.
Magnesite, crude, 95 per cent., $7 to $8.50 per long ton.
Molybdenite, commercially pure, 25 to 30 cents per lb.
Pyrite, lump, arsenic free, 10 to 12½ cents per unit.
Pyrite, fines, arsenic free, 8 to 11 cents per unit.
Tungsten ore, 50 per cent., $7.70 per unit.

MARKET NOTES.

October 10.—(Quotations from Canada Metal Co., Toronto):
Spelter, 6.50 cents per pound.
Lead, 4.25 cents per pound.
Antimony, 8 to 9 cents per pound.
Tin, 43 cents per pound.
Copper, casting, 12.75 cents per pound.
Electrolytic, 12.75 cents per pound.
Ingot Brass, 7 to 12 cents per pound.

October 10.—Quotations from Drummond, McCall Company, Toronto):
Summerlee, No. 1, $23.00 (f.o.b. Toronto).
Summerlee, No. 2, $22.50 (f.o.b. Toronto).
Midland, No. 1, $19.50 (f.o.b. Toronto).
Midland, No. 2, $19.00 (f.o.b. Toronto).

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

COBALT STOCKS.

Bailey	.02¼	.02¾
Beaver Consolidated	.49	.49½
Buffalo	1.40	1.50
Chambers-Ferland	.10	.10½
City of Cobalt	...	.10
Cobalt Central	...	...
Cobalt Lake	.27¾	.28
Coniagas	5.90	...
Crown Reserve	2.66	2.71
Foster	...	...
Gifford	...	...
Great Northern	.10½	.11½
Green Meehan	.01	.01⅜
Hargraves	.04	.07
Hudson Bay	...	.90
John Black	...	...
Kerr Lake	3.50	4.00
La Rose	4.00	4.05
Little Nipissing	.02½	.03⅛
McKinley	1.62	1.63
Nancy Helen	...	...
Nipissing	7.50	7.75
Nova Scotia	...	...
Ophir	...	...
Otisse	...	...
Peterson Lake	.06¾	.07⅛
Right of Way	.06½	.08
Rochester	.02	.02¼
Silver Leaf	...	...
Silver Bar	...	...
Silver Queen	...	...
Temiskaming	.35	.35½
Trethewey	.65	...
Watts	...	...
Wettlaufer	.83	.84

PORCUPINE STOCKS.

	Bid	Asked.
American Gold	...	...
Apex	...	.15
Coronation	...	.06
Nor. Exploration	...	4.00
Dobie	...	1.62
Dome Ex.	.75½	.75¾
Foley-O'Brien	.60	.65
Rea	2.53	2.55
Hollinger	12.00	12.20
Monita	...	.18
Pearl Lake	...	.43
Central	3.06¼	3.48¾
Imperial	...	.10
Northern	.87	.88
Tisdale	.05	.06
Preston East Dome	.19⅞	.20
Standard	.09	...
Swastika	.35	.36½
United	.02½	.03½
Porcupine Gold	.46	.46½
West Dome	.85	.90
Crown Chartered	.36	.37
Eldorado	.10¼	.10½
Gold Reef	.15	.20
Porcupine Canada	.90	1.00

NEW YORK CURB.

Braden	4½	4¾
B. C. Copper	3½	3¾
Butte Coalition	14½	15¼
Ely Central	.01	.02
Ely Cons.	5/16	⅜
First National	⅞	1⅛
Giroux	3 11/16	3 13/16
Green-Can.	5½	5¾
Inspiration	6⅜	6½
Nevada Hills	2 15/16	3
Ohio	1⅜	1 7/16
United Cop.	1	1⅜
New Baltic	...	...
Ray Central	1¼	1⅜
Union Mines	⅛	¼
Yukon Gold	3 7/16	3 5/16
Goldfields	5¼	5⅜
Nevada Cons.	16⅛	16¼
Miami	16⅞	17½
Granby	off	60.
Con. Min. & Smelt.	40	45
Davis-Daly	⅞	1
Con. Arizona	11/16	¾
Rawhide Coalition	...	...
Ray Cons.	12¾	12⅞
Chino	17⅝	17⅞

L. Vogelstein & Company, New York, forward to us th following figures of German consumption of foreign copper fc the months January to August, 1911:

Imports of copper,	tons	125,298
Exports of copper	tons	5,793
Consumption	tons	119,505

as compared with consumption during the same period in 191 of 108,876 tons.

Of the above quantity 109,441 tons were imported from th United States.

THE LANCASHIRE DYNAMO & MOTOR Co. Ltd.

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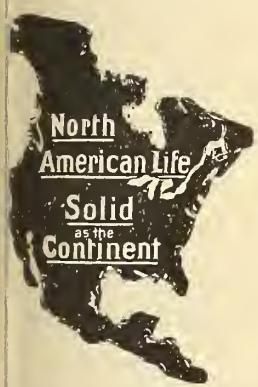

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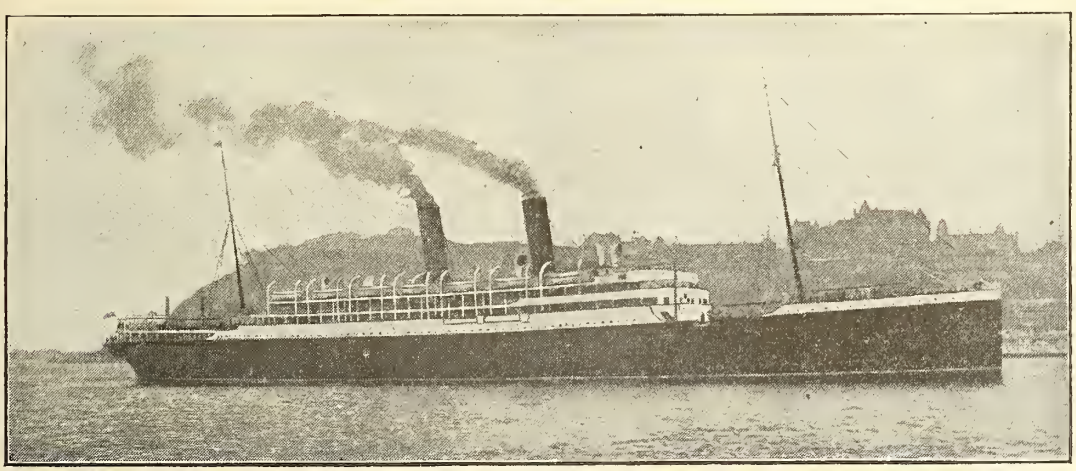

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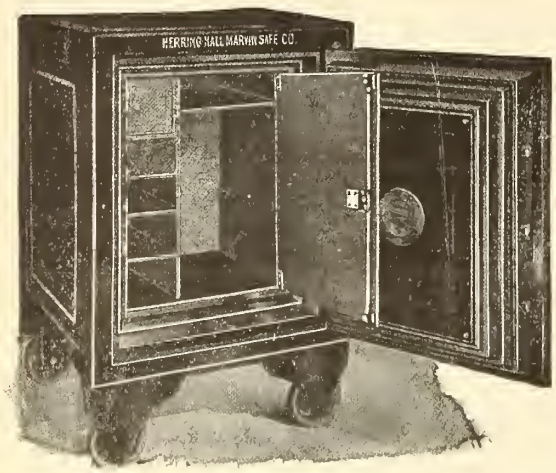

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PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining gineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show s of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a rough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

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eMorest, Stull & Low
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1091. Map 8 A, Lake Nipigon, Thunder Bay District, Ontario. Scale 4 miles to 1 inch.

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1164. Map 28 A. Sketch map of Portland Canal Mining District.

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1089. Map 9A. Explored Routes on Parts of the Albany, Severn and Winisk Rivers. Scale 8 miles to 1 inch.

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Aggregate Value of $374,197,650.

In 1910 the quantity of Ore mined was 2,216,428 tons, and of coal 3,139,235 long tons. The value of Minerals produced that year was: Placer Gold, $540,000; Lode Gold, $5,533,386; Silver, $1,245,016; Lead, $1,386,350; Copper, $4,871,512; Coal and Coke, $11,108,335; Other Minerals, $1,692,473, making the

Total Value for 1910, $26,377,066.

Lode mining has only been in progress for about eighteen years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those in any other Province in the Dominion, or any Colony in the British Empire.

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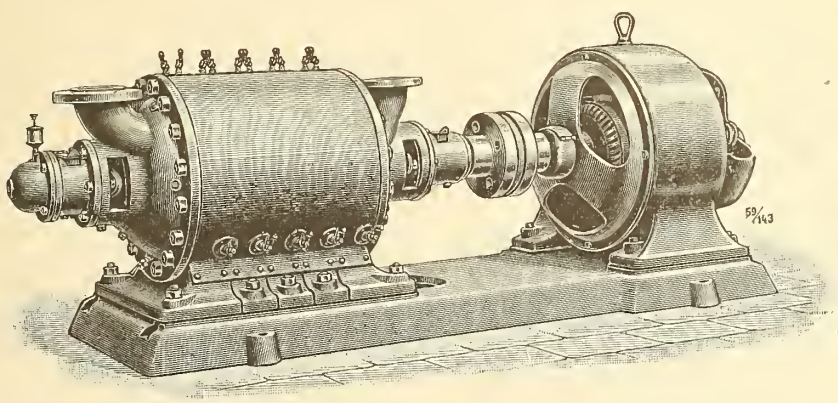

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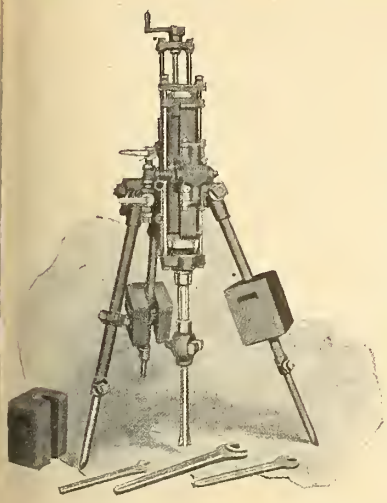

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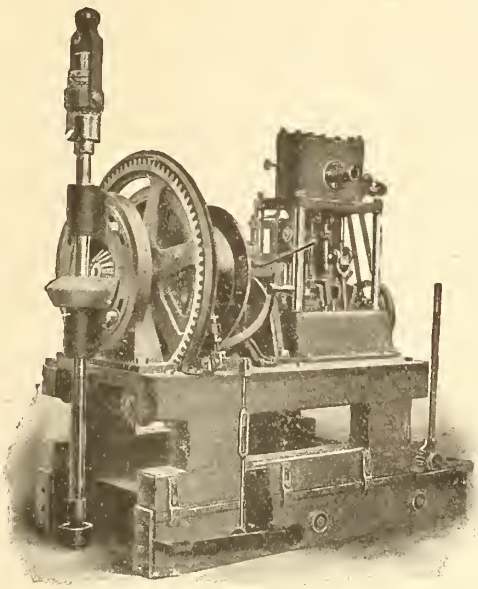

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The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to th extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his right must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cent an acre per year and a fee of $10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavi that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of $10 an acre fo SUPERIOR METALS when more than 20 miles distant from a railway and $20 an acre when less than 20 miles.

For INFERIOR METALS the prices are $2.00 and $4.00 an acre respectively.

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Large deposits of iron also are known to exist at various places in the Province; and considerable mining has been done in connection with this mineral, the ore being used locally and shipped to foreign ports.

Among the most important minerals occurring in economic quantities may be mentioned, Coal, Gold, Silver, Manganese, Leadsilver, Copper, Barytes, Mineral Pigments, Gypsum and Tungsten.

Licenses are issued for prospecting for Gold and Silver for a term of twelve months.

The licenses are for areas 150 by 250 feet, and can be obtained for 50c. an area.

Leases can be secured for $2. an area, for a term of forty years; subject to annual rental of 50c. an area.

Licenses to search over five square miles, for a period of eighteen months, for minerals other than gold and silver, cost $30.

Leases for three renewable terms of twenty years each can be obtained for $50., and are subject to a yearly rental of $30.

Royalties are as follows:—

Gold, two per cent on the gross value thereof; Copper, four cents a unit; Lead, two cents a unit; Iron, five cents a ton; Tin and Precious Stones, five per cent; Coal, ten cents on every long ton sold or removed from the mine.

Copies of the mining law can be had gratis, by applying to the Department of Public Works and Mines, Halifax, Nova Scotia, or to Mr. John Howard, Agent General for Nova Scotia, 57a Pall Mall, London, England.

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In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

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The mining laws of Ontario are liberal, and the prices of mineral lands low.

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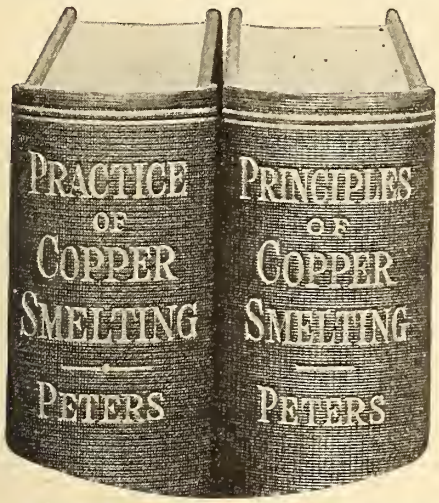

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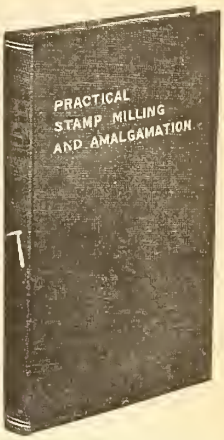

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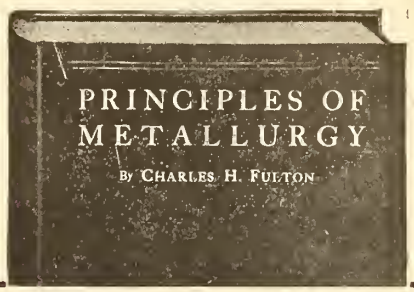

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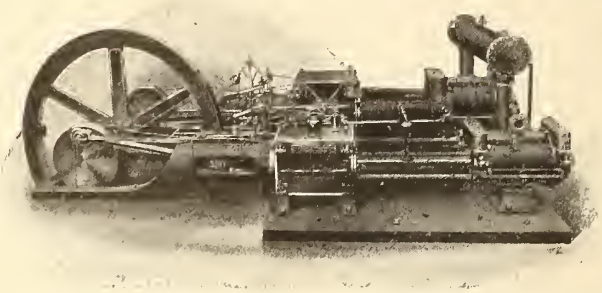

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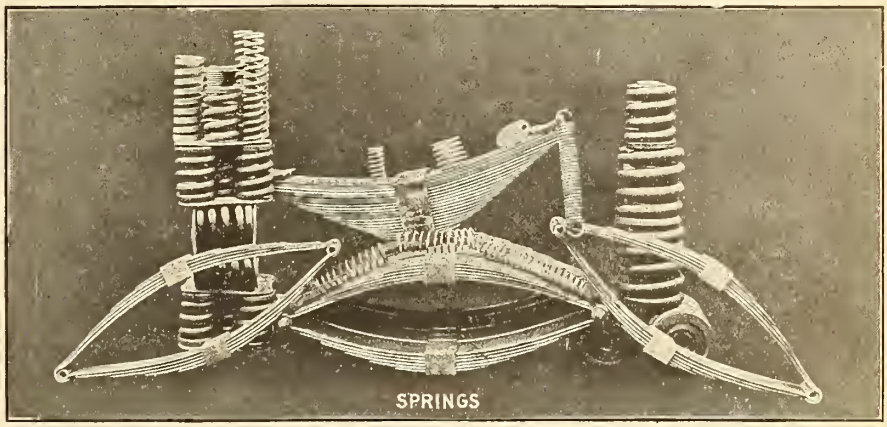
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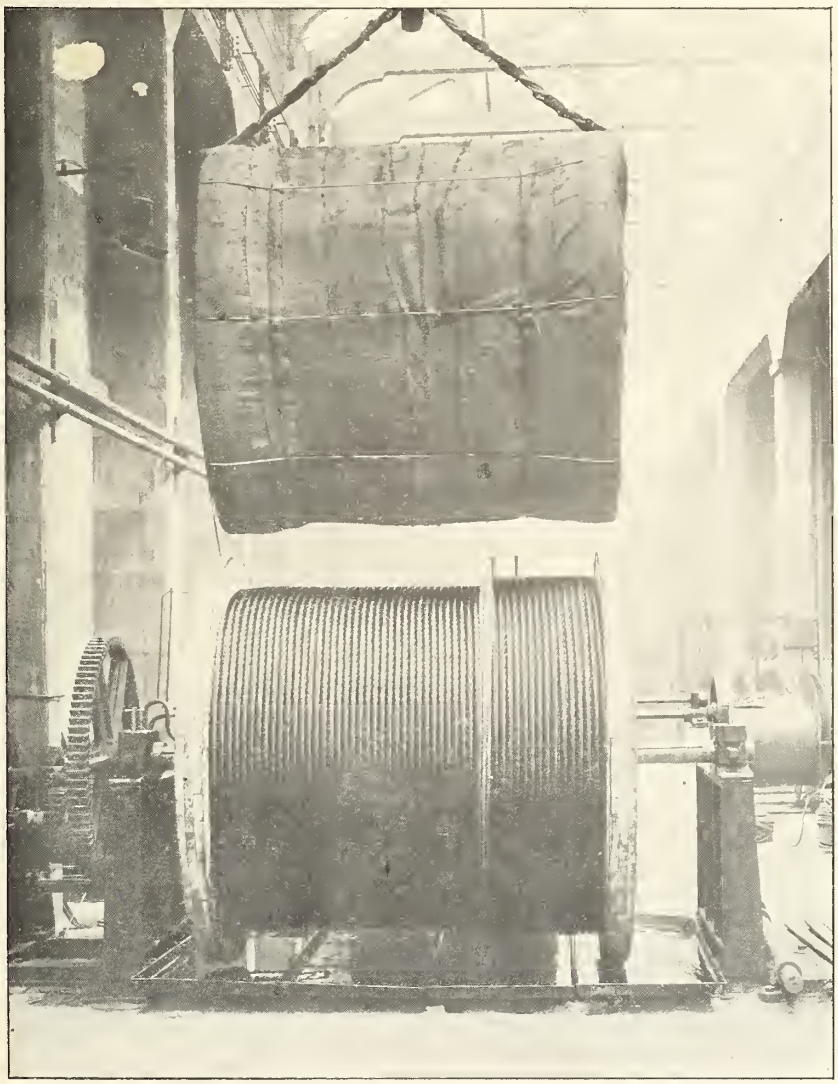

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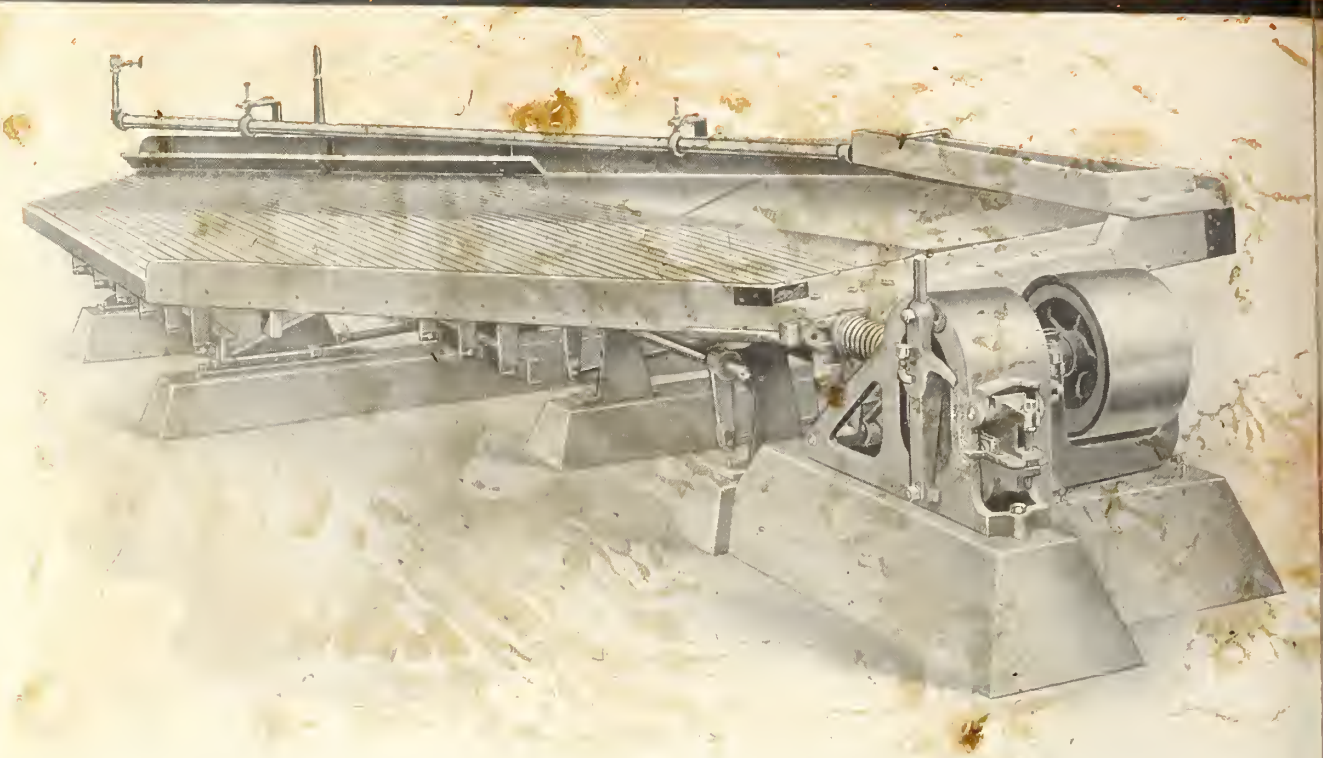

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32 TORONTO No. 2

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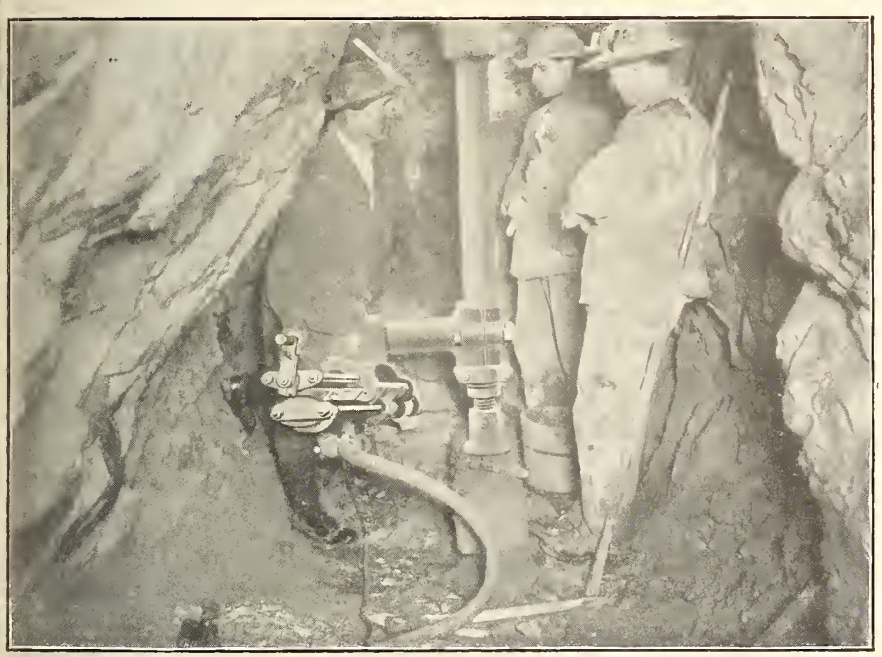

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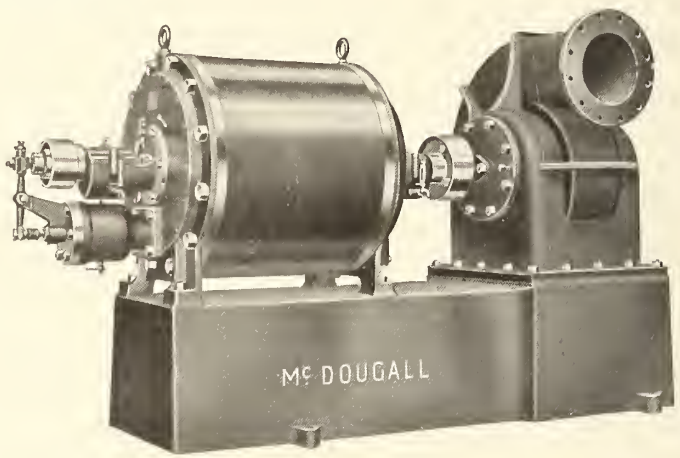

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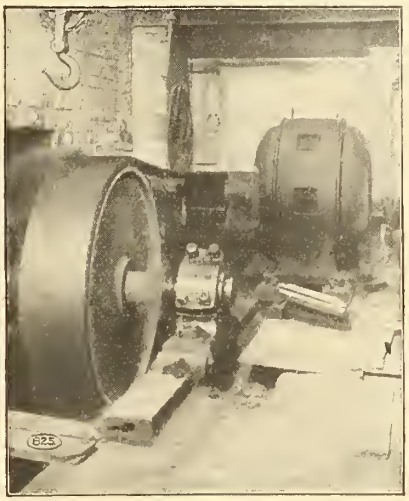

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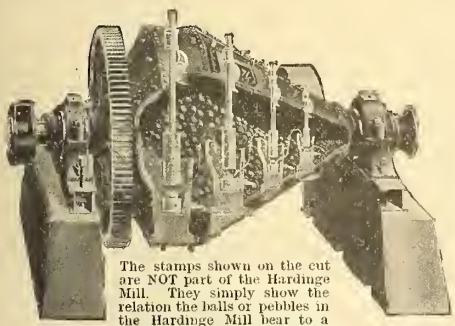

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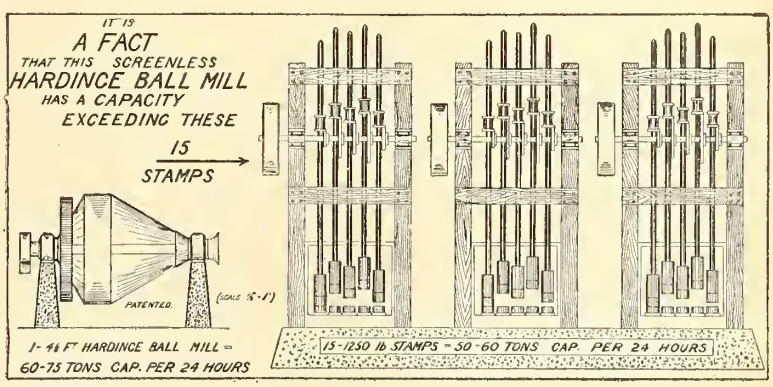

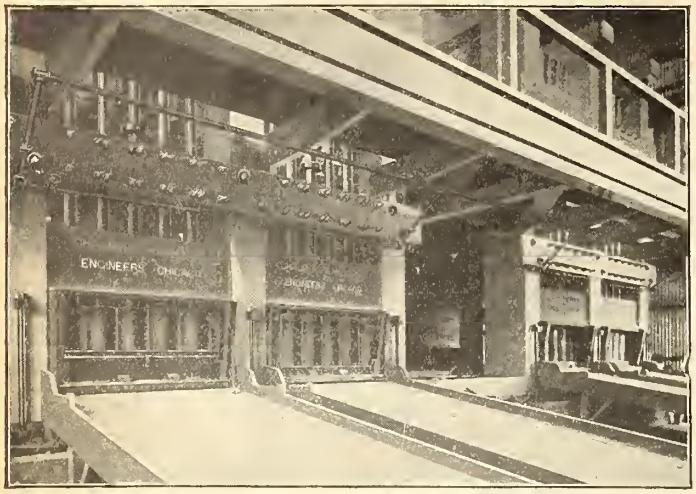

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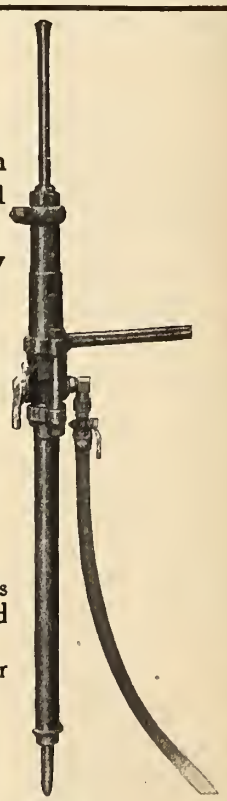
Write for new Bulletin 666-C



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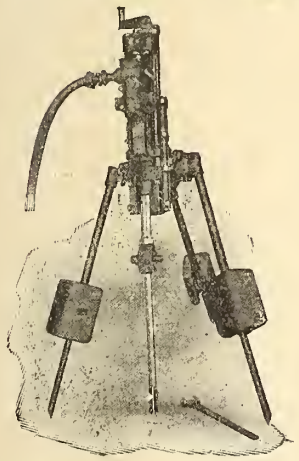

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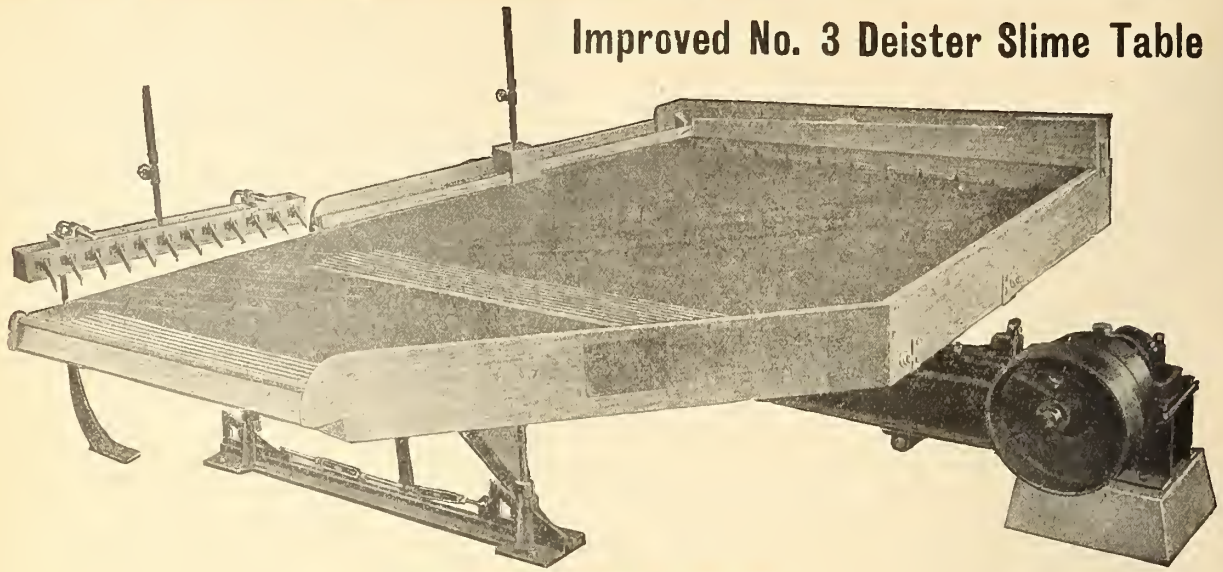

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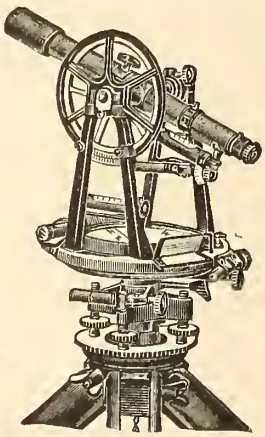

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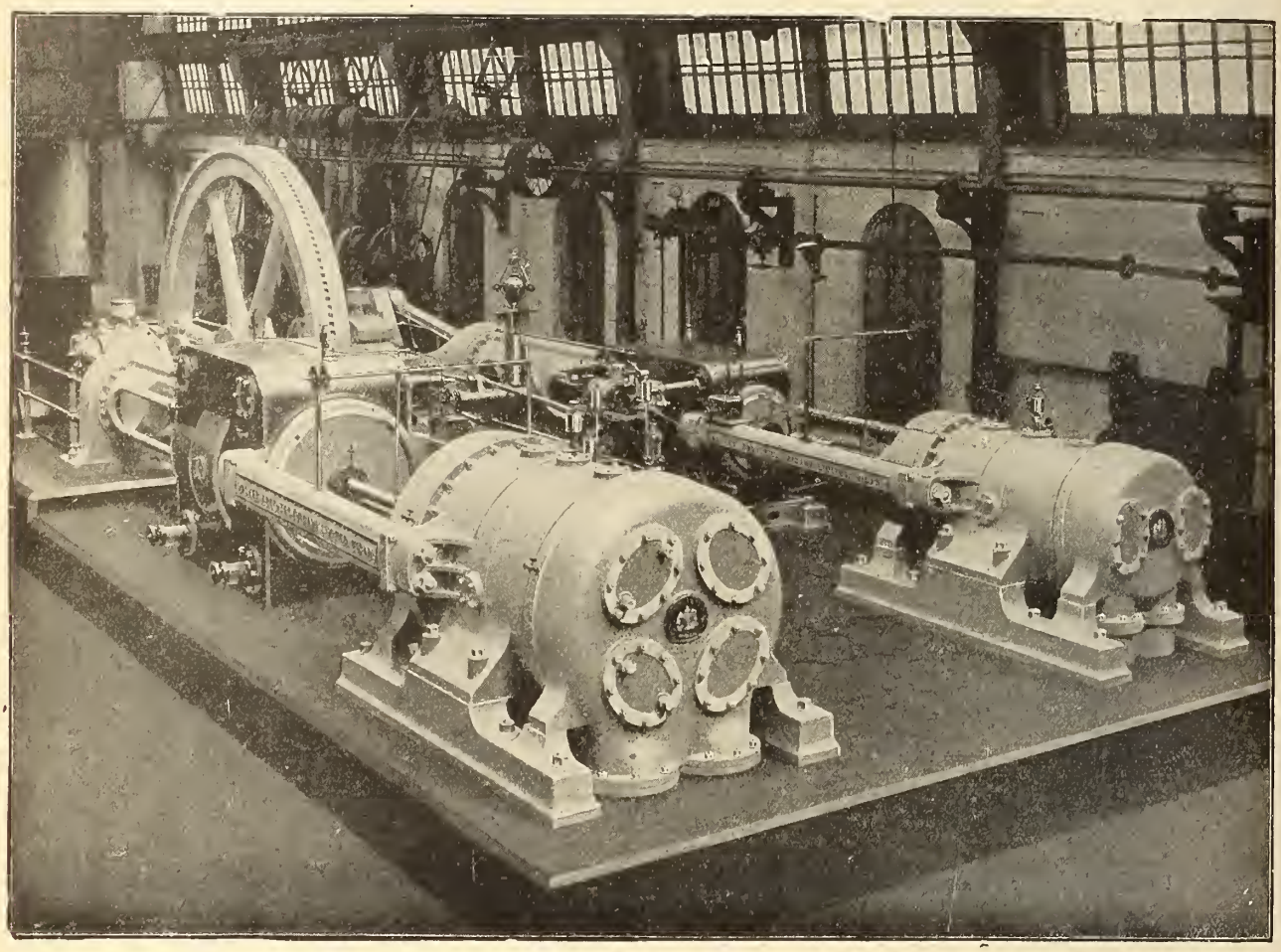

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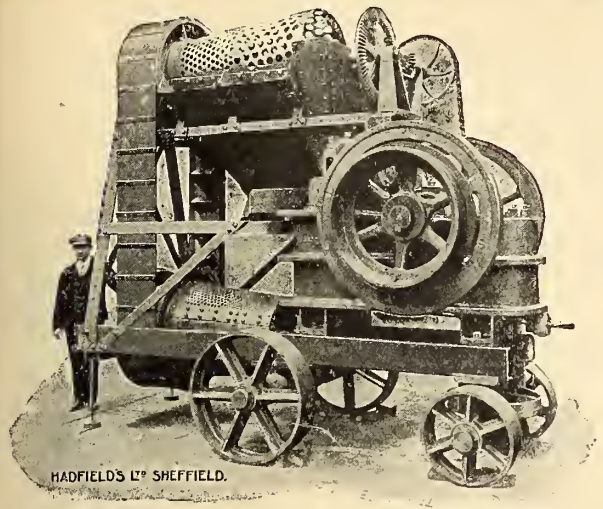

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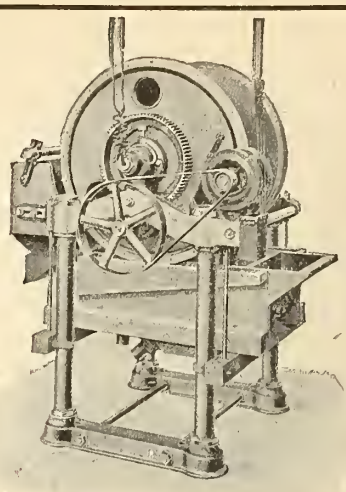

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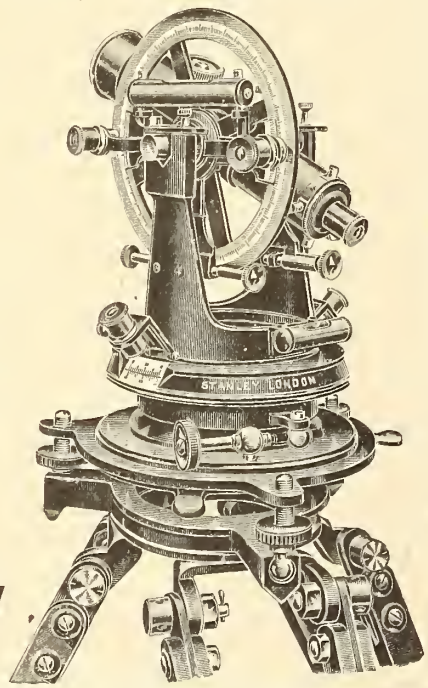

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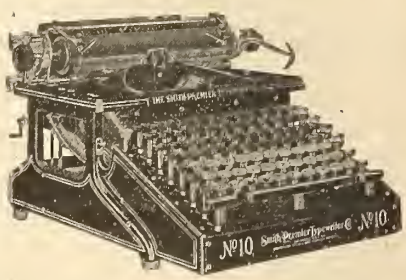

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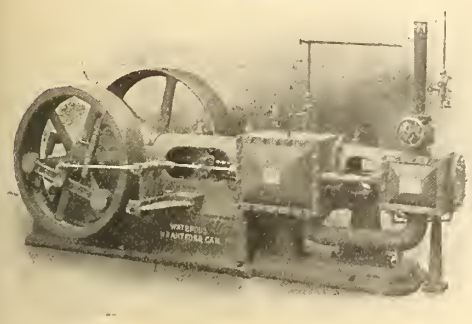

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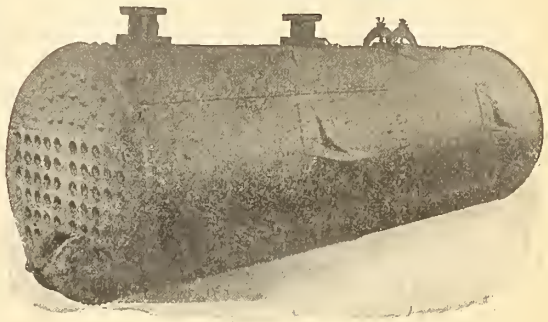

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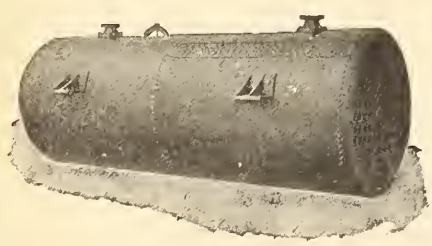

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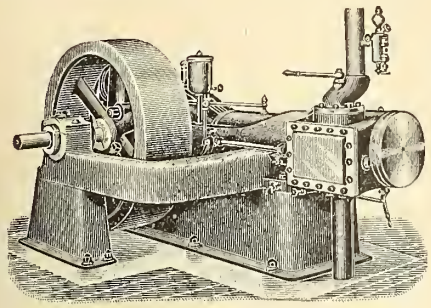

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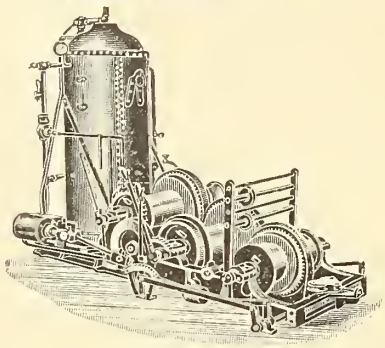

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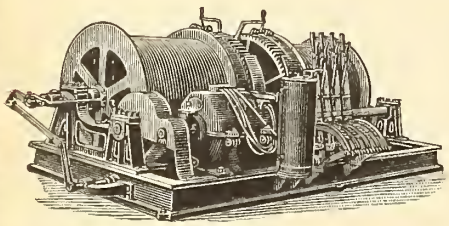

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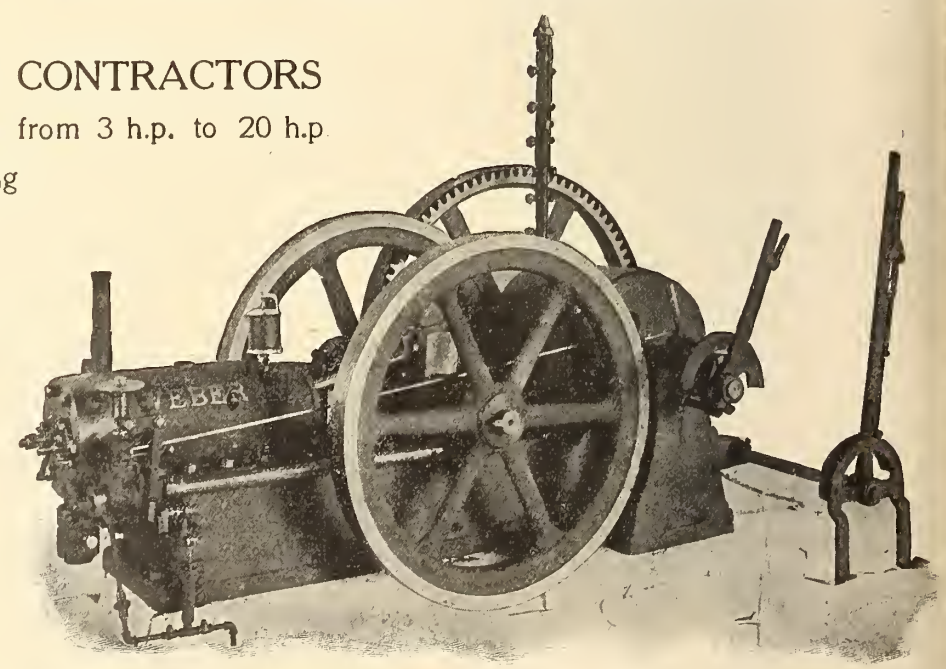

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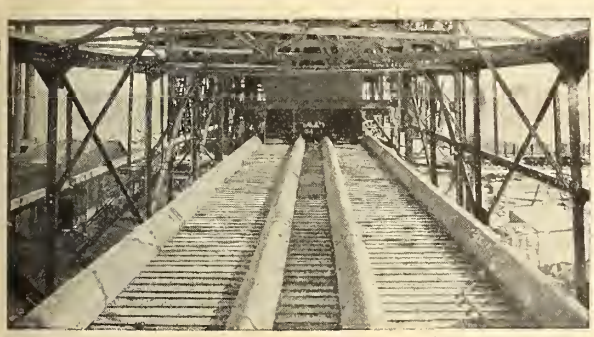

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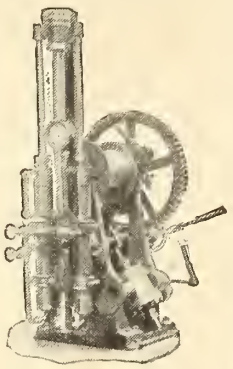

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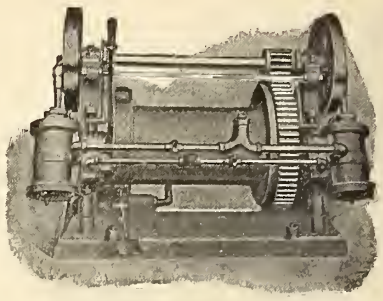

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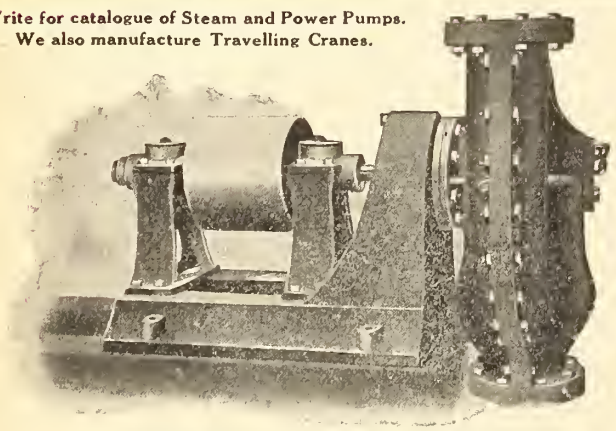

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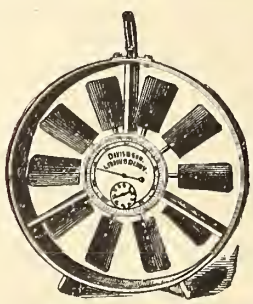

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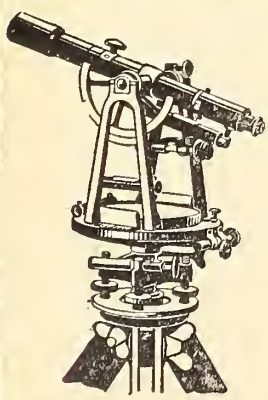

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MINE TIMBER.

The serious consideration of the fact that Canada's available supplies of mine timber are rapidly vanishing is forced upon us. The data collected by Messrs. MacMillan, Robertson, and Boyce for the Dominion Forestry Branch, represent the first attempt to define the present situation.

During the past year, mine timber to the value of $827,337 was used in Canada. 52,848,000 linear feet of round timber, valued at $523,339; and 22,305,000 board feet of sawn timber, valued at $303,908, made up the total. The average cost of the former was $9.90 per thousand linear feet, and of the latter $13.63 per thousand board feet.

Of the round timber, British Columbia used 55 per cent. The average cost per thousand linear feet was $7.01. Nearly all this was Douglas fir, 20,000,000 feet of which was of four to six inch diameter, used as lagging in coal mines. This accounts for the low average cost.

Nova Scotia used 30 per cent. of the round timber, or 15,653,000 feet, the average cost of which was $10.74 per thousand. Most of this timber was five inch spruce.

Alberta's consumption, 7,484,000 feet, consisted largely of lodge-pole pine, supplemented by spruce and small quantities of Douglas fir. The average cost was $17.75.

Ontario's mines are credited with only 549,000 linear feet, costing $26.83 per thousand. About one-half of this was five to seven inch spruce; while one-third was pine of small diameter.

Although twelve species of wood are reported, only two are used in important quantities. These are Douglas fir and spruce, used respectively in the coal mines of British Columbia and Nova Scotia.

As regards sawn timber, practically the same proportions hold as for round.

Timber used in mining has shorter life than when used overground. Underground conditions are conducive to decay. The danger of fire in coal mines is an added risk. Hemlock has a life of about five years in its natural condition. Spruce lasts only three years. When treated with creosote or zinc chloride the durability of all species is increased from 100 to 300 per cent. An added argument in favour of such treatment is the fact that inferior woods may be successfully used.

The use of preservatives has got far beyond the experimental stage. Particularly in the United States has the subject been investigated. Practical applications have been made of results obtained. Hence,

Canadian mine operators have merely to borrow from the experience of others.

It may or may not be practicable to create and enforce legislation on this subject. There is no question, however, as to the present duty of all large consumers of mine timber. Apart from other aspects, the fact that the use of preservatives makes for economy is sufficient cause for change in the present attitude of indifference.

THE ORIGIN OF PETROLEUMS.

That tireless champion of the theory of the inorganic origin of petroleum, Mr. Eugene Coste, contributes to the last bulletin of the Institution of Mining and Metallurgy, a vigorous attack upon the supporters of the organic theory.

After asserting that the advocates of the latter theory persistently start from wrong premises, and that they thus impede progress in the solution of an important problem, Mr. Coste proceeds to flay his opponents in characteristic fashion.

To show that a substantial body of thinkers have given their support to the inorganic theory, Mr. Coste quotes such names as Berthelot, Mendeleef, Moissan, Elie de Beaumont, Humboldt, and others of high repute. Hence, it is incorrect to argue that the inorganic theory is held by chemists only. Moreover, says Mr. Coste, the one fundamental fact that the only phenomenon analogous to the production of petroleum visible to-day is in some phases of volcanism. This is entirely overlooked by the advocates of the organic theory.

Abundant evidence has been furnished by scientists to show that associated with active volcanoes and with ancient volcanic rocks are large quantities of hydrocarbon gases. Massive crystalline rocks contain as much as 0.2 per cent. of carbon. This, Mr. Coste believes, establishes the fact that the source of all carbon was far removed from the organic realm.

The oil-bearing character of strata in "petroliferous provinces" does not depend in any way upon the presence of fossils, but does depend solely upon the fact that faulting and fissuring have provided ingress for petroleum emanations from the interior. In further support of this statement, Mr. Coste cites the facts that oil is obtained even in crystalline schists and gneisses, that productive sands range from the Archaean to the Quaternary, and that the oil everywhere presents the same characteristics.

On the other hand, although the "organics" admit that the process of petroleum production must be operative to-day, they also admit that there is no visible evidence of the fact. Mr. Coste, commenting upon this, asseverates that never in nature did a petroleum production process "coeval with the kingdoms of life" exist. That there is any genetic relation between coal and petroleum he categorically denies. That methane exists both in coal and in petroleum proves merely that methane can be formed in two ways. "Although "are surrounded . . . . . everywhere with "death, decay, and decomposition of countless org- "isms, animal and vegetable, no one has yet been a "to . . . establish one single case in which th "mixtures of hydrocarbons known as petrolcums "found through the natural processes of decaying "ganisms, while its constant and abundant product "in volcanic phenomena cannot be disputed a "longer."

On two major propositions Mr. Coste lays stro emphasis. Vegetable organic remains were alwa transformed into coal, and soft organic tissues w never entombed in sedimentary rocks.

Several quotations from adherents of the orga theory are given by Mr. Coste. These show a surpr ing lack of agreement. The assumption that time a temperature compensate each other in the natural d tillation of petroleum, is laughed at. Why, asks M Coste, are coal-beds left undistilled? To believe th the mere passage of time can make up for the abse of heat is as reasonable as to assert "that by leavin "turkey long enough in cold storage, it will cook "self to the most succulent point."

Point after point is scored by Mr. Coste. These cannot touch upon. Suffice it to indicate the sev positive statements on which he bases his positi These are:—

First, bituminous shales containing bitumens petroleums, as such, never constitute widely and u formly spread sheets, nor thick horizons; they found only as isolated patches of comparatively sm extent along faults, fissures, or joints or in brecciat zones of sandy shales, and the secondary nature their bitumen is as a rule plainly evident.

Second, so-called bituminous shales, forming enti horizons in sedimentary formations, are really not tuminous shales, but are black carbonaceous sha containing the carbon as coal.

Third, even very fossiliferous strata contained wh deposited only the remains of the calcareous or si cious parts of the organisms, from which no petroleu could possibly be produced.

Fourth, petroleums as a rule are not associated wi fossils, which are themselves almost always absolute devoid of petroleum of any kind.

Fifth, the association of petroleums with sedime tary strata is one of secondary replacement.

Sixth, not only shales, but almost all other strat constitute in the unaltered sedimentary formations the oil fields, saturated impervious beds; and this i perviousness precludes the supposition that oil, gas, a water could travel through the fine pores of the sed ments, which from the time of their deposition we already occupied by water.

Seventh, the mode of occurrence of petroleum d posits in the sedimentary strata of all ages, but i certain districts only, and the constant recurrence

drocarbons in volcanic and igneous rocks, in volcanic anations, in metallic and other veins, in meteorites, comets and other stellar bodies, clearly demonstrate at petroleums are not of organic origin; if they were. eir distribution could not possibly resemble the ac- al occurrences that are known.

Without doubt, Mr. Coste has given his opponents me hard nuts to crack. The chief bar to proper dis- ssion, however, is the fundamental divergence in e postulates of each party.

We shall make it a point to inform our readers of e answers that Mr. Coste's paper is sure to evoke.

HE NEW CHAIRMAN OF THE TRANSCONTIN-ENTAL.

The Premier's selection of Mr. R. W. Leonard to fill ie important post of Chairman of the National Trans- ntinental Railway Commission, will be viewed with rofound satisfaction by all those who know Mr. Leo- ard. Particularly will the appointment appeal to ining men.

Mr. Leonard is a native of Canada. Since graduat- ig from the Royal Military College about twenty- even years ago, his professional work has consisted railroad engineering and power-plant construction, nterspersed with a certain amount of actual mining ood fortune, a function oftentimes of initiative and ision, led him to take chances in Cobalt in the earliest lays of that camp's existence. Now, as the largest older of Coniagas shares, he is able to keep several acks of wolves from his door. In fact, the emolu- nents of office will be a negligible quantity. This is y no means a disadvantage.

Apart from his attainments as a civil engineer, Mr. eonard may fairly be looked upon as a member of the ining fraternity. In addition to holding high office n the Canadian Society of Civil Engineers, he is one f the four vice-presidents of the Canadian Mining In- stitute. This position is elective, and signifies the fact hat the members of the Institute have confidence in is judgment. Moreover, he is the only member of the Board of Governors of Toronto University who has mining affiliations. This honourable post he accepted about a year ago, to fill the vacancy created by the death of Dr. Goldwin Smith.

In all probability no more arduous and ungrateful task could be conceived than that of guiding the des- tinies of the National Transcontinental Railway Com- mission. Mr. Leonard possesses at least two of the qualities that are essential to such a position. He is endowed by nature and by experience with a certain decisiveness, and with a judicial temperament. Whe- ther these qualities in themselves are, or are not, suf- ficient to carry him successfully through the admin- istrative troubles that are brewing we cannot say. He is "fortiter in re"; much will depend upon his be- coming "suaviter in modo."

From the point of view of the industry that the CANADIAN MINING JOURNAL has the honour to repre- sent, it is necessary to impress upon our readers the need of co-ordinating mining and transportation. If, in the course of his tenure of office, Mr. Leonard suc- ceeds in inducing the Grand Trunk Pacific to regard mining as THE basic industry of the country, as the one that in season and out of season will yield constant freight supplies, he will have accomplished much.

STOCK VALUE AND MINE VALUE.

Under the above caption, Dr. A. C. Lane, formerly Michigan State Geologist, now professor of geology at Tufts College, contributes to this issue the first of a series of papers in which he discusses the various factors that cause fluctuations in the value of shares, particularly shares in mining companies.

Dr. Lane takes particular pains to accentuate the inherent difference between mining shares and others, and postulates as a necessary yield for mining invest- ments an annual return of from 7 to 10 per cent. apart from amortization or return of capital.

The five elements that fix prices are, according to Dr. Lane's analysis, return, stability, marketability, ac- tivity, and control. Each of these elements is dis- cussed fully.

In view of the storm of protest aroused by Mr. J. R. Finlay's appraisal of the Michigan copper mines, Dr. Lane's articles will be timely.

We especially request our readers to send in early comments.

WEST SHINING TREE.

A preliminary report on the West Shining Tree region will be found on another page. Of seven sam- ples taken by Mr. R. B. Stewart, one contained no gold, whilst the others ranged from 40 cents to $6 per ton. As these samples were taken from different properties, it is reasonable to believe that they are characteristic of the country generally. This is not encouraging.

The mischievous practice of lauding to the skies any possible gold-bearing region must be discounten- anced. West Shining Tree will suffer. Naturally, no brief inspection can furnish sufficient evidence thor- oughly to damn a large tract. But Mr. Thompson's report will certainly dampen the ardour of the hotel- prospector who has been shouting deliriously for some months about the superlative merits of West Shining Tree.

TUBE MILL PRACTICE.

Proofs are accumulating that the best results in the employment of tube mills are obtained when the pattery produced is very coarse. At the El Oro mine, for instance, one hundred stamps crushed 360,294 tons of ore in the year ending June 30th, 1911; whereas in the preceding year two hundred stamps crushed

only 285,181 tons. One tube mill is installed for each nine stamps. As illustrating the other extreme, it may be noted that at the mill of the East Rand Proprietary only fourteen tube mills are in commission for 820 stamps, or one mill for 58 stamps.

The El Oro practice not only gives greater capacity, but effects a considerable reduction in costs.

MORE ABOUT THE GIESECKE MILL.

Late reports have it that the Rand Mines Trials Committee, after a searching investigation of the Giesecke mill, has found that the high claims of efficiency cannot be substantiated. Neither in point of capacity nor in operating costs were the hopes of the inventor realized.

Much time and more trouble have thus been saved. Had the Giesecke been placed on the market before being investigated, no doubt many operators would have given it a trial. Now, however, very few customers will be found for a device that has been officially declared uneconomic.

A CORRECTION.

The retirement of Mr. Harold Kingsmill from the management of the Rea mine, Porcupine, gave rise to several damaging rumours as to the physical condition of that mine. We have been requested by Mr. Kingsmill to state plainly that his only reason for leaving was that he wished to accept a far more remunerative billet. Not the slightest unpleasantness had occurred.

Mr. Kingsmill requested us further to quote him as being responsible for the statement that the mine is in good condition and that no discouraging features have been encountered. The bringing in of a promising body of low grade ore has added to the possibilities of the mine.

We give these statements publicity for the reason that irresponsible story-tellers have attributed to Mr. Kingsmill assertions that reflected not only on the mine but also on Mr. Kingsmill's discretion as an engineer.

EDITORIAL NOTES.

The official estimate of the gold resources of Rand is two billion pounds sterling. With an ann output of £40,000,000, this gives a life of 50 years o the Rand proper.

That sanguine person, Col. L. R. Stuart-Weather accuses some person or persons unknown of hiding "discoveries" at Porcupine. The Colonel is so what original. In his breezy way he assures the p lic that he has nothing to sell. This may be ta in two senses.

Mr. T. A. Rickard's letter in this issue serves directly to press home the need of more publicity Nova Scotian gold mines. The report of a carefu chosen commission is needed and needed badly. Ma Montreal and Toronto investors would willingly ta a shot at Nova Scotia if they had authentic inform tion.

Yukon's gold output for the current year is uno cially estimated at $4,650,000. This is a gain of $40 000.

The parabolic curve described by Kerr Lake sha is unusually marked. On a share capital of $3,000,0 the mine has paid dividends amounting to $3,720,0 The par value of the shares is $5. The market pr of these shares has fluctuated between $11 (Janua 1910), and the present figure, $3. The manageme has never taken the public into its confidence. Th essentially narrow policy usually brings its own ward. Dividend rates reached a maximum of 42 p cent. in this present year of grace. Yet the sha decline.

Sir James Whitney is being maligned for lack initiative in devising means for opening up northe Ontario. The most practical retort that could be ma would be the construction of good roads where th are most needed. A good road to Gowganda wou be a fine starter. Farming follows mining. Mini cannot expand without transportation.

CORRESPONDENCE

GOLD MINING IN NOVA SCOTIA.

The Editor:—

Sir,—In your issue of September 15th you refer to the report made by me in 1905 for the Government of Nova Scotia, and you state that "the colour of the report is not known to the public." It may simplify matters and save controversy if I quote the last paragraph of the letter accompanying my official report, as it summarizes my views on the subject.

"The conclusion which I formed from the sifting of all the evidence obtained, is that there is a geologic similarity to Bendigo, as regards the gold-bearin quartz, for in both cases the miner has encounter 'saddle reefs' or anticlines of quartz; but there a differences so great between the two districts as destroy the economic value of the structural likenes The occurrence of ore capable of yielding a reasonab profit, say, a stoping-width of 6 or 8 dwt. per ton, is scanty in Nova Scotia as to render invidious the cor parison with Bendigo; and, as far as is known, there no justifiable expectation of such persistence of goo ore in depth within the northern goldfield as in th

the Antipodes. Gold mining on a large scale has rely proved profitable in Nova Scotia, and the likelihood of developing such enterprises has been decreased the events of recent years, because these have indicated the improbability of a repetition of ore-shoots the underlying quartz formations. By 'ore' I mean old-bearing quartz from which, under existing conditions, a profit can be won. On the other hand, it is y opinion that mining operations on a small scale, rried out by working miners, without the investment of large sums of money, either in equipment or xploration, but based upon local knowledge and skilful prospecting, are likely to prove remunerative. I not endorse the attempts made (chiefly by those ho spend large amounts of money lavishly, and too ften improvidently, in undertakings not founded on areful preliminary investigation) to belittle the local ndicates and parties of lessees who have found and orked most of the profitable mines of Nova Scotia, nd I advise that the policy of the Department be so aped as to encourage this form of domestic enterrise. It is upon such that the future of gold mining in ova Scotia must depend; as it has done, for the most art, in the past."

Surely any responsible person can see the report nd the covering letter by applying to the Minister for lines at Halifax.

T. A. Rickard.

London, October 5.

THUNDER BAY DISTRICT.

The Editor Canadian Mining Journal:

Sir,—I note in your editorial, in the issue of 15th ast., regarding the twentieth annual report of the ntario Bureau of Mines, that you say, "Mr. N. L. owen's description of the Thunder Bay silver district ill stir up interest in that historic mining country." And that you "quite concur in the belief that the istrict is worthy of attention."

I have not seen Mr. Bowen's article; but I am pleased o know that the Thunder Bay silver district has, at ast, begun to attract some attention. It was the misfortune of this district that it was discovered 25 ears too soon.

Speaking of the small group of mines lying to the outhwest of the city of Port Arthur, this section of he district first began to attract attention about 1885. Considering the amount of development and explorary work done, the results obtained were certainly uch as to warrant a more systematic and extensive levelopment than then obtained. This section of the listrict had about the year 1888 five shipping mines all roducing high grade silver ore.

All the silver produced in Ontario, in the late nineties came from this district. The writer from 1888 until 1890 had charge of one of these mines, which produced in this period upwards of $300,000 worth of silver. At least one other mine exceeded this production in the same period.

The transportation problem at this time was a serious one, as all supplies and ore had to be freighted by team from 25 to 40 miles.

The mines were all closed down about 1890, before the completion of the railway through the district, and they have been practically closed to the present time. Such efforts as have been made to revive the industry were made in a way to discredit rather than revive it.

This silver field is a large one. It is the belief of the writer, based on a wide knowledge and experience gained in the 21 years that have intervened since the closing of these mines, that there is a good chance for success.

Had the mines, and the whole district, been as thoroughly explored, and the mines operated as persistingly and in as up-to-date a manner as now prevails in Cobalt, the history of the district would be another story.

However, the deposits are still here, awaiting the prospector and investor.

Yours truly,

Herbert Shear.

October 20th, 1911, Port Arthur, Ont.

THE LAY MIND.

Editor Canadian Mining Journal:

Sir,—In the current issue you suggest that the "lay mind" does not recognize that profits come to those who enter the mining business. As a matter of information, it would be of great interest if you could let your readers know how far the individuals who put up money for the Centre Star group were rewarded. In the last annual report of the Canadian Mining & Smelting Company it is stated that the Centre Star group has produced minerals to the value of $21,488,745. The "lay mind" would greatly appreciate your statement as to how this value was distributed among those who took part in its production. The same question applies to the production of St. Eugene mine, which is given in the report as $10,394,520.

Yours faithfully,

G. C. Biggar.

Toronto, Ont., October 18th, 1911.

TIMBER USED IN MINING OPERATIONS

Compiled by H. R. MacMillan, M.F., assisted by Bruce Robertson and Guy Boyce.
Courtesy of Dominion Forestry Branch.

The statistics of the timber used in the mines of Canada in 1910 are based upon reports received from 136 coal and ore mines throughout the various provinces, as follows: British Columbia, 59; Ontario, 27; Alberta, 20; Nova Scotia, 15; Yukon Territory, 9; Saskatchewan, 4; Manitoba, 2. These represent practically all the mines using timber in any quantity. There are a large number of mines in Canada which do not use timber in their operations.

In the tables two main divisions have been made, viz.: round timbers, and sawn timbers. The round timbers are used underground to give artificial support for insecure roofs or walls and to protect shafts, drifts, and gangways. The sawn timber reported is mostly

lumber, together with a small quantity of square timber, and was used principally above ground for buildings, breakers, tipples, washers, and trestles. A small quantity was used underground for sets, stulls, and ventilator shafts.

Including round and sawn timbers, timber to the value of $827,337 was used in Canada during 1910 for mining purposes.

This total is made up of 52,848,000 linear feet of round timber, worth $523,339, and 22,305,000 board feet of sawn timber, which cost $303,998.

The various species of woods used by mining industries are chosen, not because of their superior technical qualities, but because of their cheapness, suitable size and accessibility. Thus, Douglas fir is the most-used mining timber because it grows in the province where most of the mining is done, and is easily obtained. When this is understood it is easily seen why the use of each species is confined to one province. British Columbia used all the Douglas fir; Nova Scotia used practically all the spruce, balsam, hemlock, birch, beech, and maple; Alberta used almost all the jack pine and poplar.

Round Timber.

Table 1 shows by provinces the quantity and value of the round timber used by mines in Canada during 1910.

An Albertan Fire—how too much good timber disappears

of this amount was four to six-inch Douglas fir, used by two of Canada's largest coal companies for lagging.

Nova Scotia, using 30 per cent. of the Canadian consumption, is second in importance; 15,653,000 linear feet were used at a cost of $168,142. The price this averages $10.74 per thousand linear feet, and is, after that current in British Columbia, the lowest price. Spruce five inches in diameter formed a great proportion of this province's consumption.

TABLE 1.

Round Mining Timber, 1910, by Provinces; Quantity, Value, Average Cost, and Per Cent. Distribution.

Province or District.	Quantity M linear ft.	Per cent. Distribution.	Value	Av. cost per M linear ft.
British Columbia	29,047	55.0	$203,597	$ 7.01
Nova Scotia	15,653	29.5	168,142	10.74
Alberta	7,484	14.1	132,900	17.75
Ontario	549	1.2	14,724	26.83
Saskatchewan	105	.2	3,597	34.25
Yukon	10	*	379	37.90
Canada	52,848	100.	$523,339	$ 9.90

*Less than one-tenth of one per cent.

The mines of Canada used, in 1910, 52,848,000 linear feet of round timber, which cost $523,339. This is an average cost of $9.90 per thousand.

British Columbia alone used 55 per cent. of this consumption, i.e., 29,047,000 linear feet, at an average cost of $7.01 per thousand. This is a lower price for round timber than in any other province, the smallness of price being due to the fact that nearly 20,000,000 feet

Norway Pine Typical of Nipissing District.

Alberta used 7,484,000 linear feet, or 14 per cent. of the total. This quantity cost an average of $17.75 per thousand. Over 70 per cent. of this was small lodge-pole pine. Spruce made up nearly 25 per cent. and the balance was mostly Douglas fir.

The foregoing three provinces, namely, British Columbia, Nova Scotia, and Alberta, contain all the important coal mines in Canada, and consume 98.6 per cent. of the timber used in mining. The remaining 1½ per cent. was used in Ontario for ore-mining, and in Saskatchewan and Yukon for small coal mines supplying local demands.

Ontario mines used 549,000 linear feet, at an average cost of $26.83 per thousand. Nearly one-half of this was spruce five to seven inches in diameter; one third was pine of small diameters. The remaining one sixth was tamarack and timber of unspecified species. The mines in Ontario use, so far, a very small amount of timber per mine as compared with the large mines of British Columbia. Most of the Ontario mines are small and shallow, and are excavated in the solid rock so that little timber is required for protection. Moreover, a great number of the mining companies incorporated in this province have not advanced sufficient far in their operations to require any timber.

Saskatchewan has a very small number of coal companies, only one of which sells to the public; 105,000 linear feet were used in this province, and cost, on

erage, $34.25 per thousand. The high price of this nber is due to transportation charges, either from e spruce and tamarack belt of northern Saskatchen or from the Rocky Mountains.

Ten thousand linear feet of spruce were used by the al and gold mining companies of the Yukon territory an average cost of $37.90 per thousand. This is all tive wood and the high cost of this amount is due expensive labour. The small quantity of timber ported from Yukon is explained by the small number deep mines. Mining operations do not extend far low the surface, and therefore there is no great nessity for timbering.

Table 2 shows by relative importance of species, the und timber used in Canada in 1910.

and British Columbia, and comprises 90 per cent. of the so-called "jack pine" listed.

Hemlock, which was the cheapest species of lumber produced in Canada in 1909, formed only 2.3 per cent. of the total consumption of mining timbers in 1910. Nova Scotia used all the hemlock, 1,172,000 feet, at an average cost of $13.39 per thousand. Very little hemlock grows in the mining districts of Canada.

The above five species (Douglas fir, spruce, jack pine, balsam, and hemlock), of which jack pine was the most expensive, were the important woods used by the mining industries, forming over 96 per cent. of the total quantity of the 12 species reported.

Tamarack or larch was used to the extent of 893,000 feet, and cost $15,029. This is an average cost of $16.72 per thousand linear feet, the highest price paid

TABLE 2

ound Mining Timber, 1910, by Species; Quantity, Value, Per Cent. Distribution and Average Cost per Thousand Linear Feet.

Species.	Quantity M linear ft.	Per cent. Distribution.	Value	Av. cost per M linear ft.
Douglas fir	28,268	53.8	$198,776	$ 7.03
Spruce	14,417	27.5	179,734	12.46
‡Jack pine	4,455	8.5	66,751	14.96
Balsam	2,170	4.1	21,215	9.78
Hemlock	1,172	2.3	15,691	13.39
Tamarack or Larch	893	1.7	15,029	16.72
Pine	720	1.4	10,234	14.21
Birch	326	.6	4,311	13.22
Poplar	54	.1	848	15.70
Cedar	23	†	1,107	48.13
Maple	1	†	11	11.00
Beech	1	†	11	11.00
*Total	52,848	100.	$523,339	$ 9.90

*The total includes a small amount of timber not identified by species.
‡Includes jack pine and lodgepole pine.
†Less than one-tenth of one per cent.

The mines of Canada reported the use of twelve ecies of wood in their mining operations.

Douglas fir alone was used to the extent of 53.8 r cent. of the total represented by the twelve species. ,268,000 linear feet of fir was used, which cost $198,-6. This is an average of $7.03 per thousand, which the smallest price paid for any species. Fir is a ry popular wood for mining purposes, particularly British Columbia, on account of its accessibility and rength.

Spruce stands second in importance and contributed er one-quarter of the total; 14,417,000 linear feet ere used at a cost of $179,734. This is an average cost $12.46 per thousand. The great quantity of spruce due to its occurrence in Nova Scotia, where it is sed by most of the coal mines. Although in amount early twice as much fir was used as spruce, in value r was worth only $19,042 more than spruce; this is ue to the difference of $5.37 per thousand feet in the st of spruce over that of fir.

Jack pine was the third important species; 4,455,000 et were used, at a cost of $66,751. This is an averge cost of $14.98 per thousand. The entire quantity f jack pine mining timber was used in Alberta. Two ecies of pine are included under jack pine. The ne is the true jack pine, (Pinus Banksiana), and the ther is lodge-pole pine (Pinus Murrayana). Lodgeole pine occurs extensively on the slopes of Alberta

Typical Jack Pine Country

for any mining timber except cedar. Over 700,000 feet of this was used in British Columbia; 158,000 feet was used in Alberta, and the remainder was about equally divided between Saskatchewan and Ontario. Larch is a splendid mining timber, but its use is limited by its scarcity.

Five-sevenths of all the pine used was consumed in British Columbia coal mines. Ontario ore mines used nearly all the balance. The pine used in British Columbia is yellow pine and western white pine. The total pine used was 720,000 feet, and cost $14.21 per thousand linear feet. Small quantities of red and white pine were used in Ontario.

Birch formed less than one per cent. of the total; 326,000 feet were used in all, costing $4,311. This is an average of $13.22 per thousand linear feet. All the birch mining timbers were used in Nova Scotia.

All the poplar used, 54,000 feet, at $15.70 per thousand, was used in Alberta. Poplar is cheap and accessible, but is not sufficiently durable for use in mines.

One thousand feet each of maple and beech were used in Nova Scotia at $11 per thousand.

There were also used 348,000 feet of timber, the kind of which was not specified. It came principally from the provinces of Ontario and Nova Scotia, and averaged in price $27.62 per thousand.

In table 3 is given the quantity, total cost, and average cost of the round mining timbers used in Canada, 1910, by diameter-classes and species.

There were used 1,835,000 linear feet over ten inches in diameter. This timber cost, on an average, $37.62 per thousand, and included the best quality of timber used in the mining industry. These large-sized timbers are used for heavy props and in gangways. For such purposes timbers are used up to three feet in diameter.

In comparing the prices of different species in the same class, consideration should be given to the fact that the diameter varies a great deal within each class.

Of the Douglas fir used in the mining industry, 411,000 linear feet was less than five inches in diameter and cost only $2.33 per thousand. The timber used under five inches diameter was practically all Douglas fir and was used by the large coal companies of British Columbia. Of timber varying from five to nine inches in diameter, 10,110,000 linear feet were used, which cost $12.92 per thousand feet. Fir also stands second in importance in the largest diameter class; 747,000 feet were used, which cost, on an average, $36.92 per thousand linear feet.

Spruce was used to the extent of 445,000 feet in the class under five inches in diameter. This species was used more in the five-to-nine-inch class than any other species, the amount being 13,116,000 feet. The 856,000 feet over ten inches in diameter was all used in Alberta. Spruce of the first diameter-class cost $8.35 per thousand, while fir of this size cost only $2.33 in British Columbia. This apparent inconsistency is due

TABLE 3.

Round Mining Timbers, 1910, by Diameter-Classes and Species: Total Quantity, Total Cost, and Average Cost.

Species	Class 1—Under 5 In.			Class 2—5 In. to 9 In.			Class 3—10 In. and Over.		
	Quantity M linear ft.	Value	Average Cost.	Quantity M linear ft.	Value.	Average Cost.	Quantity M linear ft.	Value	Average Cost.
Douglas fir	17,411	$40,583	$ 2.33	10,110	$130,617	$12.92	747	$27,576	$36.9
Spruce	445	3,716	8.35	13,116	148,807	11.32	856	27,211	31.8
Jack pine	1,156	6,132	5.30	3,216	55,497	17.25	83	5,122	61.(
Balsam	.....	.....	....	2,170	21,215	9.77	.....	.....	....
Hemlock	.....	.....	....	1,155	14,123	12.23	17	1,568	92.3
Tamarack or Larch	.....	.....	....	801	9,596	11.98	92	5,433	59.(
Pine	.....	.....	....	688	8,361	12.15	32	1,873	58.5
Birch	1	11	11.00	325	4,300	13.23	.....	.....	....
Poplar	.....	.....	....	54	848	15.70	.....	.....	....
Cedar	.....	.....	....	15	487	33.47	8	620	77.5
Maple	1	11	11.00	.....	.....	.....	.....	.....	....
Beech	1	11	11.00	.....	.....	.....	.....	.....	....
*Total	19,046	$50,765	$ 2.66	31,967	$403,171	$12.63	1,835	$69,403	$37.8

*Includes a small amount of timber not identified by species.

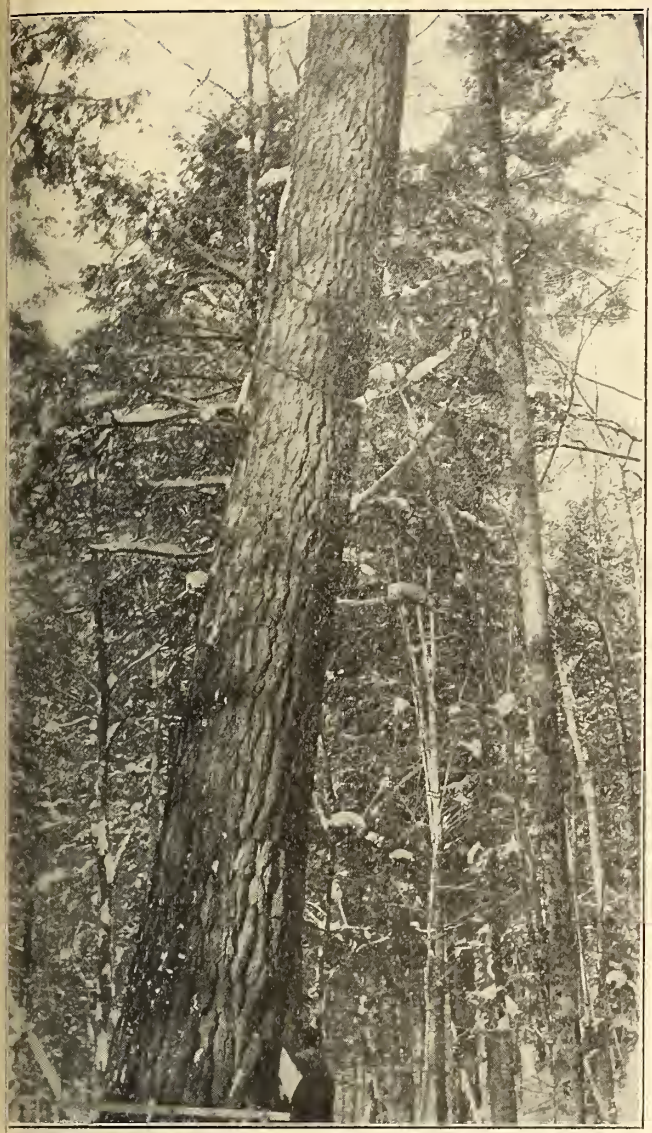
Of the 52,848,000 linear feet of round timber used in Canada during 1910, 31,967,000 feet were from 5 to 9 inches in diameter. Timber of this size cost, on an average, $12.63 per thousand, and was used for various purposes; 5 to 6 inch timber was used for caps 2 to 10 feet long, and for ties, 6 to 8 inch timber for long caps, and 12 to 16 foot booms, 5 to 9 inch material for props. In some mines, where the seam was narrow, four inch timber was used for props.

The class "under 5 inches in diameter" includes 19,046,000 feet, or over one-third of the total consumption. This cost on an average only $2.66 per thousand linear feet. It is used mainly for pinning and lagging. For pinning it is used in short lengths; for lagging it is used in lengths varying from eight to twelve feet.

to the fact that the spruce was used for props and the fir for lagging. The large spruce was all used in Alberta and cost $31.80 per thousand, less than the cost of big timbers in any other province.

Jack pine was important mainly in the second diameter class; 3,216,000 linear feet of this dimension were used in Alberta, costing $17.25 per thousand. To a small extent this species was also used in the third diameter class, and cost $61.60 per thousand. 1,156,000 feet of jack pine under five inches in diameter was used in Alberta, and cost $5.30 per thousand, making it next to Douglas fir in cheapness in this class.

The use of balsam was confined to the second diameter class and consisted of 2,170,000 linear feet at an average of $9.77 per thousand. Balsam appears as the cheapest species in this class, because it was



White Pine

Hemlock

e-inch timber used by a Nova Scotia company. It i a weaker and less durable wood than spruce or hem- k, and is worth less for mining purposes.

Hemlock was used only in two classes. In the sec- d diameter class 1,155,000 feet were used, costing 2.23 per thousand. In British Columbia 17,000 feet ed ranged from 10 to 36 inches in diameter. These l ge-sized timbers made the average cost $92.30 per t usand linear feet, the highest price paid for mine nbers.

Of tamarack or larch, 801,000 feet, five to nine inches i diameter, was used throughout the various pro- nces, and cost an average of $11.98 per thousand. l rch to the extent of 92,000 feet of 10 inches or more i diameter was used in British Columbia. It cost on e average $59.05 per thousand feet.

Pine, birch, and poplar were used in small quantity d practically all ranged from five to nine inches in ameter. The term "pine," as used in Table 3, in- ides western yellow pine, western white pine, red ne, and white pine; of this timber 96 per cent. be- nged to the first diameter class and four per cent. to e third diameter class.

In Alberta there were used 54,000 linear feet of plar five to six inches in diameter, which cost, on an erage, $15.70 per thousand.

Cedar was used only in British Columbia, and of the small cut of 23,000 feet used, two-thirds were in the medium class and one-third in the largest class. Cedar was used chiefly in the gold mines.

One thousand feet each of maple and beech were used in Nova Scotia; this was small-sized timber.

Less than one per cent. of the total amount of round mining timbers reported was of undetermined species; 317,000 feet were five to nine inches in diameter, and cost $29.90 per thousand. A very small amount, 31,000 feet, of ties were not specified, and cost $9.70 per thousand linear feet.

Sawn Timber.

Table 4 shows the quantity and value of sawn timber used in the mines of Canada during 1910, by provinces.

22,305,000 board feet of sawn timber were used, representing an expenditure of $303,998. This is an average of $13.63 per thousand. British Columbia used over 50 per cent. of this amount, of which the principal species was Douglas fir. The price of sawn lumber in British Columbia was only $12.28 per thousand, less than in any other province.

It is impossible to give correctly the species of sawn timber used in the various provinces, as the reports did not always state the species, but in most cases the

TABLE 4.

Sawn Mining Timber, 1910, by Provinces: Quantity, Value, Per Cent. Distribution, and Average Cost Per Thousand Ft. B.M

Province.	Quantity M Board ft.	Per cent. Distribution.	Value	Av. cost per M Board ft.
British Columbia	11,933	53.6	$146,510	$12.28
Alberta	5,569	25.1	77,114	13.85
Nova Scotia	3,282	14.8	45,281	13.80
Ontario	1,390	6.4	29,470	21.20
Yukon	105	*	5,025	47.85
Saskatchewan	26	*	598	23.00
Canada	22,305	100.	$303,998	$13.63

*Less than one-tenth of one per cent.

sawn timber would be the same species as the round timber.

Alberta used 25 per cent. of the total sawn timber, seven different species of wood being utilized.

Fifteen per cent. of the total consumption was used in Nova Scotia. Spruce was the principal species used in this province.

Ontario used about equal amounts of pine and spruce to make up the 1,390,000 board feet of sawn timber used in this province. Yukon and Saskatchewan used very small amounts. Yukon paid the highest average price for sawn timber, (namely, $47.85), most of which was spruce.

Table 5 shows by relative importance of species the amount and value of sawn timber used in Canadian mines during 1910.

Nova Scotia Spruce

Douglas fir was the most important species used f sawn timber, forming 56 per cent. of the total; 1 107,000 feet were used at an average cost of $10. per thousand, the smallest average price paid for sa mining timbers, exeept eedar. Spruce was used to t extent of 3,689,000 board feet, and formed over o fifth of the total consumption. Spruce was mueh mo expensive than fir, costing $18.33 per thousand. T two species just mentioned, namely, fir and spru alone formed over three-quarters of the total amou of the sawn timbers used. Tamaraek (lareh), pine, dar, jaek pine, hemlock, and birch were used in sm quantities and ranged in price from $9.90 per tho sand feet for eedar to $19.39 for pine; 48,000 feet oak were used, mostly by the metal mines of northe Ontario. The average cost of this timber was $89. per thousand feet; 436 feet of cypress at $110 p thousand was also used by one mine of this province.

Preservation.

The preservation of mine timbers by ehemical trea ment has not yet been adopted by the mining indu tries of Canada. In many loealities, however, the di tances required to transport mining timbers are b coming greater, poorer qualities of woods have to l used, and the annual cost of the upkeep of mine tim bering is becoming greater. In the United States muc has been done in the treatment of mine timbers, and has been proven that a treatment of creosote or zin chloride decreases the destruction due to decay, fi and insects. This increases the life of the timbers an decreases the annual cost of replacing mine timber Timber used in mines has, on the average, a shorte life than wood used for any other purpose. The su roundings in a mine are very conducive to rot, whic after a period of three to five years, eauses the timbe to break, crumble and become useless. Experiment have been conducted in United States mines with a ro of untreated and treated mine props alternatel placed. In one instance, after 18 months, every un treated stick was weakened by decay and broke while the treated props were sound and useful. Fro various practical experiments of this kind with di ferent species of wood, important results have been ob tained.

Douglas fir has an average of five years' life whe untreated. Treated, it lasts twelve years. Hemloek lasting as a natural wood five years, doubles its ter of life when treated, as does tamarack. Spruee is on of the species which decays quickest when untreated lasting only three years. If treated, it will last twelv years, thereby increasing its life 300 per eent. To sum up, wood preservation not only prolongs the life o

Table 5.

Sawn Mining Timber, 1910, by Species: Quantity, Value, Per Cent. Distribution and Average Cost per Thousand Ft., B.M.

Species.	Quantity M Board ft.	Per cent. Distribution.	Value	Av. cost per M Board ft.
Douglas fir	10,107	56.7	$104,151	$10.25
Spruce	3,689	20.8	57,622	18.33
Tamarack or Larch	1,540	8.6	21,586	14.01
Pine	743	4.2	14,385	19.39
Cedar	614	3.5	6,070	9.90
Jack pine	539	3.0	8,121	15.09
Hemlock	361	2.0	5,055	14.00
Birch	148	.9	1,821	12.30
Oak	48	.2	4,285	89.25
Balsam	12	.1	420	35.00
Maple	4	‡	102	24.28
Beech	3	‡	71	20.28
Poplar	3	‡	95	27.14
Cypress	4	‡	48	110.09
Total	22,305	100.	$303,998	$13.63

*Includes a small amount of timber not identified by species.
‡Less than one-tenth of one per cent.

rable timbers, thus decreasing their annual consumption, but also permits the substitution of inferior species, whose use considerably reduces the drain upon the more desirable kinds.

Stock Value and Mine Value

Written for the Canadian Mining Journal by Alfred C. Lane.*

My object, or perhaps it would be fairer to say my nclusion, for I did not know the hole at which I ould come out when I started this investigation, is to ow that the value of a share of stock as given in the ictuations in the various stock exchanges is by no eans wholly that of the property which the stock presents. Thus it is not fair in assessing that prorty for purposes of taxation to suppose that it as the value that might be shown by measuring the ice of the shares of stock by the number of shares stock based on it. It has often been attempted to alue mining property for taxation in just this way, ut I think it can be clearly shown that such an efort would be very unjust as compared with adjacent roperty from which no shares have been issued.

Again, I may give some idea of what rate of return ay fairly be expected in mining investments. It is ot fair to expect a person who obtains a return which uncertain in amount and time to be satisfied with the ame return that he can obtain regularly and with no oss of principal or interest. A little study of mining tock values such as I propose to undertake will, I hink, show this, and we shall see that where a man is atisfied with 4 per cent. if the security is perfect and he returns regular, and he can at any time obtain is money to put into other forms of investment, he vill naturally and properly expect more, say about per cent., if he can not get his money back when e wants it; and if his money is to be tied up for an ndefinite time he will on the average expect about 0 per cent. I think it may also be said fairly that nining property should yield something like 7 per cent. to 10 per cent., even not allowing for extraordinary risks, but only for those that are inherent in the fluctuating prices of labour, supplies, and the metal produced. This, of course, has its bearing on questions of capitalization. I derive these conclusions by a study of past values and prices.

Five Elements in Fixing Price: Return, Stability, Marketability, Activity, Control.

One can not with much hope of success take a great mass of price fluctuations purely at random. If but two factors were involved it might be done by arranging the prices in order with regard to the variation of one factor and seeing how the other varied. But in fixing the price of a stock (which represents a share in a property) a number of factors play a part. While these can never be wholly separated, in some cases one is so much more important than another that it can largely be isolated. Then, by allowing for its effect we can little by little isolate the others. I tried to separate five factors in fixing price—five elements of value.

First, return, annually or regularly, in the shape of dividends or income.

Second, stability, respectively the remote increment or decrement of the principal. While this is not theoretically separable from the other, when the dividend or annual income is irregular, it is particularly important for us to consider it separately, as it and the values found are to be handled in a very different fashion.

Third, marketability, that is, the readiness with which a security may be sold for the money paid for it.

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Fourth, activity, that is the range of fluctuations in price.

Fifth, control, or the value of the voting privileges attached to the stock.

(1) Return, the first element, is the fairly regular net return yielded by way of interest or dividend. The word "net" is added to remind us that if one security is subject, or liable to be subject, to taxation, the amount of tax or a part thereof proportional to the risk of the tax being collected must be deducted. This first factor of return is almost the only element of value to be considered by trustees of estates in considering securities of unquestioned value, and is by far the most important element of value in good bonds and mortgages.

Their value, however, is also affected by their marketability. To get this value as pure as possible, cases should be taken where the question of ready marketability did not come in. An ideal case, perhaps, would be a first-rate mortgage on property worth very much more than its value in the hands of a man of ample means known locally to be prompt and able to pay all obligations. This might be perfectly secure to any one knowing the facts but might not be readily marketable because of the investigation needed to convince a purchaser of these facts. In such cases as English consols, fluctuations in price and hence in interest take place which depend in part at least upon the prospect in the near future of a greater or less demand for consols and the possibility of buying the same at a less price or selling them at a higher.

(2) This suggests the second factor. The second factor, stability, is taken to cover the prospect of permanence or of increase or decrease in the value of the principal. This is the main element of value involved in speculation in any improved city lots and must be a large element in fixing the price of any stocks which do not pay dividends.

(3) The third element of value is that of ready marketability. The enlarged market means a higher price. If a certain class of securities is made a legal investment for savings banks or trustees, it at once increases their value. The capacity to turn the investment promptly into money so as to take advantage of some opportunity to reinvest or to pay debts as they come in, is worth something. Insurance companies and many other corporations must carry a certain proportion of their capital in securities of this class. This value is illustrated and to some extent measured by the difference in interest which will be paid for call money and for time loans. The man who lends money on call at a lower rate of interest than he could get for a time loan does so because he values the privilege of being able to get it back again at any time he sees a chance to make an especially good investment. If the rate for call money is about 2½ per cent. and for time loans about 3¼ per cent., an addition to value of a stock of 30 per cent. or more would be a comparable amount.

(4) A fourth element is the value of a stock as a medium of exchange or as an implement of organized speculation. Not only are stocks recognized to be desirable because they have a ready market, but to some people activity, that is to say, a continued play of values up and down, is an attractive feature. Though a ready market is made very largely by the activity of a stock as a means of speculation and the marketability and activity values are interwoven, yet the fundamental idea behind them is not the same and the fundamental motive is very different. In the one case the value is enhanced by the power to get mon back at short notice without fluctuation. On the oth hand. the value as the medium for speculation is e hanced by the very fact that a stock does fluctuate.

In the proposed consolidation of the Calumet a Hecla and many of the smaller Michigan copper m ing companies, much of the complaint of the broke and holders of the small companies was not at t value set upon their stocks as measured by any pr ent or definitely ascertained prospective returns, b at the fact that they would be obliged to change active for an inactive stock with a loss of speculati possibilities. I shall later show how a definite, n merical statement of this loss (?) can be given. I the activity value, then, is meant a value depende upon the hope to make a profit by change in t value of stock without regard to whether this chan is up or down.

It is hardly conceivable that this value should exi without some other element of value. It exists in i simplest condition in a poker chip and may well called the poker chip value; and while it does not o dinarily exist apart from the value of the stock other ways, yet one can to some degree isolate it as factor in price or value.

(5) The fifth element of value may inhere in t voting privileges that a stock carries, and may reside i a particular certificate of stock or a particular nun ber of shares of stock. It may not vary with t value of the property as a whole, but rather with t control of the whole property that it gives. We I to go out of the field to which I propose to confi myself, the famous struggle for the control of t Union Pacific or the quoted value of the Equitabl Life Insurance Company paying but 7 per cent., bu carrying the control of that company, might be cite Another illustration is that Alexander Agassiz wa offered $1,000 a share for his interest in the Calume and Hecla carrying with it the control of the property Upon his reply that whatever was offered him mus be made to every other stockholder, the matter wa dropped.* One can compute in such a case, roughl speaking, the value of this control factor. The sellin price of a small quantity of Calumet and Hecla withi a year before and after was between $600 and $800, an as will be seen, $600 was not so far from the value o the property on other grounds, so that the additiona control value was something like $300 to $400.

Now, while this last element becomes conspicuou in such illustrations as those cited, it remains to b seen if it exists at all times to a greater or less degree and can be traced in the fluctuation of a stock. It i one of the elements that make it hard to assess a pro perty fairly on stock market basis or to tax the own ers of such stock on the basis of single sales. There never was a time when all the stockholders of the Calumet and Hecla Mining Company could get $1,000 for their stock nor will any one compute any such value as 100,000 x $1,000 for that mine.

Now I plan to find the value of organized specula tion by finding first the yield from securities which have not such a ready market as organized specula tion affords and then compare the yield from listed se curities as similar as possible. The reduction in yield will measure that part of the value which is due to

*Editor's Note:—The action of Mr. James Ross in stipulating that all shareholders of the Dominion Coal Co. should be paid at the same rate as was offered for his shares furnishes a parallel Canadian instance.

marketability, or due to activity or to conditions other than the return either regularly or by appreciation at the end of a period of years.

I find that some people object to the idea that a stock exchange can be valuable by reducing income yield; but it seems to me clear that the activity of stock exchanges and organized speculation can not increase the income yield in any fashion. If they can make the stock with a given yield otherwise more desirable—if listing adds to the value of the stock—they will raise the price and thereby reduce the yield of the stock. It does not, however, follow that it will reduce the yield to the holder. The man who must have a certain sum of money at short notice, if he has no place where he can readily market his securities, might have to keep them in an old stocking and get no return, or in a savings bank and get 3 per cent. Thus the yield on the security in relation to its price or value may be reduced and yet the income to the purchaser may be better than he could otherwise get, since the security would not be otherwise available to him.

Investigation Confined to Michigan Securities.

In order to get rid of the effects of the different laws I shall confine this study mainly to Michigan securities with a particular view to the listed Michigan copper stocks. I am more familiar with them, and, moreover, Michigan laws enable one to obtain important facts not to be obtained elsewhere. Also, the age of the mines and the records of price are sufficiently long to enable one to study average fluctuations in a way in which it can be done for mining stocks in no other districts. Compared with the railroads, the elements of financial and political entanglements are reduced to a minimum. Finally, the recently proposed consolidation of a number of companies has made public in the papers many facts which are of help in our inquiry.

There is one element that I have found difficult to treat satisfactorily. That is the question of unenforced taxation laws upon the yield that stockholders can be fairly supposed to get. Were all stockholders residents of Michigan, that would be eliminated, since property is taxed only once; but the Michigan copper stocks are largely held in Boston and other places where there is a pretence of double taxation. For instance, a stockholder having a residence in Michigan can not be taxed on his copper stock, but if he should move to Massachusetts he would theoretically be taxed at a rate which around Boston would vary between 1 per cent. and 2½ per cent., or about a quarter of his income. This, however, is generally not collected from business men; but to some extent is collected from widows and orphans and their trustees. Consequently on the death of an owner of these stocks and the passing of the stocks into the hands of trustees it becomes at once of less income-bearing value. If thrown on the market by the trustees the value of the stock itself may be affected. If volume of "Lake buying" or Michigan buying is sufficient to determine the range of prices. this factor need not be considered, and it is a platitude of economics that a very small amount of buying added or subtracted may control the prices. Judging from newspaper comments "Lake buying" has a distinct effect upon Boston stock exchange prices. It will be noted that very considerable mines like the Calumet and Arizona are controlled in this district. One can then compare the prices of copper mines and other securities open to the Michigan investor.

The same principle, namely, that the price is affected by the subtraction of even a small group who can find a more profitable investment open to them elsewhere, also applies in comparing these stocks with trust fund investments. If the same people did not purchase either there would be no possible connection in price. But some people do have investments in both classes of securities, so that a large disparity in prices between the two would tend to change their investments, and, even though the vast bulk of purchasers belong to different classes, the appreciable number who hold in common may be sufficient to produce a connection in price. The Michigan law compels a filing of lists of stockholders and the larger have been published in the papers. It is possible, therefore, to be sure that there are some common holders of the various stocks which are to be compared.

I propose to place in the body of the paper just enough figures to make clear the point of the argument, leaving to a series of notes (something like the old-fashioned excursus, which always used to delight me) details of figures and qualifications and answers to possible objections.

Return from Stable, Non-Marketable Stock 6.3 Per Cent.

The first question to which we shall address ourselves is to find the part of the value of a stock which is due merely to its income-producing power. In Michigan we get this as nearly pure as possible in mortgages, or in shares of building and loan association stock which are but the average result of such mortgages. The Northern Michigan Building and Loan Association, of Hancock, in the copper country, has been maturing shares which have yielded from 6 per cent. to 7 per cent. For instance, shares at $1 a month and 50 cents initiation fee mature at $102.50 in eleven years, making a compound interest rate of 6.3 per cent., or a paid up share of $80.50 yields $4 a year. This is close to the common "legal" rate of interest of 6 per cent. It will, of course, vary from community to community and from time to time, but during the past twenty years the national bank in Houghton, which is the principal banking town of the copper country, has been making time loans at 7 per cent. I assume, then, that a security yielding 6.3 per cent. a year and absolutely secure, or a group of securities which on the average will not depreciate or increase in value, should be worth $100. Any lower rate of yield would mean an increased value due to some other cause, and a higher yield would mean a decrease of value due to insecurity or irregularity of yield or some other cause.

Return from Stable, Marketable Shares 4.2 Per Cent.

Let us next look at equally secure stocks, which have the added advantage of marketability, to see how much lower rate of interest they yield. We find them best represented in such guaranteed Michigan railroad stocks as the Fort Wayne and Jackson, the Detroit, Hillsdale, and South Western; the Grand River Valley, and the Jackson, Lansing and Saginaw — guaranteed stocks of the New York Central system. Though the rate of interest varies from 3.5 per cent. to 5.5 per cent., the price was (December, 1910) so adjusted that the income return varied only from 4.07 to 4.34. They had fallen two to five points in a year, but never vary widely. In July, 1911, the yield had dropped to 4.03, as money was then very cheap in New York. The yield upon such stocks (4.2 per cent) may be taken as that which could be obtained from an investment

which is absolutely certain, in which no question of taxes could arise and which is readily marketable. The savings banks of the copper country also had been paying 4 per cent. on savings banks deposits. Theoretically those savings banks deposits are subject to taxation at a rate of nearly 3 per cent., which would leave a net yield to the owner of 1 per cent. I need not comment upon this. The law is obviously a farce.

Increase of Value 50 Per Cent. Due to Organized Speculation.

It follows that if 4.2 per cent. is the yield of stock combining marketability and security and 6 per cent. to 7 per cent. (say 6.3 per cent.), if the security is not so marketable, there is 52 per cent. difference in rate of income. This is due to an increase of 52 per cent. in the value of the listed stocks over what they would sell for were they on the same basis as the building and loan.

I presume some may challenge so large an increase of value as that, but there can be little difference of opinion as to the normal interest return of about 4 per cent. on a perfectly safe guaranteed marketable stock, and I could produce plenty of evidence of a return from 6 per cent. to 7 per cent. in Michigan on as safe securities not so readily marketable. Moreover, this is often the ratio of difference between "call" money and "time" money, which differ in just the same way.

Return from Unlisted, Unstable Securities 10 Per Cent.

The next question is that of the stability factor, the appreciation and depreciation of principal and its combination with other factors. It is to be expected that, on the whole, one would want and, on the average, receive rather more return for such investments than on a mortgage, where one must wait an uncertain time before getting his reward. I shall again measure the stability factor by its effect on the return. A difficulty arises in that individual transactions do not mean much since they are so much affected by individual circumstances that they throw little light on the question as to whether a man prefers one dollar or one chance in one thousand to have one hundred dollars — whether a bird in the hand is worth two in the bush or more or less, or whether in average speculative real estate investments the net average return is the same as on a mortgage and to the average American the fact that he has to take a chance is no disadvantage if only he stands to win as much as he stands to lose.

Land appreciation—St. Mary's Canal Mineral Land Company.—Can one, then, find any clue to the speculative value of land in Houghton county, that is, the income to be derived from its appreciation? I think one may obtain a rough idea from the profits of the old St. Mary's Canal Mineral Land Company — a corporation that existed from 1863 to 1900 and held large tracts of land sprinkled all over the Keweenaw Copper Range, having, when reorganized in 1901, something over 104,000 acres of land. There were only 20,000 shares, and it was always very closely held and (up to the last few years) was not listed and not readily marketable at a forced sale. Between 1863 and 1900 it paid in cash some $111 per share beside certain shares in stock, which seem to have been enough to raise the total value to $135 per share. This makes an average return of $2.74 a share per annum for the 57 years, and during the years 1891 to 1896 it sold at from $27.75 to $35 per share. This was on a basis of about 10 per cent. return.

At the end of this period very valuable mines we developed on an adjacent property belonging to th Copper Range Company, and the company was reo ganized and adopted the policy of holding rather tha distributing many of the shares issued for land. was also listed but we can see what the results woul have been if it had continued its previous policy fro its annual reports.

It seems, therefore, likely that speculative inves ments in mineral lands may net an average interes of 10 per cent., for though it must be remembered tha the lands of the St. Mary's Company were shrewdl picked in early days and that to some extent perhap the lands sold may be the cream—on the map the appear scattered almost at random. Other facts, how ever, in the sale of tax titles and individual purchase are known to us which suggest that the speculativ value of random mineral copper lands represented b unlisted companies is not far from $25 an acre, a which price it may be expected to yield 10 per cent.

This simply shows that in a field of unlisted invest ments where quick returns are out of the question, un certainty is not more attractive than certainty, and o the average, business men do not buy and hold minera lands on speculation unless they can average to get a good deal more than bank discount or mortgage loa interest for it—a not surprising conclusion. A curious fact is that the ratio which appears to be as 10 per cent to 6.3 per cent. is not so very far from the traditiona ratio of the bird in the hand to the bird in the bush.

Probable Return from Good Unlisted Copper Mines About 10 Per Cent.

To find the value or interest return of a copper min apart from its marketability is not easy, since none o the Michigan copper mines seems to be worked except by corporations which, if they have amounted to any thing, have rarely ever had their shares listed.

It might be expected that the returns would be some thing like those of the Mineral Land Company since the very same men were interested, and that men would not put their money into copper mining with the uncertainties due to accidents like fires and caving and fluctuation in the price of copper, to say nothing of the uncertainties of the deposit itself, unless they could get as much as they get in mineral land speculation and more than bank discount or mortgage interest.

This inference is confirmed by the estimates of engineers. In the collection of articles by various engineers published as the 'Economics of Mining" (page 225) we find Robert Stevenson referring to gold mines as follows: "Having found all these, the extra capital should be subtracted from the gross profit, and the balance capitalized, so as to yield 10 per cent. per annum during the time necessary for exhaustion, and at the same time redeem the principal." He also cites Mr. Curle to the same effect. Other pertinent remarks will be found in this book, especially on page 79 where the theory is criticized that a mine should have 60 per cent. of its market value represented by net profit on ore and must yield 10 per cent. on the investment price.

From the form of the tables and the examples used by Hoskold's "Engineering and Valuing Assistant," it seems that at least in England in coal mine leases, etc., which are rarely public propositions, it has been customary to allow 10 per cent. to 20 per cent. interest beside a fund to replace the capital at a much lower rate of interest up to 4 per cent. These lower rates obviously represent the absolute security rate of interest, and the fact that his Table X runs up to 20

per cent. suggests that mining interest up to that figure is a practical proposition. This appears also from the examples and the tone of various comments in the text.

Hoskold stoutly maintains that one rate of interest should be assumed on the money and another and lower rate of compound interest on that part of the return which is laid aside to replace the principal. This would, indeed, be true in case there were an actual sinking fund, that is, amortization fund, built up and invested at savings bank rates to replace the capital at the end of the life of the mine. But if one is going to discuss what rate of interest is received in mine investments it seems better to discount payments, actually received or expected, by that rate of compound interest which may fairly be expected on mining investments in general.

Hoover, however, in his "Principles of Mining" (page 43) says that the mining business is "one where 7 per cent. above provision for capital return is an absolute minimum return of capital."

In view of the fact that most mines are listed this is not inconsistent with the other statements. It seems pretty clear that a return of over 7 per cent. and probably at least 10 per cent. (to which must be added something in case the rate of production is such as to exhaust the mine within a period when its exhaustion is of importance) is expected and received.

With regard to exhaustion being of importance if one assumes such a relatively high rate of interest on money as 10 per cent., then the present worth of a dollar to be paid after 35 years is but three cents. Consequently if one assumes that money invested in mining is going to earn such high rates of interest the importance of final replacement of capital becomes relatively small as soon as the mine has a generation lifetime.

(To be Continued.)

PERSONAL AND GENERAL.

Mr. R. W. Leonard was in Toronto on his way to Cobalt on October 23rd.

Dr. J. A. L. Henderson, of London, England, who is developing the oil and gas fields near Moncton, N.B., was in Toronto on October 24th.

Mr. James McEvoy spent several months this summer on Groundhog Mountain, near Hazelton, opening up coal measures for a Toronto syndicate. He will probably spend the winter in Toronto.

Mr. J. T. Stirling, of Edmonton, Alberta, provincial inspector of mines, recently visited the Crow's Nest Pass Coal Company's colliery at Coal Creek, near Fernie, B.C.

Mr. Francis Aspinall, formerly engaged in coal mining in the Crow's Nest Pass district of British Columbia, has been appointed inspector of mines in the Crow's Nest district of Alberta, with headquarters at Macleod.

Mr. E. Jacobs, of Victoria, B.C., has been visiting coal mines situated along the Crow's Nest Railway, from Fernie, B.C., to Lethbridge, Alberta, obtaining information for a series of descriptive articles on the mines visited.

Mr. Robert H. Morris, late superintendent for the Mexican Coal and Coke Company, is now superintendent for the Jasper Park Collieries, Limited, which is opening coal mines at Pochahontas, Alberta, distant 205 miles west of Edmonton, along the line of the Grand Trunk Pacific Railway. The G.T.P. is now taking coal from one of this company's mines.

Mr. Lewis Stockett, of Hosmer, Crow's Nest Pass district, B.C., chairman of the Western Coal Operators' Association, was in Lethbridge, Alberta, on October 13th and 14th, in connection with a renewal of negotiations with the officers of District No. 18, United Mine Workers of America, relative to a resumption of work by the coal mine employees, who have been on strike since April 1st, last.

Mr. A. J. McNab, who for the last three years has been superintendent of the Consolidated Mining and Smelting Company of Canada, Limited's, lead and copper smelting works at Trail, B.C., recently resigned that position to join the metallurgical staff of the Mason Valley Mines Company, with smelting works in Nevada. Mr. Jules Labarthe, formerly manager of the Trail smelting works, is now general manager for the Mason Valley Company.

Mr. W. W. Leach, of the Geological Survey of Canada, having completed the season's field work in the Blairmore-Frank district, Alberta, where he has been investigating the geology of the country, is about to return to Ottawa. Mr. G. S. Malloch has been continuing this year the work in the Skeena district upon which Mr. Leach was engaged several years until his illness last winter.

Mr. Chas. Fergie, of Montreal, Que., was in the Lethbridge and Pincher Creek districts, Alberta, about the middle of October, visiting several coal mines being developed and equipped under his direction. Mr. Fergie acts in an advisory capacity for the Lethbridge Collieries, Limited, with colliery at Kipp, near Lethbridge; the Western Coal and Coke Company, Limited, which is opening a coal mine at Beaver Creek, about 14 miles southwest of Pincher, on the C. P. R. Company's Crow's Nest Railway; the St. Albert Collieries, Limited; and the Pacific Pass Coalfields, Limited, developing coal property situated along the line of the Grand Trunk Pacific Railway, about 160 miles west of Edmonton.

ENGINEER'S REPORT ON ST. ANTHONY MINE.

[Editor's Note.—The following interim report by J. C. Houston is of interest as supplementing the description reproduced elsewhere in these columns.]

Dear Sirs,—As per your request, I beg to herewith hand you a supplementary report on the present physical condition and the possibilities as indicated by the last few months' work on the St. Anthony property.

On the main vein to the south we have driven for a distance of 160 feet past the old No. 3 shaft (on the 100-foot level), or to directly under the edge of Couture Lake. It was not thought advisable to drive under the lake at this level, as there would not be enough ore available above the level to warrant the work. At the point where work was discontinued the vein is about 30 feet wide, with three separate bodies of 8 feet, 5 feet, and 3 feet in width, respectively. For the full 160 feet, which we drove on the first or easterly body, it is the full width of the drive and in places more than that, and of $12 to $15 in value.

We are at present breaking out a stope to the south of No. 3 shaft, and have to take 10 to 12 feet in places to get all the ore. Sampling through the mill shows this to be from $12 to $14 ore.

Further north, beyond the north end of the open cut, on the 100-foot level, we have cut into a lens of ore, in the west wall of the drive, which had been over-

looked by the former operators. We are driving back south on this, and find that it is paralleling the small vein on which the old operators drove through on. It is about 6 to 8 feet wide, of $14 ore. We have crosscut into it in the wall of the open cut about 20 feet above the level, and find it 10 feet wide, of excellent ore, which will probably carry through to the surface or near there. This fills in the gap which my first sampling showed very low grade, the main vein having been left in the wall. I think it will be found that the main vein will carry a good width of good mill ore all the way to the main shaft, and probably 300 feet beyond to the north. This vein at the furthest point south on the 100-foot level, where work was suspended, is larger and stronger than at any other point opened, and should continue for several hundred feet further under Couture Lake. This can be opened up on the second and succeeding levels.

cut it, on the 100-foot level from the main shaft.

Between it and the main vein there is a small vei which we have partly stripped. It is about three fe wide, and shows some free gold. This is probably th outcrop of the vein that we started the No. 2 winze o at the 100-foot level. Both these veins give grea promise of a large tonnage of good mill ore. The su face assays, showing from $3 to $30 per ton, and th underground samples on the small vein even bette

The really important development of the summe was the discovery of the new No. 4 vein, which wa uncovered about 180 feet to the west of, and paralle ing, the main vein on the south end. We have not ha time to strip it nor has there been a shot put in it ye It shows rich pannings in the surface dirt at any poin along the outcrop, it being not uncommon to get a much as $3 worth of gold in a single pan. We ar driving a crosscut from the main vein at the 100-fo

The No. 2 winze was put down 60 feet, and a crosscut started to get under the main shaft. This crosscut is in about 35 feet and has about 15 feet more to go. As soon as the station at this level is cut and the shaft raised through to the first level a crosscut will be run west to intersect the main vein, which dips in that direction.

To the north of the main shaft, on the first level, some stoping has been done, but as ore still keeps showing on the east or footwall side, notwithstanding that the stope is 20 feet wide in places, it was thought better to crosscut into this wall to see how wide the ore body really is before starting to timber. This ore on sampling through the mill, runs from $16 to $18. This work, as well as a lot of other exploration work that has been planned, will have to wait until we have the power necessary to carry it through.

The big No. 2 vein to the east has not had any work done on it yet. We still have about 25 or 30 feet further to go in the crosscut, which we are driving to level at the south end to cut this vein. It is in now about 80 feet and has about 90 feet more to go. Small stringers were encountered at different points in this crosscut, some showing visible gold, and all giving good assay values.

The close proximity of all these veins (all being within a width of 400 feet), with the main vein in the centre, makes an ideal proposition for cheap and quick development.

The location of the property, lying, as it does, between Sturgeon and Couture Lakes, and within nine miles of the main line of the G.T.P., gives it natural advantages possessed by no other property in Ontario.

The mill sampling bears out the statements made in my former report, that we have large quantities of $10 to $15 ore, enough to keep a mill at work for many years.

Awaiting your further commands, I remain,

Yours very truly,

(Sgd.) J. C. HOUSTON.

The Vipond Mine of the Porcupine Gold Mines Co.

Written for the CANADIAN MINING JOURNAL by H. P. DAVIS.

The Porcupine Gold Mines Company was organized under the laws of Delaware in March, 1910, and at the date of organization took over the North and South Vipond properties, two mining claims in Mountjoy Township, and, through the ownership of the Ridgeley Porcupine Mines Company, acquired a three-fourths interest in the Atchison-McDougal claims. Since the organization the Porcupine Gold Mines Co. has purchased the Airth claims, and has taken a working option on the South Thompson property. The company at the present time owns or controls the following properties:

North Vipond, s.e. quarter or south half Lot 10, Con. 11, Tisdale ..... 40 acres
South Vipond, n.e. quarter of N. Lot 10, Con. 1, Tisdale ..... 40 acres
Airth, n.w. quarter of north half, Lot 9, Con. 1, Tisdale ..... 40 acres
South Thompson, n.w. quarter of north half, Lot 10, Con. 1, Tisdale ..... 40 acres
(Held under option agreement.)
Three-fourths interest in Atchison-McDougal group of six claims in Lot 5, Con. 11, Tisdale ..... 240 acres
Mining Claim No. 15443, Mountjoy Township 40 acres
Mining Claim No. 15444, Mountjoy Township 40 acres

Total ..... 480 acres

The Vipond Group.

This group includes the North and South Vipond, the Airth, and the South Thompson, 4 claims of 40 acres each, making a compact block of 160 acres, located southeast of the properties of the Hollinger Mines. The geological formation is of the Keewatin series. The claims referred to lie in the amygdaloidal basalts immediately south of the contact of the quartz porphyry of the Pearl Lake area.

The intrusion of the quartz porphyry has resulted in a very extensive fissuring in this area. The general course of the fissuring is northeast and southwest. The veins in this immediate vicinity show great resistance in strike, and are generally well defined with continuous ore shoots, and evenly distributed gold values.

In April, 1910, the Porcupine Gold Mines Company started development work on the Vipond claims, and by surface trenching and stripping exposed numerous quartz veins. Underground development work has been confined to veins Nos. 2 and 3. These veins have a general trend of northeast and southwest, and are approximately 100 feet apart.

Vein No. 2, which has been uncovered on the surface

Outcrop No. 3 Vein

for 600 feet, shows a varying width of from 4 to 6 feet of quartz, mineralized schist, and ferro-dolomite. The outcrop of this vein was sampled in June, 1910 Channel samples show an average value of approximately $30 to the ton. These results have been repeatedly checked and verified by independent engineers.

On No. 3 vein sampling of the outcrop shows that the quartz for an average width of 12 inches assays $83.45 to the ton. At various points along the vein assays have shown values of from $8 to $16 for a width of 8 feet. In these samples the richer ore shoot was not included.

A working shaft has been sunk to the 100-foot level midway between veins Nos. 2 and 3, and at this level a crosscut driven from the shaft to vein No. 2 and drifts driven on No. 2 vein, for a total distance of 320 feet.

The ore from these drifts for an average width of 42 inches assayed $23.10 to the ton. These results were

Test Pit No. 2 Vein

confirmed and checked by the operations of a one-stamp Nissen mill.

No. 2 vein has been proven on the surface for 600 feet, and at the 100-foot level for 320 feet.

At a point 120 feet west of the shaft a crosscut has been driven from No. 2 vein 110 feet to vein No. 3. The crosscut reached the vein just before the Porcupine fire destroyed the surface plant of the company. Where

ncountered, the No. 3 vein shows 15 feet of ore which verages, after careful and repeated sampling, $11.20 o the ton.

The south wall has not yet been reached, and as the drill holes for the last round of shots fired showed quartz nd sulphides, additional width is assured.

The working shaft has been sunk to a depth of 200 feet, at the 200-foot level a station has been cut. When the timbering is completed, crosscuts will be driven north to the No. 2 vein, and south to the No. 3 vein. Drifts will be run both east and west on each of these veins.

Plant.

At a meeting of the directors of the company, held in New York, on Tuesday, October 3rd, it was announced that $125,000 had been provided for treasury purposes, and that orders had been placed for a mill with the capacity of 100 tons per day. In addition to the new mill, a complete mining plant, including a 10-drill compressor, boilers, a 30 horse power hoist, and drills, is being installed.

It is expected that the mill will be in operation by February 15th. The small test mill destroyed by fire, which operated under difficulties owing to the lack of sufficient motive power, earned sufficient money to carry on development work on the property. The new mill will be operated by electric power furnished by the Porcupine Power Company.

The plant and mill have been so designed that the capacity can be increased as warranted by mine development.

The development work at the 100-foot level has already blocked out a considerable tonnage of high grade milling ore in the No. 2 vein. As the limits of the ore shoot have not yet been reached, further development will naturally increase the reserves above this level.

The crosscut in the No. 3 vein at the 100-foot level has indicated a large tonnage of pay ore.

On the completion of the compressor plant in December, the development work will be carried on at the rate of 500 feet a month both on the 100 and 200-foot levels. Crosscuts will have been run from the station at the 200-foot level to the No. 2 and No. 3 veins, and drifting will be started both east and west on both veins. Development work, including upraises and a small amount of stoping, will amply supply the mill.

The main shaft will be continued to the 300-foot level.

For the present, development work will be confined to the known ore bodies, and every effort will be made to increase the ore reserves.

IMPORTANT COAL MINING DEVELOPMENTS.

Although production of coal from the Crow's Nest Pass Coal Company's mines in southeast Kootenay has not yet been practicable during the last six months, owing to the miners and other employees having been on strike, the management has not been idle, for attention has been directed to the examination of the surface of parts of the company's property where the general manager, Mr. W. R. Wilson, thought it likely there would be found seams of coal not previously worked, or where some of those already known might be opened to greater advantage. As a result, the development of several practically new seams is in progress, with promise of them, in due course, becoming productive of coal of excellent grade and in considerable quantity. Some of these are at Coal Creek colliery and others at Carbonade, on Morrison Creek.

On the south side of Coal Creek four such seams are being opened. All of these are above No. 2, which has long been known as the best seam from which coal has been mined at that colliery. These are severally known as No. 1, A, B, and C seams. Their respective heights above No. 2 seam, the entry to which is at tipple level, are as follows; No. 1, 80 feet; A, 200 feet; B, 340 feet; and C, about 500 feet. The coal opened in A, B, and C seams is of excellent coking quality, a full average working section having shown on analysis but 6 to 7 per cent. ash, while picked samples gave only 3 per cent. The C seam was found 11 years ago, when Mr. Wilson was formerly in charge of the property, but had not since been developed. A plan for the systematic opening of this seam is now being outlined. The coal in both C and A seams, so far as indicated by the work done on them to date, is quite equal in quality to that of No. 2 seam, already mentioned as having proved to be the best in the Coal Creek mines. A double-track, endless-rope tramway is being constructed from the level of the colliery tipple up past No. 1 to B seam. This will have a total length of 1,900 feet, and will serve for opening three of the new seams.

On the north side of Coal Creek, prospect tunnels are being driven for the purpose of also developing there A, B, and C seams, all lying above No. 1, which last seam has been extensively worked on that, though not on the other, side of the creek.

At Carbonade, on the south side of Morrissey Creek valley, the work done during recent months has been chiefly with the object of further proving a change in the structure of the coal found to have occurred where this development was commenced; also of prospecting three seams not previously worked in this part of the property. The outlook for this colliery is now regarded as more favourable than for some time past, for there appears to be good reason for hope that it will hereafter be practicable to ship from the Carbonade mines a considerable quantity of coal of good marketable quality. Only a few men are employed here at the present time, but it is expected that when labour conditions shall again be normal in the district, quite a number will be engaged in mining and shipping coal.

CONDITION OF TURTLE MOUNTAIN, ALBERTA.

The commission appointed by the Dominion Government to examine Turtle Mountain, near Frank, Alberta, and to report whether there appears danger of another slide taking place, thereby endangering life and property, has completed its examination of the parts of the mountain reported to be unsafe, and the several members have returned east.

The commission consisted of Mr. Geo. S. Rice, of Pittsburg, Pennsylvania, one of the senior officers of the United States Bureau of Mines; Dr. R. A. Daly, of the Boston School of Technology, formerly one of the geologists of the Geological Survey of Canada; and Dr. Willet G. Miller, provincial geologist for Ontario. Mr. John T. Stirling, of Edmonton, Alberta, provincial inspector of mines, was also at Frank while the mountain was being examined.

Of course, no information as to the conclusions of the commission has yet been given out, for necessarily these will be included in the report to be made to the Canadian Government, Ottawa. All that is known in

the district is that the members of the commission made a careful examination of the mountain and of such parts of the Canadian Coal Consolidated Company's mine workings as may possibly have in some degree led to a movement of the rock structure above. Whether or not the theory that was several years ago advanced, that the operation of this company's coal mine caused the big slide from Turtle Mountain that occurred in 1903, has been in any way supported by later developments, may be expected to be one of the points upon which the members of the commission will express opinion. The question of whether or not the continued operation of this coal mine, or any part of it in the mountain below the peak (that some fear may fall on the town of Frank), may be regarded as being attended by risk of a repetition of the disaster of 1903, is one of much moment, both to the company owning and operating the mine, and to owners of property and residents in that part of the town likely to be affected should a second large slide take place.

The purport of the report of the commission, and the decision of the Dominion Government after the consideration of the recommendations that shall be made by the commissioners, is being awaited with much interest, and in some cases with anxiety, by those immediately concerned, so it is hoped there will not be any unnecessary delay in disposing of this matter, which is unique in the history of both coal mining and geological phenomena in Canada.

WEST SHINING TREE REPORT.

Chemistry and Mining Building,
Toronto, October 5th, 1911.

T. W. Gibson, Esq.,
Bureau of Mines.

Dear Sir:—

Prof. Miller requested me, on my return from the West Shining Tree district, to submit to you a preliminary report on the area.

The region visited includes the townships of Asquith, MacMurchy, Churchill, and Fawcett. West Shining Tree Lake, near which gold was discovered first, lies in the townships of Asquith and Churchill, and is 70 miles north of Sudbury, 60 miles south of Porcupine, and 20 miles west of Gowganda.

The territory was reached by C. N. R. from Sudbury to Gowganda Junction on Blue Lake, and by canoe the rest of the way, through Blue, Oshawong, Shoo-Fly, Meteor and Opickinimika Lakes and the Opickinimika River. The route leaves the latter river about the centre of the west boundary of Asquith, passing through two small lakes into West Shining Tree Lake.

The country around West Shining Tree Lake is one of low relief. While level and with no prominent elevations, it cannot be called swampy, as the general level is well above the water of the numerous small lakes that occur in the region. The area for the most part is not heavily drift covered but, owing to the level nature of the ground, the rocks are not exposed extensively excepting the part of the country that has been burned over. The forest growth is chiefly spruce, jack pine, balsam, birch, and small cedar.

The geology of the area is rather complex. Numerous samples of rock were brought down but have not yet been examined carefully. The rocks, where the claims are located, are of Keewatin age. They consist of greenstone, altered diabase, and schist. Associated with these are porphyry, rhyolite, and a rusty weathering rock which, I believe, corresponded to the ferrodolomites of the Porcupine district. Very fresh looking diabase was found in several places, and may prove to be post-Huronian. The schists, as a rule, have a strike several degrees north of east, and are nearly vertical but tipped slightly to the north. An area of Laurentian granite lies to the south. Outcrops of the granite were observed along the Montreal River across the Township of Fawcett and on the first small lake south of West Shining Tree Lake in the Township of Asquith. Occasional outcrops of granite were observed along the route into the district as far south as the north end of Meteor Lake.

The discoveries, for the most part, are located on zones of weathered schist containing veins and stringers of quartz that generally conform to the strike and dip of the schist. As to their extent but little can be said, as very little stripping had been done at the time of my visit. The quartz widens in places to several feet, but does not carry this width far till it breaks up into stringers or disappears. On one claim where some work had been done one of these zones had been traced for 8 or 9 chains. The quartz is usually white and contains considerable rust, but on three properties a bluish quartz was found. In some places the quartz and schist contains considerable iron pyrites. Small amounts of galena were observed in two places.

While the most of the quartz veins and stringers have a strike conforming to the general strike of the schist, that is, a few degrees north of east, it was noticed on three properties that the strike of the quartz outcrops was in a northwesterly direction. These suggested that a second system of veins occur in the district.

The following properties were visited:

A. Gosselins' (2195-96), east of West Shining Tree Lake.
S. Jepson's (2277), east of West Shining Tree Lake.
T. Thompson's (2312,2310), east of West Shining Tree Lake.
Moore & McDonald's (2275-76), east of West Shining Tree Lake.
R. Cryderman's, near 2312.
P. McGuire's, south of West Shining Tree Lake.
M. Caswell's (2393), northeast corner of Fawcett.
Jefferson's (2504), southwest corner of MacMurchy.
T. Seville's (2535-36), southwest corner MacMurchy.
McIntyre's, southeast of (2504).
S. Jepson's (2538), southwest corner MacMurchy.
Caswell's (2532, 2542), southwest corner MacMurchy.
G. Bennett's (2544), southwest corner MacMurchy.

Free gold was seen in place at Gosselins', Jefferson's, and Caswell's (2532). Gold was seen panned from the decomposed material on Cryderman's claim.

The property known as Gosselins' has attracted more attention than any other in the district. The stripping already done reveals what is apparently a very large body of quartz with free gold in several places. What is evidently the same body has been located at intervals for over 10 chains with a width of three or four chains. The rock associated with the quartz is a rusty schist and also a hard flinty rock in which a schistose structure has been developed in places. The rocks in places are interseeted with quartz stringers which form, at times, probably one-half of the total. In a place where the most stripping has been done the quartz shows continuously for 2 chains. A trench at almost right angles shows quartz for about 70 feet, but with some streaks of schist. The stripping

has been done in a northwesterly direction, which may prove to be the strike of the ore body.

Another property that attracted attention is that known as Clark's, about one mile in a southeasterly direction from Gosselins'. Work done on this property shows a large mass of quartz and a greenish rock that weathers very rusty. A great deal of pyrite crystals occur in the rock, and sometimes in the quartz. No gold was seen here, but it is claimed that gold can be panned from the decomposed material. This was the most extensive showing of what was considered the carbonate rocks, that I saw in the district.

At the time of my visit to the region definite information regarding many of the properties was difficult to obtain, as many men had gone out to the front or were prospecting in other localities.

* * * * *

Since writing the above, I have received the results of assays from the Belleville office on seven samples of quartz I collected from different properties where no gold was to be seen. One of these samples did not contain gold, and the others carried values ranging from 40 cents to $6 to the ton.

Yours truly,
R. B. Stewart.

The Sturgeon Lake Gold Field.

Abstract of report of Dr. E. S. Moore.*

History of the Field.

According to Mr. W. McInnes, of the Canadian Geological Survey, who seems to have been the first geologist to describe Sturgeon Lake and the geology of its vicinity, gold was discovered on Sturgeon Lake in the summer of 1898, when a number of claims were staked. A little later the most important deposit of the region, now owned by the St. Anthony Mining Company, and at first known as the Jack Lake mine, was discovered, and in 1901 Dr. A. P. Coleman describes the work which was being done on this property. A little to the north of it the Sturgeon Lake Mining Company had erected a stamp mill and installed machinery on the Dawson property, named after G. Dawson, president of the company. Mining continued, with periods of cessation, at the St. Anthony Reef mine, until 1908, when it ceased, and almost no mining work has been done since, although some new camps and other buildings were erected last summer and underground development work was begun.

During the years 1901-2 the United States Gold Mining Company did considerable work on what is known as the Shore properties, near the west end of King's Bay and on claim B. G. 136 on the southwest shore of North Bay. Three shafts were sunk on the former property and a tunnel about 50 feet long driven into a hill on the latter.

The work on those properties being unsatisfactory, they were abandoned the next year, and nothing has been done with them since.

Camps were built and shafts were sunk on the Symmes prospect on B. G. 139, on North Bay, about the same time as those mentioned above. About this time also the camps at the Northern Light and other properties near the northern part of Northeast Bay were erected, but soon fell into disuse.

In 1906-8 there was some activity in the vicinity of Belmore Bay, where the Belmore Bay Mining Company sank a shaft 260 feet deep and built a three-stamp mill, and the Douglas Mining Company did a considerable amount of development work.

In 1909 prospecting received a new impetus through the construction of the Lake Superior Branch of the G. T. P., and the establishment of steamer lines on the lake for the transportation of materials for railway construction. These afforded facilities for easy access to the region, and a good many prospectors entered the district, but the boom was only temporary. On account of the delightful lake, the ease with which the region can be reached and supplies obtained, it has often seemed that many prospectors have found it a very desirable one in which to spend a summer at the expense of someone else, and this has led to the foolish and useless expenditure of time and money on what has been called development work. Efforts have been made to sell properties that are known to be absolutely valueless. Many large pits have been sunk in rock where there is almost no sign of quartz and no gold in what quartz there is.

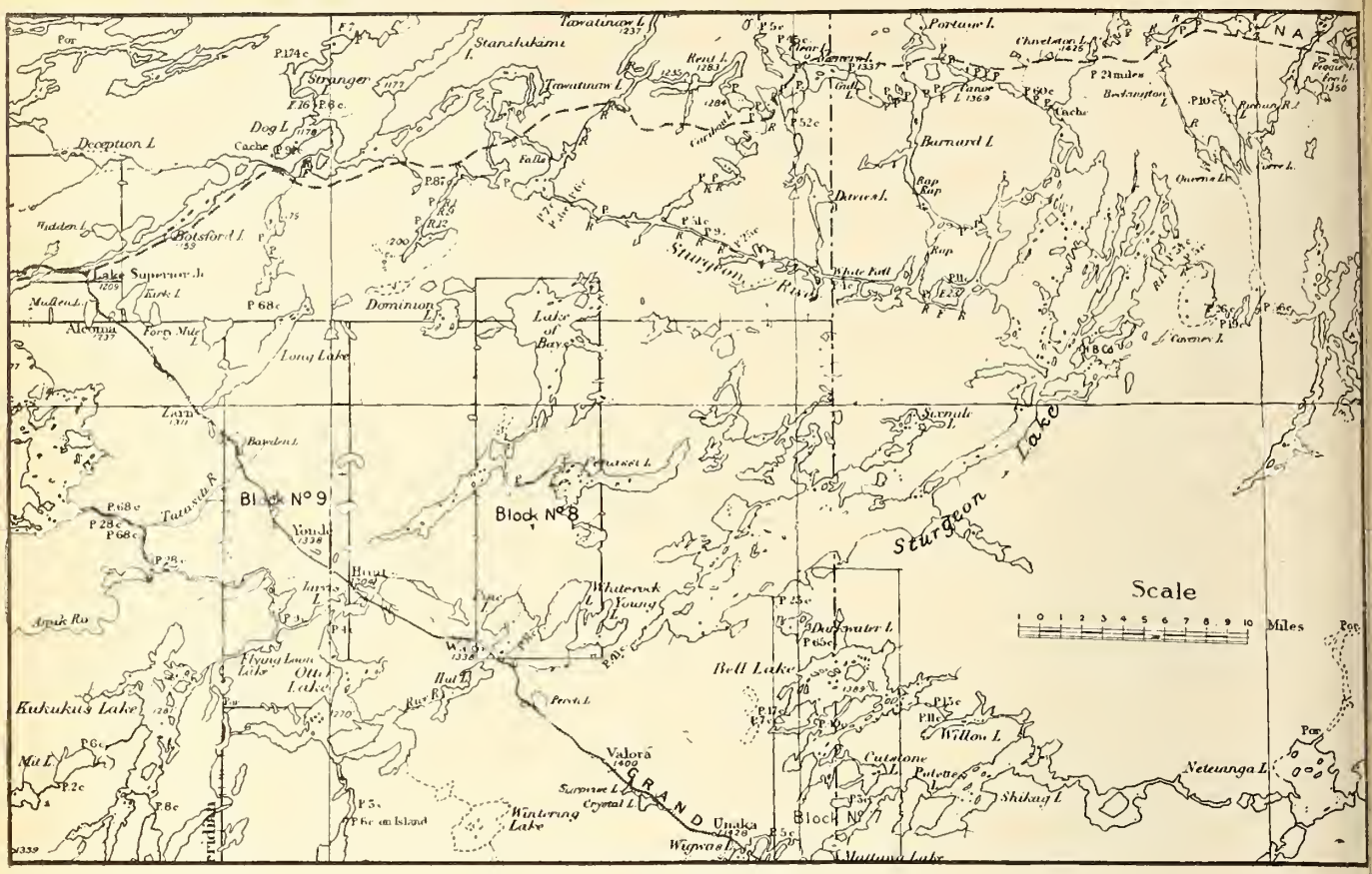
Besides the writers already mentioned, several others have written geological notes on the Sturgeon Lake region. Among these are Dr. W. G. Miller, who in 1902 wrote a good account of many of the deposits. W. H. Collins, of the Canadian Geological Survey, and E. T. Corkill, Inspector of Mines, have written briefer notes on the mines.

The lake after which the field is named is about 45 miles long, and the northern half is divided into two large arms, known as North Bay and Northeast Bay. It lies across the boundary between the districts of Rainy River and Thunder Bay, and in 50 degrees north latitude. A spur line about six miles long runs from the lake to the Lake Superior branch of the Grand Trunk Pacific Railway, at W. O. Junction, about 154 miles from Westfort, near Fort William. The field is thus easily accessible, and when the Transcontinental main line is complete it will pass about three miles north of the lake.

Geology.

The rocks round Sturgeon Lake form an extremely complex igneous series of extrusions and intrusions. There are very few sediments in the area, and none of them form definite geological horizons. The only sediments recognized with certainty were a few patches of greywacke, arkose, and dolomite, the former being found in the open cut at the St. Anthony mine, the arkose at the Dawson and Shore mines, and the dolomite on Claim H.W. 705 and on Morgan Island. Besides these there are some masses of a fine grained gray gneiss or schist, which is believed to be partly sedimentary in origin. It is finer in grain, more granular in texture, and as a rule lighter in colour than the granite gneiss. It is similar to large areas of rock found by the writer in the Lake Savant area.

*From 20th Annual Report Ontario Bureau of Mines.



Key Plan showing position of Sturgeon Lake

The igneous rocks consist of granites and their metamorphic equivalents, gneisses, aplites, quartz-porphyries, rhyolites, hornblende-syenites, diorites, diabases, basalts, gabbros, and porphyrites. Dr. W. G. Miller described boulders of nepheline-syenite which he found near East Bay, but we did not locate any of this rock in our work.

On the accompanying map a number of these rocks have been differentiated, but they are so intermingled that only the larger areas of each type could be laid down, and these areas often include small patches of the other rocks. There are represented a few small areas of agglomerate and breccia, which in some cases are crush-breccias and in others probably flow-breccias and agglomerates, the latter consisting of fragmental material ejected from volcanoes.

An attempt has been made to separate these rocks according to their relative geological age, but the only definite arrangement that can be made is on a purely lithological basis. There are no sedimentary rocks in the area which furnish definite geological horizons. The granite along the western portion of the field, designated the Sturgeon Lake granite because of its prominence in the area, is by no means typically Laurentian, and some of the quartz-porphyries are older, some equivalent in age, and some younger than the great mass of the granite.

Many of the greenstones and schists, as well as the quartz-porphyries, are typically Keewatin, but there are some greenstone dikes cutting the granite, and there are many masses of comparatively fresh-looking gabbro and diorite apparently much later than the older rocks of the area, and often cutting the quartz-porphyries, which are younger than the oldest of the greenstones.

Age of the Granite.

The age and association of the granite is interesting because of the apparent relation between it and the ore deposits, and of the petrographic character of the rocks. This granite has usually been regarded as of Laurentian age and has been mapped as such by previous investigators in this region. It was found, however, that it is not typically Laurentian, as much of it is not gneissic at all and looks like a comparatively fresh rock. The eastern portion of it is porphyritic and in places grades over into quartz-porphyry. None of these features are absolutely opposed to the rocks being Laurentian, but they are not typical of rocks of that age.

It was at first thought possible to separate the granite along the west shore of North Bay, where some of it is metamorphosed to a gneiss and in places cut by numerous granite dikes from a younger porphyritic granite along the eastern portion of the bay which contains few of these dikes. The work on the whole area, however, failed to show any means of doing this, and also indicated that the two types pass into one another by imperceptible gradations. In some places the granite has been locally more metamorphosed than in others, giving rise to the patches of gneiss, and the porphyritic phase seems to be due to differentiation influenced by the contact with the Keewatin greenstones.

The age of the numerous dikes of granite, felsite and aplite, is doubtful. These dikes were first observed near the northern end of North Bay, where they cut biotite-gneiss and a fine-grained grey gneiss or schist the latter probably of Keewatin age. It was thought that they belonged to the later porphyritic granite but they were found to be connected with the main mass of the granite in the vicinity, and later, similar

dikes were found cutting the porphyritic granite on the east shore of the bay. Dikes of felsite and aplite were also found cutting the greenstones at considerable distances from the granite mass. The assumption that there are granites of two distinct ages in this area is supported by the fact that at Unaka, a station of the G. T. P. Railway a few miles east of Sturgeon Lake, there are distinct granite dikes cutting a typical highly metamorphosed Laurentian gneiss. In this case the granite had been folded and metamorphosed before the dikes were intruded, and this was thought to be the case on the northwest portion of Sturgeon Lake, but the pegmatitic and aplitic character of so many of the dikes suggested that they may have originated as a later phase from the same magma as the granite, in some such order as suggested in the next section of this report.

That some of the quartz-porphyry is older than the granite is shown at the St. Anthony mine, where the latter cuts a schistose phase of the former and that there is quartz-porphyry of the same age as the granite is shown by the gradation of one into the other. The small area of porphyry near the mouth of the creek draining Couture Lake cuts the granite and is therefore younger.

The large mass of hornblende-syenite along the east side of the narrows is younger than the greenstones of the region, and is a comparatively fresh rock, but beyond that nothing can be said about its age. It is not improbable that it is related to the Sturgeon Lake granite and of similar age.

As to the age of the dolomite, little can be said beyond the fact that it is older than the quartz veins which cut it in some places.

Regarding the age of the rocks of the area, it is the writer's opinion that there are basic rocks of ages varying from Keewatin to Keweenawan, quartz-porphyries of Keewatin to at least Huronian age, and that the Sturgeon Lake granite is later than Laurentian and is possibly Huronian in age.

Vein Characteristics.

The veins are largely fissure fillings. They are, as a rule, very irregular, because the cavities were formed along contacts between different types of rock, along planes of cleavage and fissility in schists, and in igneous rocks by unequal cooling and torsion. In one case a considerable fissure was opened along a fault plane at the St. Anthony mine.

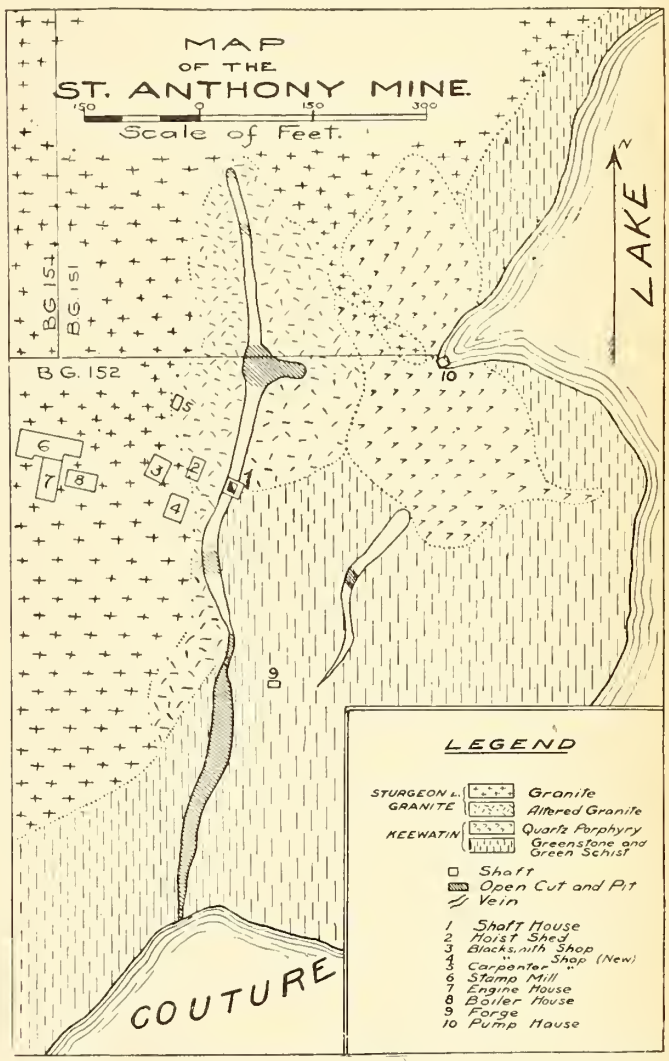
The gangue is predominantly quartz, although some calcite and siderite occur. The sulphides are pyrite, chalcopyrite, galena, zinc blende, pyrrhotite, and pyrousite. The ores are largely free-milling. The upper portions of the veins, owing to oxidation and concentration, often show splendid specimens of free gold.

Four stamp mills have been installed in the region, but only one, that at the St. Anthony mine, has handled any considerable quantity of ore. This mine has produced a good deal of ore, but it is difficult to procure records of the quantity and value. Many shafts have been sunk and a great number of test-pits dug on more than 200 claims which have been recorded in this field.

AL 499.

On an island in North Bay covered by location A. L. 499, and not far east of the last property described, Mr. T. K. Barnard has sunk a shaft and stripped a number of veins. Mr. Barnard has been on this island for seven years, and his beautiful flowers and well-kept cabin deserve special mention. It is probably the best kept and most attractive cabin owned by any prospector in the north.

On this island there is a contact between greenstone in the form of altered diabase, green schist, and quartz-porphyry, which in places becomes more like granite than quartz-porphyry, and may be regarded as a phase of the granite. The veins occur in the greenstone and schist, in the porphyry, and along the contact between the two. The quartz in most of the veins is dark and favourable looking, although one vein appears barren. One of these veins runs nearly across the island. A shaft 25 feet deep and 9 x 7 feet, has been sunk on a group of one large and many smaller veins. In the shaft there is a dike-like mass of porphyry, and there



is some evidence of a slip horizontally part way down the shaft, while at the bottom there is a mass of greenstone. As this greenstone is older than the vein, it has not intruded it, and although the vein may have pinched here it may reappear on either side of this mass.

There are many little stringers in the quartz-porphyry, suggesting that the fissures had been developed at the time of cooling and contraction of this rock. From one of these little veins some gold was panned, and the dark quartz from the shaft also showed fair values, but we did not find any visible gold, and the owner stated that it seldom occurred, although this property has had a local reputation for supplying unusual samples of free gold.

The Symmes Prospects.

On claim B.G. 139, on the shore of North Bay, there are three old camps, and near them some pits. W. G. Miller states in his report that there are two shafts on the Symmes property, which includes B.G. 138 and adjoining claims, about 25 feet apart, and that the southern one is said to be 22 feet deep and the other one 15 feet. He describes the vein as about 9 feet wide, occurring in granite, and consisting of dark quartz carrying iron pyrite, dark sphalerite, and occasionally visible gold. I could not get any definite information in the field regarding these properties, as some of the claims have been abandoned and the Coveney brothers have taken up and partially developed some of the others, which will be described under "The Coveney prospects."

Near the camps on B.G. 139 there are two pits about 100 feet apart and 7 to 10 feet deep on a large white quartz vein. The granite in which the vein lies in the upper portion of the pit as a sort of capping, is much shattered, and the vein is very irregular.

The Coveney Prospects.

On A.L. 497, a short distance from the southeast corner of B.G. 138, considerable prospecting work has

Acid granite dikes cutting arkose and biotite-granite gneiss.

been done by the Coveney brothers. They have sunk three pits, two of which lie near together, on a large irregular mass of quartz near the contact between porphyritic granite and Keewatin green schists. This mass of quartz appears to form a sort of capping from 1½ to 6 feet thick, due to solutions rising from many cracks in the shattered granite and spreading out along some horizontal line of weakness, probably between the greenstone above and the granite beneath, and then exposed by the removal of the greenstone by erosive agencies. The bottoms of the pits show very little evidence of a continuous vein. Where stripped, small dikes of granite are seen cutting the schist, and numerous stringers of quartz occur in both granite and schist.

The largest pit is in the form of a trench about 50 feet long, 10 to 15 feet deep, and 8 to 10 feet wide. Some of the ore taken from this pit was described by Mr. D. Coveney as containing the following assay values:

Silver	$25 per ton.
Gold	6 per ton.
Copper ....$2 to 3 per ton.	

One of the most highly mineralized specimens, taken by the writer and analysed by Mr. N. L. Turner, provincial assayer, showed the following values:

Gold	0.20 oz. $ 4.00) per ton.
Silver	22.72 oz. ($11.36) per ton.

The vein is fairly well mineralized with chalcopyrite and pyrite. The latter is sometimes in cubes one-half an inch in diameter, and in some places the pyrite has been dissolved, leaving cubic cavities in the quartz filled with iron oxide.

The contact between Sturgeon Lake granite and Keewatin schist runs nearly north and south in this vicinity, and about 100 paces south along the contact there is another pit on a large quartz vein. This pit is about 12 feet deep and varies in horizontal dimensions from 10 x 7 feet at the top to 6 x 5 feet at the bottom. There was a little water in the pit, and at the surface of the water the vein widens out to practically the full width of the pit. The upper portion of the vein is very irregular and is mixed with bands of schist. It strikes 160 degrees, dips 80 degrees W., and where stripped can be traced 150 feet up the hillside, where it either pinches out or is turned off in another direction by a change in the strike of the schist, which at this point changes in strike to a northeast direction. Throughout this 150 feet it keeps its width well, and the footwall is fairly distinct.

The St. Anthony Mine.

The St. Anthony mine is situated on claims B.G. 151 and 152, on the west shore of Couture Lake. The camps are located on B.G. 154 and 168 on St. Anthony Bay, a small indentation in the shore of North Bay of Sturgeon Lake. The camps, as well as some of the buildings at the mine, have been renovated during the past summer, preparatory to the carrying out of further development work at the mine.*

This property, which is by far the most important one in the district, was located about ten years ago, when it was known as the Jack Lake mine. It also goes by the name of the St. Anthony Reef, because of the idea held by some that its surroundings suggested a reef rising above the water of Couture Lake. It has been controlled for some time by the St. Anthony Mining Company, and was worked from the year 1903 until 1908, when it was closed down. During 1907 and 1908 Mr. J. Steele worked the mine under option. The present manager of the company is Mr. Arthur L. McEwan, to whom I am much indebted for his hospitality to us while working in the vicinity of the mine.

The buildings at the mine consist of a ten-stamp mill and amalgamation plant, boiler, engine, and shaft house, carpenter shop and blacksmith shop. The sulphide concentrates from the mill have been stored pending better shipping facilities.

The general plan of the mine and the geology in its immediate vicinity is shown on the accompanying sketch map. The mine workings consist first of an open cut extending almost north and south along the main vein from Couture Lake. This cut is over 300 feet long and reaches a maximum depth of 40 feet and width of 25 feet. The width varies from about 10 to 25 feet, and the greater portion of the material removed was milled. In the bottom of the open cut shaft No. 3 is found, and it extends 100 feet below the surface. About 220 feet north of this shaft No. 2 has been sunk and a drift connects the two shafts, most

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Editor's Note: This report was written in the summer of 1910. The St. Anthony is now producing gold.

of it lying along the vein. At the botom of No. 2 a crosscut runs west 30 feet to pick up the vein, and then a drift south 67 feet and another crosscut east to the north and south drift between the shafts. A crosscut is said to extend east 125 feet from the bottom of No. 2 shaft. The hoisting is done from this shaft, which is timbered.

From the west end of the 30-foot crosscut from shaft No. 2 a drift runs north 180 feet to an upraise known as No. 1 shaft, and from the opening a drift is said to continue further north 160 feet. No mine maps were available at the time of my visit, and these figures are compiled from several sources.

Besides the open cut there are on the surface a number of pits as indicated on the sketch map, but none of these are very extensive. The rocks in the vicinity of the mine consist of Keewatin greenstone, schist, and schistose greywacke, intruded by quartz-porphyry, and the whole intruded by the later Sturgeon Lake granite. The granite in this vicinity is porphyritic and highly altered by hydrothermal action, where chemically active waters have acted on the rocks. The main vein runs in the granite close to contact for some distance, and then leaves the granite and extends out into the schists. There seems to be good evidence that when the granite cooled and shrunk, the adjacent rocks were broken and shifted so that a fissure could be filled with quartz and calcite. From the appearance of the walls on the sides of the open cut it looks as if the rock on the east side of the fissure moved north and that on the west side south. At the time this large fissure was formed countless smaller ones were developed, so that there is a zone about one-quarter of a mile wide, more or less streaked with quartz veins, and in places the walls of the main fissure become indistinct in the granite. In the walls of the veins the granite has been so altered that most of the feldspar has disappeared, and the rock has turned into a greenish-yellow protogine, consisting almost entirely of quartz and muscovite.

The gangue in the granite and schist is largely quartz, but some calcite occurs in both rocks and in greater proportion in the latter. Some siderite is also present where the vein cuts the schist. In the open cut in the schist, the walls are distinct, although the quartz is often distributed in narrow veins along the planes of cleavage, and the whole mass from wall to wall contained more or less gold.

The minerals in the gangue are free gold, pyrite, chalcopyrite, sphalerite, and galena. Beautiful specimens of free gold have been obtained from this mine. Much of the ore is free-milling, but with depth the sulphides appear more abundantly. The ore from the schists contains less sulphides than that from the granite, and this seems to be due to the greater ease with which oxidizing waters percolate the schists. The writer was informed while at the Athabasca mine, near Nelson, B.C., that similar conditions existed there where the ore occurs in porphyritic granite and schist.

No assays of the ore were made by the writer, but the manager states that much ore was mined which ran as high as $85 per ton, and that there is still in the mine a good deal of ore which will average $12 per ton. It is not unlikely that with depth the quartz veins will become less clearly defined in the granite, it being probable that most of these veins were formed in the outer and upper portion of the granite magma when it cooled, before the mass as a whole was completely solidified.

During the past summer new interest was taken in this property, and considerable work was done in the way of putting up new buildings and making a start at development work by sinking in No. 3 shaft.

This property has been described by other writers, and references are given in this report in the section on the history of the field.

The English River Gold Mining Company.

On location B.G. 157 is what is known as the Dawson mine, now owned by the English River Gold Mining Company, and formerly controlled by the Sturgeon Lake Mining Company. Like the St. Anthony, it is situated near the contact between the green schists and granite, but instead of lying on the main contact, it lies on the contact between bands of schist and arkose cut by the granite. There are here a number of pegmatite dikes, in some parts composed of about half feldspar and half quartz, and in other parts consisting largely of one or the other.

The gangue is quartz, and the ore minerals found were galena, sphalerite, pyrite, and chalcopyrite. Good specimens of free gold are said to have been found, though we were unable to find any on the dump.

The workings include a shaft, open cut, and some pits, the former being full of water. The shaft is said to be 64 feet deep, and the open cut is about 70 feet long, 10 feet deep, and 5 to 6 feet wide. Much of the country rock is included in this width.

The buildings include a mill containing ten stamps and other equipment, but the mill has been long idle.

Prospects on Couture Lake.

There are a great number of prospects in the vicinity of Couture lake, but it is possible to describe only a few of them here.

On the large island northeast of the St. Anthony there are some large quartz veins in schist. None of these have been developed, and Mr. Miller has already described them. One of these gave an assay of $2.75 per ton in gold.

On claims A.L. 656 and 657 there are a number of pits and one shaft. These are controlled by Messrs. King and Frazer. The shaft is said to be 75 feet deep. The vein of quartz and calcite is about 8 inches wide, and has a pretty distinct hanging wall. It carries some nice specimens of visible gold. The vein can be followed over a portion of two claims, and although it is largely in green schist, it is closely associated with a narrow band of comparatively fresh-looking quartz-porphyry, in which is some of the quartz, and some of it along the contact between it and the schist. The vein shows a tendency to break up into stringers in some places, and is small, although the quartz looks favourable as a carrier of gold.

To the north of the shaft, on some claims worked by Mr. Fawcett, are a number of pits on veins which in some places show visible gold. North of these claims there are a good many pits, most of which are of no interest.

On the west side of the lake, on claim A.L. 662, there is an old shaft at least 20 feet deep, containing a good deal of water. The vein is about 2 feet wide and dips 30 degrees west. It fills a fissure between a footwall of schist and a hanging wall of altered greywacke. The vein is mineralized with chalcopyrite, galena, sphalerite, pyrite, and a little pyrrhotite. A little free gold was found in some specimens of quartz believed to have come from the shaft.

Prospects Around Ouillette Lake.

There are a large number of prospects in the vicinity of Ouillette Lake, lying north of Couture Lake.

Many of these consist of little pits of no importance, but the Ouillette Lake Mining Company, with headquarters at Sault Ste. Marie, Ontario, has done much prospecting work on nine claims northeast of the lake. Outside of the two old locations S.V. 421 and 422, none of the claims has been surveyed, but they adjoin on the east and south.

One pit about 25 feet long runs across a mass of schistose diorite, and the rock is cut up with stringers of quartz. The gold carries considerable pyrite and pyrrhotite, and a number of specimens of free gold were seen.

In another pit about 15 feet long and 7 feet deep a mass of white quartz stringers about 10 feet wide may be seen lying along the hanging wall. The rock has about the composition of diorite. On the surface near this pit there is a quartz vein about 3 feet wide which may be connected with the mass already described. It pinches down to about 20 inches in a pit 10 feet deep.

On location S.V. 422 there is a pit on a large mass of quartz. The pit is about 14 feet wide, and the quartz extends almost across it.

On another claim a mass of stringers appearing on the surface unite in a pit to form a vein about 8 feet wide

The rock in which the veins occur is largely coarse greenstone, the gangue is mostly quartz, and the other minerals in the vein chalcopyrite and pyrite. The veins in places form some of the largest in the region, and some of them carry gold, but they show a tendency to break up into small stringers or otherwise become irregular.

The Powell Property.

On the west shore of Northeast Bay, on Claim A.L. 701, there is a deposit locally known as the Powell property. Last summer it was developed for Mr. Beidelman under the management of Mr. Atwood, who was formerly with the Douglas Mining Company. The workings lie on a vein, consisting of attractive-looking quartz, beginning near the lake shore and running a little west of south. There are a number or pits, and two of them were about 25 feet deep, but neither was timbered at the time of our visit. The rocks consist of a complicated mixture of quartz-porphyry, grey schist, and greenstone, and the vein lies sometimes in one rock and sometimes in the other, and in places along the contact between the two. It varies in width from 2 to 15 inches, and frequently breaks up into stringers, especially at the contact between different types of rock. The quartz is well mineralized with pyrite and chalcopyrite, the latter frequently altered to malachite and azurite. We had no difficulty in finding good samples of gold at a depth of 20 feet. These gold specimens are doubtless due to the secondary enrichment process, as they occur in association with the secondary carbonates of copper.

Near the pits described there are a number of smaller ones on this same vein, which fingers out a little farther south.

Other Deposits on Northeast Bay.

On the long point running south, just west of the island covered by S.V. 414, Mr. George Day has staked a number of claims which have not yet been surveyed. On these claims there are some pits on irregular quartz veins in quartz porphyry and along the contact between the quartz porphyry and green schist. The quartz is often disseminated in the porphyry, and appears in places like veins filling cracks in a partially cooled molten mass, though the veins may be later impregnations by hot solutions along lines of weakness. The rock is usually much decomposed along the veins, while the veins and rocks, especially near the fissures, are impregnated with iron pyrite, in some places with cubes one-quarter inch in diameter. In one place a beautiful specimen of gold was seen in a space left by the removal of one of these cubes, and in the oxidized and decomposed rock free gold could be found by panning. Gold in any quantity seems to be limited largely to the upper portion of the deposits, which have been oxidized, and it seems probable that a considerable amount of the quartz may have been collected into these veins by the partial decomposition of the surrounding rocks and the segregation of the quartz under the action of organic acids. The organic acids, no doubt, have had a good deal of influence in dissolving and concentrating the gold which would be freed from mechanical union with the pyrite by the oxidation and removal of the pyrite in the form of ferrous sulphate.

Many other small deposits occur in Northeast Bay, but they seem much alike and too numerous for description.

Prospects on Belmore Bay.

Since the year 1906 the region around Belmore Bay has attracted considerable attention, as there are many veins within about three miles of the lake. The Douglas Mining Company has camps on the east short of the bay and has sunk a couple of shafts. On claim P. 7 there is a shaft said to be 22 feet deep on a vein varying in width from 3 inches to 2 feet. A test-pit near by shows stringers running through the schist. On the same claim and 98 paces distant from the 22-foot shaft there is another one 73 feet deep on the same vein. The rock from the bottom of the shaft consists of grey to white quartz scattered through schist and mineralized with chalcopyrite and pyrite.

There seems to be little galena or zinc blende in this region, and the same can be said of the deposits on the northern part of Northeast Bay, while around Couture Lake and North Bay these minerals seem to be more common.

On what is called the Ruby property, owned by the Douglas Mining Company, there is a shaft said to be 30 feet deep on a mass of quartz stringers about 4 feet wide, in dark greenstones varying in composition from diabase to diorite. North of this shaft 100 feet and on the same vein is a pit about 22 feet deep where the vein varies in width from 3 inches to 2 feet. The veins run in a general northeast direction with the strike of the rock and with a dip 60 degrees northwest.

The gangue here is quartz of good quality and calcite. It contains pyrite and chalcopyrite, and specimens of free gold were seen in calcite and quartz.

The other company which has done much work in the vicinity of Belmore Bay is the Belmore Bay Mining Company, which owns a number of claims just east of the lake. It is said that the shaft near Mud Lake, where the camps are situated, is 260 feet deep, and very little ore came out of it. A three-stamp mill has been erected on the shore of the lake, but it did not run long.

Besides the properties described, there are many prospects unnecessary to mention, as most of them are pits on small veins or stringers and a description of one serves for almost all. The rocks in the area are mostly coarse greenstones, not as a rule very schistose, syenite porphyries, quartz porphyries, rhyolite tuffs, and plagioclase porphyries with very large phenocrysts

sometimes an inch in diameter. The veins are as a rule very irregular, frequently breaking up into stringers, pinching out or expanding to form masses several feet in width. The metallic minerals are predominantly chalcopyrite and pyrite, with considerable pyrolusite in some places.

Free gold was seen only on a few claims. Some of the veins are associated with aplite and felsite dikes. In one case an aplite dike cuts a syenite porphyry, and near it there are crystals of ilmenite. The rock has been brecciated, and the cracks filled with calcite, carrying chalcopyrite and pyrite. The ilmenite may have been developed as a contact metamorphic mineral.

On Morgan Island, just west of Belmore Bay, is a mass of rhyolite tuff in places, impregnated, especially near its contact with quartz porphyry, with calcium and iron carbonates, which are mineralized with copper and iron pyrites and galena. The tuff, in a band about 100 feet wide, is composed of angular fragments of rhyolite, and the whole mass is reddened by the alteration of the iron bearing minerals. This deposit has not been found to carry gold to any extent.

On East Bay are a number of abandoned prospects, and on the east side of the narrows about five miles below Sturgeon Lake hotel there is a pit on a vein of calcite. Associated with the vein there are besides calcite, apatite, tourmaline, hornblende, zircon, pyrite, and chalcopyrite and, it is said, values in silver.

As there are in the Sturgeon Lake gold field hundreds of pits, many of them of no importance and the majority of them having characters in common, it is impossible to describe them all, and it may be that some left unmentioned are as important as some of those described. An attempt has been made to indicate on the accompanying map the shafts and many of the pits, but many pits and strippings have necessarily been omitted, as it would require too much detail to plot all of them.

Economic Possibilities of the Sturgeon Lake Gold Field.

Having spent considerable time in studying this field it might be well for the writer to express, from a geological standpoint, his opinions regarding its future.

A study of the region shows that gold is widely distributed, and that one can locate a vein, small or large, in many parts of the area. These veins are, however, as a rule, very irregular and uncertain, not having been formed by any widespread movements which opened extensive fissures, but rather by cooling and shrinking of igneous rocks and slight movements along contacts and cleavage planes. The fissure at the St. Anthony is the only one which can be regarded as an important exception to this rule, and it is the only deposit which has given promise of really making a mine.

While this area has been remarkable for the large number of fine specimens of free gold, these have been the products of secondary enrichment and concentration, and are not likely to continue to great depths. With the absence of much free gold at depth, few of the veins show a sufficient increase in the sulphide ores to counterbalance the diminution of the free gold. As the region has for so long been exposed to erosive agencies, it is probable that much material from the upper portions of the veins has disappeared, and with it considerable gold. The low relief and the scarcity of streams are also against the possibility of valuable placers being found.

Much unprofitable work has been done in the area, partly because many of the prospectors lacked experience, and partly because, as already mentioned in this report, some men having charge of the work were doing it at the expense of others. While there are plenty of veins in the region, many mere stringers of quartz have been exploited without any justification, largely because the region is easily accessible and an attractive one in which to work. In the future those who wish to carry on proper exploratory work should profit by the experience of most of the other companies which have operated in the region, and not build stamp mills before they have enough ore in sight to justify such an expense.

Consolidated Mining and Smelting Co. of Canada, Limited

Managing Director's Report.

Trail, B.C., August 25th, 1911.

To the Directors of the Consolidated Mining and Smelting Co., of Canada, Limited.

Gentlemen,—I beg to submit the results of the Consolidated Company's operations for the year ending June 30th, 1911, including Balance Sheet, Profit and Loss Account, Production, and General Report.

Financial Statement.

Operations for the year under review show a net profit of $202,278.29, after writing off depreciation on plant and equipment $193,342.27 (as compared to $175,502.60 for last year), sundry items including bad debts $3,162.31, and charging to profit and loss $438,354.54 expended on development of our various properties. The increase in depreciation is accounted for by the writing off of the Snowshoe equipment, the lease having terminated, and heavy depreciation on the St. Eugene plant, which is liable to close down at an early date.

Additions to plant and equipment during the year amounted to $146,350.30, from which is to be deducted sales of plant to the amount of $11,699.87, or a net amount of $134,650.43. Increase in lands at the smelter is $12,611.57, making the total charge to plant account.

Expenditure on account of the purchase and development of new properties amounted to $217,613.90, which was provided for by the issue of new shares to the value of $250,000.

This amount was expended in purchasing stock and bonds of the Fort Steele Mining & Smelting Company, and the Sullivan Mining Company, owning the Sullivan group at Kimberley; in the purchase of property surrounding the Sullivan; on the development of the Number Seven and Molly Gibson groups, and other small purchases.

The amount due to banks for borrowed capital has been reduced to $584,031.95, a decrease of $181,980.65 for the year.

Quotations for London Lead and New York Silver show slight increases over last year, the average being: London Lead, £12.953, as compared with £12.921 during the previous year; New York Silver, 53.696c., as compared with 51.948c.. Electrolytic copper was lower, averaging 12.337c., as compared with 12.981c. for the previous year.

Production.

The gross value of metals produced at the company's smelting works for the year was $4,437,901, as compared with $5,911,767 for the previous year, a decrease being shown in all of the metals. It will be noted that

there is an increase in the production of the Centre Star and Sullivan groups, that the Molly Gibson and Number Seven have entered the list of shippers, and that the remainder of properties show a decrease.

The large decrease in total production is due to the working out of the St. Eugene, dropping the Snowshoe lease, and to the fire in the Slocan a year ago, which closed down the Kaslo & Slocan Railway and caused a large decrease in shipments from that district.

In our Rossland mines, ore developed and shipments have about balanced. Although the tonnage developed is numerically less than for the previous year—194,000 tons, as against 245,000 for the year 1910—the average value of the ore developed this year on the lower levels is considerably higher.

In the Centre Star and Idaho mines no ore has been developed in the lower levels and but little work done, most of the development having been confined to levels

Year Ending June 30th, 1911.

	Tons Ore.	Gold in Ounces.	Silver in Ounces.	Lead in Pounds.	Copper in Pounds.	Gross Value.
Centre Star group	193,223	81,348	60,200	.....	2,318,456	$1,980,112
St. Eugene—Ore	47,705	.....	.....	.....	.....	.....
St. Eugene—Conc.	7,708	.....	204,044	9,012,152	.....	429,044
Richmond-Eureka	3,168	.....	115,656	720,306	.....	87,638
Phoenix Amalgamated	2,244	46	379	.....	6,195	1,885
Snowshoe (leased)	85,627	5,335	22,450	.....	2,001,700	363,702
Sullivan (leased)	34,065	.....	258,376	14,187,354	.....	635,223
Number Seven group	1,776	445.	20,052	49,674	.....	19,339
Queen Victoria	1,985	13	744	.....	59,210	7,977
Molly Gibson	733	.....	31,043	197,634	.....	23,435
	Smelted.					
Trail Smelter	388,785	119,067	1,458,758	24,026,015	4,421,988	4,437,901

Production Beginning 1894 to Date.

	Tons Mined.	Gold in Ounces.	Silver in Ounces.	Lead in Pounds.	Copper in Pounds.	Gross Value.
Centre Star group	1,670,547	802,984	910,950	.....	30,557,473	$21,488,745
St. Eugene—Ore	1,001,820	.....	.....	.....	.....	.....
St. Eugene—Conc.	187,833	.....	5,259,477	225,076,673	.....	10,394,520
Richmond-Eureka	11,126	.....	559,639	3,569,049	.....	422,286
Phoenix Amalgamated	2,493	53	423	.....	8,409	2,336
Snowshoe	605,719	41,328	160,428	.....	14,752,418	3,277,063
Sullivan	126,175	.....	1,040,369	52,840,751	.....	2,566,449
Number Seven	2,862	669	31,563	49,674	.....	30,447
Queen Victoria	6,189	49	3,947	.....	263,409	49,771
*Molly Gibson	733	.....	31,043	197,634	.....	23,435
Trail smelter	2,847,469	1,017,123	18,458,631	,224,898,570	47,875,802	47,083,926

*For the year only; previous records not available.

Development.

The total amount of development work underground in the company's mines is about as follows:

	Feet.	Miles
Centre Star group	146,288.5	27.70
St. Eugene group	103,102.5	19.54
Richmond-Eureka	7,003.0	1.32
Phoenix Amalgamated	2,581.0	0.48
Molly Gibson	6,985.0	1.32
Sullivan	15,162.0	2.87
Number Seven	5,479.0	1.03

During the year 22,452 feet of narrow work and 38,757.3 feet of diamond drilling have been done, as follows:

	Drifting and Crosscutting.	Raising.	Sinking.	Total.	Diamond Drilling.
Centre Star Group	11,290.5	1,803.0	290	13,383.5	25,622.3
St. Eugene group	2,223.5	1,469.0	24	3,716.5	4,346.0
Richmond-Eureka	667.0	295.0	...	962.0	.....
Molly Gibson	340.0	110.0	20	470.0	.....
Sullivan	1,322.0	431.0	45	1,798.0	8,789.0
Number Seven	1,977.5	98.5	46	2,122.0	.....
Total	17,820.5	4,206.5	425	22,452.0	38,737.3

above the 10th. In these a number of small ore bodies have been opened up and one or two larger ones of lower grade. The same is true of the Iron Mask.

The greater part of the new ore that has been found has been in the lower levels of the War Eagle. A winze sunk from the 12th level opened up ore to a depth of 150 feet and of a length at the bottom of 200 feet. Values of this ore are very good. The 10th and 11th levels are also producing a large tonnage of good ore.

In the St. Eugene group no new large ore bodies have been discovered and the ore reserves are practically depleted, being estimated at 6,000 tons. Enough ore is being found from time to time to keep the mine running at a small profit.

The Richmond-Eureka group continues to produce a small tonnage, though an estimate of the probable tonnage is difficult on account of the variable nature of the ore bodies. No large new ore body has been discovered.

A few tons were shipped from the Phoenix Amalgamated during the winter, but as the grade was unsatisfactory at the points where work was done, and as the price of copper was so low, it was thought advisable to do no more work there until conditions improved.

The Snowshoe lease has been abandoned, as it was no longer profitable, owing to low prices for copper, higher costs of mining, and conditions at the smelter which made the use of the Snowshoe ore no longer valuable as a flux.

The lease and bond of the Queen Victoria mine has been abandoned for the same reasons.

The Molly Gibson mine has commenced shipments and with about 14,000 tons of milling and shipping ore in sight and good prospects below the lower level, will, we hope, continue to be profitable.

Development on the Number Seven mine has proved disappointing, both as regards the continuity of the ore bodies and their grade. Work is now being done on the lower levels in an attempt to locate further ore bodies of good grade.

New Properties.

During the year the company has acquired a majority of the stock of the Fort Steele Mining & Smelting Company, Limited, owner of the Sullivan mine. The lease to the Consolidated Company expired on June 30th, and the Fort Steele company is now operating the property and shipping ore to Trail. The mine is producing between 2,500 and 3,000 tons per month of ore containing approximately, lead 20 per cent., silver 6.6 ounces.

Since the close of our fiscal year, arrangements have been completed with the liquidator of the Le Roi Mining Company for the purchase of all the property of the Le Roi Mining Company in Rossland. This property still has a large amount of low grade ore, and some prospects of finding ore of a better grade, and we believe that the purchase will be a profitable one.

Construction.

Construction for the year consisted mainly of the equipment of the Molly Gibson mine with an aerial tramway about four and one-half miles in length; repairs and improvements to the old tramway, which was badly damaged by snowslides; new bunkhouses at the mine; improvements in the mill; horses and wagons for hauling ore, etc.; finishing the equipment of the Number Seven mine, and increasing the roasting capacity of the smelter by the installation of two Dwight and Lloyd roasters; the purchase of lands near the smelter to protect us against claims for damage by smoke; sundry small improvements.

General Conditions.

The past year has been in many ways an unfavourable one for the company. The early part of the year was marked by the low grade of the Rossland ores and limited tonnage, particularly in reduction of tonnage from the St. Eugene due to the working out of the principal ore bodies, and from the Sloean, due to bad forest fires and the consequent interruption of service on the Kaslo & Sloean Railway, which condition unfortunately still exists. Unfortunate weather conditions in the Crow's Nest Pass during the month of February, and interruption of coke shipments on this account, lessened the tonnage of the furnaces at Trail to a considerable extent, and finally, the present strike in the Crow's Nest Pass has lasted from the first of April until the present time, and has not only forced us to buy coke in Pennsylvania at greatly increased cost, but has, more or less, unsettled traffic conditions and increased our cost of handling material, such as coke and limestone, at the smelter. In addition we have been put to greater expense for coal supply. All these causes have made great inroads into profits for the year and account almost entirely for the reduction from last year.

With regard to the future, developments in the Rossland camp during the past six months have been favourable and give promise that this next year at least will be a profitable one in that direction, and there is good reason to hope for some time after that.

The loss of the St. Eugene tonnage has been serious, but will be partly overcome by the operation of the Sullivan, in which the mineral bearing area has not yet been thoroughly prospected. There seems, too, to be good grounds for the belief that new and profitable mines will be opened up in other parts of the Kootenay, and provided some means is found for the proper protection of the lead industry by the Dominion Government, either by a renewal of the bounty on lead when that bounty expires in about eighteen months, or by an adequate duty on lead coming into Canada, prospects for the Kootenay country are, on the whole, bright.

Considerable interest is being taken this year in lead properties throughout the country, and some promising prospects have been opened up. We have continued the policy of the Company of adding to our list of properties by keeping men in the field looking up such prospects this summer and hope that in this way we may be able to add to our tonnage of profitable ore.

Management.

In conclusion I wish to express my appreciation of the hearty co-operation of those in charge of the various properties or departments as follows:

S. G. Blayloek, assistant general manager; T. W. Bingay, comptroller; A. J. McNab, superintendent of smelter; J. F. Miller, superintendent of refinery; M. E. Purcell, superintendent of Centre Star group of mines; Charles Biesel, superintendent of mines at Phoenix; C. H. McDougall, superintendent of St. Eugene mine; A. W. Davis, superintendent Molly Gibson mine; W. A. Cameron, superintendent of Richmond-Eureka mine; James Buchanan, metallurgist; John M. Turnbull, mining engineer; and W. M. Archibald, mining engineer.

Respectfully submitted,

R. H. Stewart, General Manager.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay: Dominion Coal Output.

The season of open navigation for 1911 is nearing the close. The outputs of the Dominion Coal Company during the past summer were larger than for any previous continuous period. The total output for the six months, May to October, inclusive, reached about 2,125,000 tons, an average of over 354,000 tons per month. The monthly outputs were as follows:

May	352,119
June	367,014
July	369,930
August	387,927
September	324,342
October, estimated	324,000
Tons	2,125,000

In the months of September and October the output declined, but this was due to dulness in the coal market, and not to any diminution in capacity.

Unusually large storage banks were laid down in the early part of the year, but these have now been all lifted. So far as it is possible to judge the prospects for winter shipments indicate a slightly lowered output during the coming six months when compared with the shipments which were made last winter.

The disproportion between summer and winter outputs is every year growing less noticeable. In 1893, when the Dominion Coal Company was incorporated, the total output from November to May was only a little over 200,000 tons, and it was not until 1900 that this state of affairs became ameliorated. In the winter of 1910-1911 the output was approximately 1,800,000 tons, fully half the annual output. It is a far cry from 1893.

The term of the agreement between the P.W.A. and the Dominion Coal Company, by which the terms of the Shortt award were renewed for two years, expires at the end of this year. Negotiations have already been begun, and it is understood that the company has offered the men a renewal of the two years' agreement on exactly the same terms as before. It is to be hoped that it will be possible to renew this agreement, as it will mean settled and harmonious conditions for some time to come. This is particularly desirable in view of the large programme of capital expenditure which the Coal Company has undertaken, coupled with the dulness of the coal trade, and the persistent inroads on the St. Lawrence market which are being made by United States operators.

The season's programme of new construction is well advanced. The new Siemens-Ilgner electric hoisting engine for hoisting water from the International water-shaft, is in successful operation. The uniformity of the load on the transmission line is in marked contrast to the previous hoist, which was not provided with any compensating device.

At No. 2 colliery a large Walker fan is being put in position to serve as an auxiliary or emergeucy fan in case of breakdown of the present ventilating arrangements.

The coal-handling plant at No. 2 is running, and is expected to effect a notable economy. The large boiler plant at this colliery was designed for automatic coal-handling, and the addition made this year will complete the lay-out.

Delivery of the large electric hoisting engine for No. 14 colliery is expected early in the new year. No. 14 is getting 1,100 tons daily with the present inadequate hoisting engine, and may be expected to make a much better showing when the new hoist is installed.

Part of the framework of No. 15 bankhead is being erected. It is intended to have this bankhead in full operation for the 1912 season. The smaller colliery buildings at this mine will all be completed this season.

With the new electric hoist at International water shaft, the electric air-compressors at Nos. 12 and 14 collieries, and the bankhead at No. 14, in addition to the previous load, the central power station at No. 2 is being heavily drawn upon, and in view of the intention to install still more electric machinery at the Lingan collieries, it is expected that a large electric power station will have to be provided for the Lingan side. This will probably be undertaken next year.

The railway connection to the Birch Grove collieries has been somewhat delayed by lack of labour, but it is expected that it will be finished before the winter sets in. Two sets of slopes are now being driven, one set at the point where the seam was originally opened, now known as No. 21 colliery and a second set about half a mile away at the site of No. 2 colliery.

The rescue station at No. 12 colliery is completed. The equipment will shortly be provided, and in the meantime a few apparatus from the Glace Bay collieries will be sent over to No. 12, and training of the men in their use will be commenced.

The company is sending the superintendent of its main station to the National Field Day at Pittsburg which will be held at the end of October by the First Aid Societies. The proceedings should be well worth watching. Some day in the future it is to be hoped that in Canada also the First Aid movement will be taken up with the enthusiasm it deserves. Up to now there has been a decided lack of ambulance training among the Nova Scotian workmen in all trades, and many a death and mutilation has taken place which a little first-aid knowledge promptly applied might have prevented, to say nothing of the needless suffering which a lack of this knowledge entails.

Springhill.

The output for September was 31,000 tons. The daily output now averages 1,500 tons, and has on several occasions been near 1,600 tons, which is fully up to normal. A large amount of repair and cleaning-up work has been necessitated by the long idle time caused by the strike, but this is now about finished. A new air-compressor is being installed, and it is proposed to shear the coal in some sections. At the present time the coal is all hand-got, and no explosives are used. By shearing it is expected to get a larger product, and to effect considerable economy. Before very long much larger tonnages may be expected from Springhill. For October the output will be over 35,000 tons, at the present rate.

ONTARIO.

Cobalt, Gowganda, and South Lorrain.

During September the Crown Reserve Mining Company shipped 250,000 ounces of silver, and the total production for the first 9 months amounts to $2,376,000 ounces. This month the company has shipped a car of 120,000 ounces to the Kingdom of Saxony.

Operations on the 150-foot level of the Savage have opened up a good ore body on the new No. 4 vein. The values in this vein are not as consistent as in other leads on the property, but the wall rock yields good milling ore.

Dividend No. 33 has just been declared by the Temiskaming & Hudsou Bay Mining Company. The 300 per cent. issue means a disbursement of $23,283. This is the fifth dividend paid by the company this year. Altogether the company has paid 18,700 per cent., or $1,451,307 on a capitalization of less than $8,000.

The Temiskaming Mining Company has started to sink its main shaft to the 650-foot level. At the lowest level where crosscuts have been made, namely, the 575, there is one shoot of very rich ore. Where the diabase is encountered on this level, values cut out.

The Beaver Consolidated Mining Company has at length decided to build a concentrator treating low grade ore. The mill will have a capacity of 50 tons a day, and will differ from the ordinary practice in the Cobalt camp, in as much as two crushers a ball and a pebble mill, will take the place of stamps.

The shipments from the Cobalt camp for the month of September totalled 2,387.52 tons, which was a few tons lower than the previous month. Nineteen mines figured on the shipping list, contributing a total of 75 cars. While the tonnage shipped from the camp for the first nine months of the year is considerably less than that for the same period of 1910, the value of the ore is higher. It is estimated that the 12 months will

how an increase of at least $1,000,000 above that of 1910, which, it must be remembered, was far ahead in production of ny other year.

During September the Nipissing mined ore of an estimated et value of $227,082, and shipped ore of an estimated uet alue of $239,843. Favourable developments were encountered nderground at veins 73, 148, and 123. Owing to the non-arival of the big pump, hydraulicking operations for prospecting urposes will not be attempted until next spring. To develop hat part of the conglomerate area lying near the Savage mine, main working shaft is now being sunk. This will be used or the purpose of underground exploration.

One feature of the shipping list for the past month has been he re-appearance of the Drummond. The old workings at No. 1 shaft are now being cleaned out, and are yielding unxpectedly in low grade ore. Excellent terms have been made vith the Denver smelter owing to the fact that the rock is ighly silicious, and therefore very desirable as a flux.

The Lumsden Mining Company is opening up the Rochester nder contract. The crosscut on the 300-foot level is now 200 eet from the Lumsden shaft. The intention is to cut several alcite stringers that were found at the edge of Brady Lake.

The annual meeting of the City of Cobalt Mining Company howed that there was cash in bank, $31,954, with ore at smelter $26,860, and metallics on hand and ready for shipment nother $2,000. During the year 292,694 ounces were produced from 392.04 tons of ore. All the old directors were relected. The management report the cutting of another small ein at the 265-foot level.

Porcupine, Swastika, and Cripple Creek.

Mr. Harold Kingsmill, who for about a year has been manager of the Rea mines, has resigned his position to go to Peru. While no successor has yet been appointed, the property will e controlled and developed by Mr. Williams, resident manager or the Bewick-Moreing Company in the camp.

The most important development in the Porcupine camp to late is probably the discovery of ore bodies 700 feet below the urface on the Pearl Lake claims. While no average assays re given, it is important to note that consistent values are o be found at this depth in the Pearl Lake field. Mr. G. W. Thompson, manager of the Pearl Lake property, wished to btain some evidence of the value of the Pearl Lake claim efore he proceeded to install a large plant. He, therefore, ystematically prospected the ground with a diamond drill. No. 1 hole, which was put down vertically, and about the centre of the south claim, attained a depth of 800 feet. At 200 eet a small quartz stringer was encountered, but it carried o values. At 400 feet values were struck going up to $18.80. t must be noted that in every case maximum assays are given. While the management may guess at the average values, they express natural reluctance to strike a mean at this stage of the game. At 644 feet the main band of mineralized schist intersected with rich quartz stringers, was entered. From this oint down to 800 feet the drill cores showed more or less alues. Assays ranged as high as $58. No. 2 hole was put down 200 feet northeast of the initial boring. It was inclined at 76 deg. from the horizontal. The same small quartz stringer was struck and the upper band of mineralized schist was entered at 324 feet. Assays here ran up to $21.40. The second band of ore was struck at 520 feet, and the drill remained in the same formation as far down as 768 feet, values ceasing at 744 feet. Assays ran as high as $14. No. 3 hole is being put down in the southwest corner of the property. It will be continued to 1,200 feet. The ore bodies encountered are believed to be extensions of the Dixon system of veins, and it is calculated that on the Pearl Lake property they will vary from 67 to 120 feet of mineralized schist intersected by quartz stringers. Encouraged by the success of these operations, a main three-compartment shaft has already been commenced at the centre of the property. It will be sunk to 400 feet at once. A crosscut will be commenced from there, and the shaft will be taken to 600 feet. Stations will be cut and exploration commenced at every 200 feet, down to the 1,000-foot level, as quickly as possible. At the present time the Pearl Lake is running its drills with air from the McIntyre, but the big compressor is on the ground, and when the motor and transformer arrive, will be at once installed and work will commence on a large scale.

It is reported that the Seymour mine, operating in Larder Lake field, has ordered a small 10-stamp mill. The machinery, it is stated, is now on its way to the property, which lies on the Dane Road three miles from Larder Lake.

Spectacular ore is being obtained in the sinking of shafts on the Brydge claim in Tisdale, adjoining the Preston East Dome, and one claim south of the Dome. This claim has been purchased by Col, Stuart Weatherley, an Alaskan operator, who has called it the Little Pet Gold Mine. In a quartz porphyry formation, the gold is found freely in the wall rock, in a coarse state. A plant has been ordered for the property, air for one drill, and a hoist being supplied meantime from the Preston, and camp buildings are under construction.

The main shaft at the Swastika is now connected up with the 200-foot level. This will greatly facilitate the further development of the mine, and operations should now proceed at a much better pace. The new plant, lately installed, is working satisfactorily, and Manager Reddington is making an excellent daily record underground. There is no intention of building a mill other than the present small 5-stamp one, until considerably more ore has been blocked out.

Mr. C. E. Watson has resigned his position as manager of the Dobie Mining Company, in order that he may give his whole attention to the development of the Plenaurum. Some excellent results have been obtained this summer in the course of prospecting of the holdings of this Pearl Lake property. On its claims adjoining the Jupiter, the Plenaurum has discovered the Jupiter's veins, both on the surface and underground, with a diamond drill, an excellent showing has been made on the shore of Pearl Lake near Bewick-Moreing's No. 1 camp, and near the old Armstrong-Booth camps a very promising vein has been uncovered. About 100 yards from the Jupiter east line, No. 1 shaft is being sunk, and it will soon reach a depth of 100 feet. This shaft is sunk on an extension of the Jupiter vein, which for a width of 20 feet showed values of $20.90 to the ton. No. 2 shaft is being sunk on the edge of Pearl Lake near the Bewick-Moreing No. 1 camp. Mr. C. E. Watson has planned an extensive campaign of development, and once adequate power is obtained work will proceed very rapidly.

In addition to locating the rich Brydge lead on the Preston East Dome property, which will be reached by a crosscut from the No. 2 shaft, a spectacular showing has been uncovered on the north East Dome claim, just a short distance from the Dome line. In a dike of porphyry from 300 to 400 feet wide, many quartz stringers and seams exist, and free gold is found in these in a coarse state. The width of the paystreak has not yet been determined, and a large gang of men is engaged in stripping the vein. Cross-cutting westward at 90 feet in No. 2 shaft, a strong quartz vein 2 feet wide has been encountered, and eastward three parallel veins will be cut.

Work has been commenced by the Timmins-McMartin-Dunlap syndicate on the Dixon claim adjoining the McIntyre. The first few shots threw up some very spectacular ore and work is proceeding now with every confidence. The vein has been stripped for a distance of 900 feet and varies from 3 to 5 feet in width. In the railroad cut on the Dixon property, some beautiful specimens of quartz carrying much native gold have been found. The rock cut passes through the zone of mineralized schist, intersected by small quartz stringers, which in many cases are rich in native gold.

In the No. 4 shaft on the McIntyre at 180 feet, the vein has again been encountered. The vein left the shaft for about 80 feet, but has now dipped back again. Some very pretty specimens have been obtained.

Activity on the Standard Gold Mine has recently been confined to diamond drilling operations. Several thousand feet have been accomplished, it is reported, with satisfactory results. Nine buildings are being erected and everything got ready for an active winter campaign.

McIntyre Camp

The McEnaney is the first plant in Porcupine to be run by power from Sandy Falls, where the Porcupine Power Company has its station. The Porcupine Power Company has been prepared to deliver power since last July, but the fire has so retarded operations in the camp that no companies have been able to take advantage of it until recently.

A statement has been made to the effect that above the 200-foot level on the Rea, $280,000 in ore has been blocked out. At a depth of 250 feet the vein carries the same values, and sinking is now being carried on to the 300-foot level. At a distance of 175 feet west of the main shaft No. 2 shaft is being sunk.

BRITISH COLUMBIA.

At the date of writing (October 14) no settlement of the matters in dispute between the executive of District 18, United Mine Workers of America, and the Western Coal Operators' Association appears to have been reached. Mr. John P. White, International President of the U. M. W. of A., has returned to the United States, after having spent a week or more in the coal mining districts along the Crow's Nest Railway, from Lethbridge, Alberta, to Fernie, B.C. Mr. Lewis Stockett, chairman of the Operators' Association, spent the latter part of this week in Lethbridge, following the holding of a convention there of some delegates from all the locals of the district affected by the strike. While no official announcement has been made as to the actual point or points upon which no agreement seems to be practicable at this time, it is freely stated in conversation in some of the towns most directly affected by the long-continued cessation of coal mining that the most serious bar to a settlement is the insistence on the part of the U.M.W.A. local executive on the retention of the check-off system where it has been in existence in the past, and the most positive refusal of the Operators' Association to grant it at any mine concerned in the settlement sought to be arrived at. It should be remembered that this is only what is said in the various towns along the Crow's Nest Railway —it is not an authorized statement of either side to the dispute. It is quite probable, though, that the Operators' Association is fully determined to deny the Union this advantage; on the other hand, it is equally likely the Union officials will hold out for it as long as there shall remain the slightest chance of their retaining it to the extent they have enjoyed it in the past, for without it, there would be much difficulty in collecting fees, dues, fines, levies, etc., from many of the workers. It is also freely stated that both sides are willing to arrange for an early resumption of work on the basis of wh is known as the Gordon report—that is the report made to e Minister of Labour by the chairman of the Board of Conci tion that last summer heard much evidence bearing upon e various matters on which there had arisen divergence of op ion between workers and operators. There is a growing feel that the local officials of the U. M. W. of A. will not m longer be able to hold together the great body of the work in a determination not to return to work upon the terms Operators' Association is willing to concede. There are t strong influences at work tending to weaken the hold of Union officials on the men, namely, that 500 to 600 men already at work in various mines in the district, and that near approach of cold weather is bringing home to them fact that they will at least be very much inconvenienced, not caused positive suffering, by conditions which involve th being practically without money and without fuel. Doubtl the strike allowance made by the Union will keep them fr starving, but it is very probable their condition, if they sh not be earning wages regularly, will be a trying one.

It seems to me, therefore, and this with a sincere desire express an opinion without prejudice to the mine workers, th their sacrifice has been in vain, and that the Operators' As ciation is steadily gaining advantage, while the U. M. W. of is losing it.

Reviewing the position as it has during the last few da come under my notice, I find it to be about this: In the Brit Columbia part of the Crow's Nest district, the Crow's N Pass Coal Company has probably about 60 men doing devel ment only; it is not mining coal. I have no information c cerning Hosmer. At the Corbin mine, about 175 men are e ployed, more than half of them underground, and from 400 500 tons of coal a day is being shipped. In Alberta, there practically nothing being done at the mines of the Internatio and McGillivray Creek companies, at Coleman. The W Canadian Collieries, Ltd., is mining coal at its Blairmore mi employing 50 to 60 men, and shipping about 150 tons of coal day; but no production is being made at this company's B levue and Lille collieries. At Frank, the Canadian Coal Co solidated Company has men working, but how many and wh the production of coal I did not ascertain. The Leitch C lieries, Ltd., is mining a small quantity of coal at its Passbu (south) mine. At its north mine (known locally as at Poli Flats) much work has been in progress in connection with erection of a coal washery, coke ovens, and other surface i provements. In all, at least 100 men are employed by th company, which number, however, is only one-third of wh would be the working force under ordinary conditions. Co was being loaded on railway cars at both mines when the were visited this week. At Burmis, the Davenport Coal C is operating its mine, but with both number of men workin and output of coal below the ordinary. At Lundbreck tw companies are operating, but neither on a large scale. Aroun Lethbridge, no large mines are producing coal. One compan which has put in an extensive surface plant, is as yet onl doing development work underground, in the course of whic it takes out about 150 tons of coal a day, and this is bein shipped. Two small mines are together producing betwee 100 and 150 tons, which coal is sold for domestic use in Leth bridge. The present position is, therefore, that the large collieries are doing little work, and that little developmen work or surface improvements. It should be stated that sev eral of the smaller ones are working under agreements to pa whatever wages or rates shall eventually be agreed upon, whe the Operators' Association and the U. M. W. of A. shall ar rive at a settlement.

Similkameen.—In September the Hedley Gold Mining Com pany, owning and operating the Nickel Plate group of mine on Twenty-mile Creek, and the 40-stamp mill at Hedley, pai

nother dividend of five per cent. on its issued capital of $1,-0,000. This makes the third similar distribution of profits ring the current year, the total for the nine expired months which is $180,000. It is gratifying to know that not only the company's mining property continuing to look well the parts from which a comparatively large output of ore s long been maintained, but there have been late develop-nts in another part which are nnderstood to have added lly $1,000,000 worth of ore to the known reserves. About ree months ago ore of good grade was found in the lowest orkings, opened by what was known as Rodgers' tunnel, hich was practically abandoned by an earlier management unproductive, following the time when Mr. M. K. Rodgers d this adit driven and had satisfied himself that good ore ould be found here. So little was this part of the property nought of by a later manager that work in it was stopped, nd the tramway rails aloug the tunnel taken up. When, how-er, the property was acquired by the Hedley Gold Mining ompany, a different working policy was adopted by the pres-nt general superintendent, Mr. G. P. Jones, who agreed with Ir. Rodgers concerning the prospective value of the lowest orkings and proceeded to extend them. Since a shoot of good re was entered, it has been developed and found to be 46 eet in width, while about 150 feet of drifting has been done n it, with the result that, as above-mentioned, a substantial ddition has been made to the available ore reserves. This ewly-opened orebody is well up to standard grade; indeed, it understood that some of the ore contains gold to the value f $15 to $20 per ton. It is manifest, therefore, that the com-any will not experience any trouble in maintaining the aver-ge grade of its milling ore at the customary value of about 12 per ton.

Observatory Inlet—The Pacific Metals Company, Ltd., of hich Mr. J. L. Parker is general manager, a short time ago eceived advice from its mine foreman at the Red Wiug mine, ituated in the vicinity of Goose Bay, Observatory Inlet, that e had broken into more ore in the workings, the orebody aving widened from about 6 feet to between 10 and 11 feet. he additional width of ore was described as being "fine re." There had been encouutered a cross lens of ore run-ing at right angles to the vein. This cross lens is now being leveloped by driving on the ore west of the dike and towards he footwall. The assay value of a sample of this orebody, aken over a width of 6 feet, showed as follows: copper, 6.75 per cent.; silver, 4.45 oz., and gold, 9.06 oz. per ton. This is the third cross orebody found in the length of the tunnel so far driven. An average sample of 6 feet of ore on the strike of the vein assayed: copper, 4.12 per cent; silver, 2.35 oz., and gold, 0.02 oz. per ton. The estimated recoverable value of this ore, after allowing for the customary smelting deductions, is placed at $7.70 per ton. Allowing for mining costs, $1.50; smelting, $2; and freight, $1.50 per ton, there would remain an estimated net profit of $2.70 per ton.

Vancouver Island.—Although the Tyee Copper Company's last fiscal year ended April 30, 1911, no information concerning the quantity of ore smelted in that year at its smeltery at Ladysmith, Vancouver Island, and the amount and value of the product, had up to October been published. The figures follow and, for purposes of comparison, also those of the company's two immediately preceding fiscal years:

YEAR ENDED APRIL, 1911.

	Tons.
Ore received at Ladysmith smeltery ...	46,521
Ore smelted at Ladysmith smeltery	44,817
Total value, less refining charges only	$555,843.08
Total quantity of copper produced	4,242,246 lbs.

Corresponding figures for fiscal year ended April 30, 1910:

	Tons.
Ore received	41,530
Ore smelted	45,758
Total value, less refining charges only	$575,468
Total quantity of copper produced	3,461,107 lbs.

Corresponding figures for fiscal year ended April 30, 1909:

	Tons.
Ore received	34,304
Ore smelted	29,550
Total value, less refining charges only...	$327,270
Total quantity of copper produced	2,216,230 lbs.

It will be noted that the quantity of copper produced last year was 781,139 lbs. greater than in the year to April 30, 1910, and 2,026,016 lbs. greater than in the year to April 30, 1909, the latter being an increase of nearly 100 per cent. The management of the Tyee Copper Company may be congratulated on the progress made, especially as this was in the face of keen competition for custom ores and low average market prices for copper.

GENERAL MINING NEWS.

NOVA SCOTIA.

Sydney, Oct. 20.—President Plummer and the visiting direc-ors of the Dominion Steel and Coal Company, spent the day t Glace Bay and the various collieries of the company, and re-urned to Sydney this evening. When seen to-day Mr. Plum-ner and the directors expressed themselves as thoroughly satis-ied with the progress of the development work now under way t the mines, and conditions geuerally at their Cape Breton ndustries.

The directors were particularly struck with the great pro-gress and development of the New Waterford district, where the ompany anticipate having at least from four to six new ollieries producing coal by next summer. It is estimated that hat total output from the mines of the company will exceed 4,000,000 tons and that there will also be a substantial in-rease in shipments.

The president and directors were accompanied by General Manager M. J. J. Butler, D. H. McDougall, Assistant Gen-eral Manager, and C. S. Cameron, Comptroller of the Steel Company on tour of the collieries to-day.

The directors leave to-night for Montreal, only President Plummer remaining in the city for a few days to attend to important business which has piled up here.

As the result of an expressed desire on the part of Mr. Plummer on behalf of the company, the city will probably undertake the erection of a new hospital for the accommodation of city patients shortly, the present institution which is conducted by the company being entirely inadeqnate to supply the ever increasing number of patients seeking admission.

About twenty Italians who have been residing here for the past several years, left here yesterday en route for Italy with the intention of engaging in the present Turko-Italian war. They are believed to be the first party of Italians from the Maritime provinces to start for the scene of hostilities.

Halifax, October 17.—President Plummer and ten directors of the Dominion Steel Corporation, leave Montreal for Sydney, on October 17th, and will spend four days inspecting the steel plant and mines, leaving again Sunday night.

W. B. Perley, assistant to the president of the U. S. Steel Corporation, is in Sydney, but it is not known that his visit has any grave significance.

The directors' party consists of President Plummer, Sir H. Montagu Allan, Messrs. Gei. Caverhill, Wm. McMaster, Frederic Nicholls, W. G. Ross, J. R. Wilson, and Mark Workman, accompanied by Mr. Cameron, secretary of the company, and Mr. J. P. McNaughton, general sales agent. They leave at 7.30 to-night by the I. C. R.

Sydney, October 15.—The Dominion Coal Company has started the work of opening another new colliery at Lingan, near the scene of the mining operations conducted there about 30 years ago. It is not definitely known as yet when the new mine will be in a position to furnish a coal output, but the preliminary work will be started as soon as possible. It is the intention of the company to ship their entire output next year from Lingan direct. For this purpose the company will erect a new pier there and equip it with the most modern conveniences for the handling of coal and loading their steamers and vessels with as little delay as possible. The company is erecting a new bankhead at No. 15 colliery at Waterford and several large colliery buildings, which will be ready for business early next winter.

ONTARIO.

Cobalt, Oct. 16.—For the past year the McKinley-Darragh Company has had four drills at work on practically nothing but crosscuts on the Savage lot, and in that time vast changes have been made in the underground workings by the opening up of new veins.

One of the latest discoveries is No. 8, found some six weeks ago from No. 4 shaft. This vein runs along the foot of Diabase Mountain and the 150 feet of drifting that has been done has revealed a vein averaging two inches in width. The ore had been very patchy, some times being exceptionally high-grade, while in other parts it would be comparatively lean.

Kenora, October 18.—The Cameron Island mine, on Shoal Lake, about 35 miles southwest of here, is to be re-opened and developed.

B. M. Cameron, of Hamilton, and Frank Grew, of Toronto, representing a syndicate that recently purchased the property, have decided to put the plant into shape this winter and start actual mining early in the spring.

Cobalt.—Beaver directors, who have for some time been contemplating the erection of a concentrator to treat the low grade ore piling up on the Beaver dump, have finally decided to begin construction, and ground is being broken for this purpose. The mill will be constructed to treat fifty tons per day, and will be so designed that it can easily be increased if circumstances warrant the extension.

It is not expected that the construction of the mill will interfere with Beaver dividends. The mill will probably cost from $30,000 to $40,000, but the company had on August 31 last nearly $60,000 in cash, and twice that amount coming to them from the smelters for ore shipped.

BRITISH COLUMBIA.

Ymir, October 19.—About noon yesterday fire was seen by the caretaker of the Ymir mine issuing from one of the buildings of the mine. He, at the time, was at the mill, about a half mile away. On arriving at the scene, all of the buildings were discovered to be on fire, and, being alone, and with the hose in one of the buildings, he could do little towards checking its progress.

The following buildings were totally destroyed: Blacksmith shop, cook house, dining house, two store rooms, boiler house, two cottages, and stables. The aerial tramway terminal building was saved by carrying water from the pipe line, but the rest of the buildings, together with various mining t[o]ls, stores and other etcetera, were a total loss. The cause of the fire is at present unknown.

Loss is estimated at about $20,000, which was partly cov[e]red by insurance.

Vancouver, B.C.—Mr. A. C. Flumerfeldt, of Victoria, has this week elected a member of the board of directors of G[ra]nby Consolidated Mining & Smelting Company, of Grand F[or]ks and Phoenix. He will once more be in touch with its affairs [in] which he formerly took a prominent part. For several y[ea]rs he filled the important position of assistant to the presid[en]t, an office then filled by the late S. H. C. Miner, of Gran[by], Que., and resided at Grand Forks.

When Mr. Miner withdrew from the office, Mr. Flumerf[eldt] also resigned. Although Mr. Miner was credited with hav[ing] sold most of his stock in the big company, it developed a[fter] his death that he was the second largest shareholder. [Mr.] Flumerfeldt is executor of the estate of the deceased milli[on]aire.

Vancouver, October 24.—Mining properties in the fam[ous] Silver Lead section, Slocan district, valued at over $2,000,[000] were amalgamated by a deal concluded in Vancouver to-day.

The amalgamation is one of the most important moves m[ade] in British Columbia mining affairs for several years. It is [the] consolidation under a new company of the Byron, N. W., [and] John M. Harris mineral properties at Sandon, most noted [of] which is the Slocan Star mine, which, up to the time w[hen] its activities were suspended by litigation, had produced [$]-000,000 in silver, lead, and zinc.

UNITED STATES.

Butte, Mont.—The copper production of this district [for] the month of September was 1,200,000 pounds less than it [was] in August, as the following official figures of the Anacon[da] Company will show: Washoe smelter, 15,900,000 pounds; Gr[eat] Falls, 5,400,000 pounds; making a total of 21,300,000 poun[ds], the East Butte smelter turned out 1,000,000 pounds, bringi[ng] the grand total for the district up to 22,300,000 pounds, [as] compared with 23,500,000 pounds in August.

Miami, Ariz., Oct. 20.—At the Miami all departments [are] running with a smoothness that is remarkable for a mine th[at] is in its initial stages of operation. General Manager B. Gottsberger states that from 1,800 to 1,900 tons of ore p[er] day are being mined and milled, with a daily production [of] about 82 tons of concentrates averaging 41 to 42 per ce[nt] copper.

Cripple Creek, Colo., Oct. 20.—Checks have been mailed o[ut] for the regular quarterly dividend of 2 cents a share by t[he] Portland Gold Mining Company. The new mill at the Portla[nd] mine treated 29,559 tons of low-grade ore during the thr[ee] months ending September 30th, at a net profit of $33,110.7[1], according to a statement accompanying the dividend check. The total net profit of the company from the mill during th[e] first nine months of this year was $100,939.16.

Duluth, Minn., Oct. 23.—The ore rate on the two Iron Rang[e] roads of the United States Steel Corporation will be cut [to] 60 cents a gross ton within the next 30 or 40 days. The a[n]nouncement of the proposed reduction came to-day from Pres[i]dent William A. McGonagle, of the Duluth, Mesaba, and No[r]thern Railway, later confirmed by President Frank E. Hou[ston] of the Duluth and Iron Range Railway.

The present rate on iron ore is 80 cents per gross ton fro[m] all Mesaba range points to Duluth. The rate covers all shi[p]ping points on the Duluth, Mesaba, and Northern Road and a[ll] the Mesaba range points on the Duluth and Iron Range Ra[il]road. From Tower the rate is 90 cents to the docks at Tw[o] Harbours, and from Ely it is $1.

STATISTICS AND RETURNS

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending October 20th, and those from Jan. 1, 1911, to date:

	Oct. 20. Ore in lbs.	Since Jan 1. Ore in lbs.
Badger	.....	55,200
Bailey	.....	40,000
Barber	.....	6,000
Beaver	64,479	1,465,937
Buffalo	62,427	2,154,971
Chambers-Ferland	.....	1,086,900
City of Cobalt	.....	663,980
Cobalt Lake	64,700	3,585,090
Cobalt Townsite	104,000	1,089,420
Colonial	.....	183,410
Coniagas	125,390	3,442,153
Crown Reserve	61,200	1,951,980
Drummond	120,000	2,622,480
Green-Meehan	.....	60,000
Hargraves	.....	161,100
Hudson Bay	.....	1,194,340
Kerr Lake	60,070	2,173,670
King Edward	.....	40,000
La Rose	66,500	6,023,078
McKinley Darragh	175,089	5,334,438
Nipissing	127,649	4,876,667
O'Brien	63,800	1,210,958
O'Brien, M. J.	.....	47,000
Peterson Lake, Little Nip.	.....	58,430
Provincial	.....	151,950
Right of Way	59,800	1.191,805
Silver Cliff	.....	106,680
Standard	.....	102,813
Temiskaming	.....	1,348,452
Trethewey	53,040	1,118,020
Wettlaufer	.....	117,232

The shipments for the week were 1,208,140 pounds, or 604 tons, against 580 tons last week.

The shipments from Jan. 1, to Oct. 20, were 42,361,798 lbs.. or 21,180 tons.

B. C. ORE SHIPMENTS.

The ore shipments for the week ending October 14th totalled 1085 tons, and the smelter receipts were 14,704 tons. For the year to date the shipments were 1,302,545 tons, and the receipts were 1,175,036 tons. Following are the returns:

Rossland Shipments.

Centre Star	3,699	157,709
Le Roi No. 2	463	22,414
Le Roi No. 2, milled	300	12,300
Le Roi	531	12,926
Other mines	.....	457
Total	4,993	205,806

Boundary Shipments.

Mother Lode	4,600	243,583
Rawhide	3,327	33,446
Jackpot	331	21,416
Athelstan	198	6,614
Unnamed	690	5,813
Other mines	.....	630,692
Total	9,146	941,564

Slocan-Kootenay Shipments.

Molly Gibson	31	860
Van Roi, milled	800	30,649
Molly Gibson, milled	300	39,000
Sullivan	247	15,481
St. Eugene, milled	420	21,876
Richmond-Eureka	58	1,879
Silver Cup	31	414
Rambler-Cariboo	60	1,387
Queen, milled	420	17,010
Granite-Poorman, milled	250	10,260
Nugget, milled	110	4,510
Second Relief	25	108
Knob Hill	93	3,945
Ate	41	41
Alix	10	10
California Clipster	12	12
United Copper	36	36
Other mines	.....	7,697
Total	2,946	155,175

B. C. Copper Co.'s Receipts. Greenwood, B.C.

Mother Lode	4,600	243,583
Rawhide	3,327	33,446
Jackpot	331	21,416
Athelstan	198	6,614
Unnamed	690	5,813
Other mines	.....	10,652
Total	9,146	321,524

Consolidated Co.'s Receipts. Trail, B.C.

Centre Star	3,699	157,709
Sullivan	247	15,481
Le Roi No. 2	463	22,414
Le Roi	531	12,926
Richmond-Eureka	58	1,879
St. Eugene	128	5,971
Silver Cup	31	414
Rambler-Cariboo	60	1,387
Second Relief	25	108
Queen	61	524
Knob Hill	93	3,945
Van Roi	32	1,186
Molly Gibson	31	860
Ate	41	41
Alix	10	10
California Clipster	12	12
United Copper	36	36
Other mines	.....	38,196
Total	5,558	263,099

DOMINION STEEL.

The Dominion Steel Company's output for September was as follows:

Pig iron, 22,300 tons; steel ingots, 27,290; blooming, 23,705; rails, 16,575; rods, 3,365; coke, 39,300. Total shipments, 22,000.

The rod mill is on a single shift.

TORONTO MARKETS.

October 26.—(Quotations from Canada Metal Co. Toronto):

Spelter, 6.50 cents per pound.
Lead, 4.25 cents per pound.
Antimony, 7 to 9 cents per pound.
Tin, 43 cents per pound.
Copper, casting, 12.85 cents per pound.
Electrolytic, 12.85 cents per pound.

Ingot brass, 7 to 12 cents per pound.

October 26.—Pig Iron (Quotations from Drummond, McCall and Co., Toronto):

Summerlee No. 1, $23.00 (f.o.b. Toronto).
Summerlee No. 2, $22.50 (f.o.b. Toronto).
Midland No. 1, $19.00 (f.o.b. Toronto).
Midland No. 2, $18.50 (f.o.b. Toronto).

GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.

Coke.

October 24.—Connellsville Coke (f.o.b. ovens):
Furnace Coke, prompt, $1.50 to $1.55 per ton.
Foundry Coke, prompt, $1.80 to $1.90 per ton.

October 24.—Tin, Straits, 42.00 cents.
Copper, Prime Lake, 12.50 cents.
Electrolytic Copper, 12.50 cents.
Copper wire, 13.50 cents.
Lead, 4.25 to 4.35 cents.
Spelter, 6.30 cents.
Sheet zinc, (f.o.b. smelter), 8.00 cents.
Antimony, Cookson's, 8.00 cents.
Aluminium, 19.00 to 19.50 cents.
Nickel, 40,00 to 45.00 cents.
Platinum, ordinary, $46 per ounce.
Platinum, hard, $48.50 per ounce.
Bismuth, $1.80 to $2 per pound.
Quicksilver, $46 per 75-pound flask.

SILVER PRICES.

	New York. cents.	London. pence.
Oct. 6	52½	24¼
" 7	52½	24¼
" 9	52⅜	24 3/16
" 10	52½	24¼
" 11	52⅝	24 5/16
" 12	52⅝	24 5/16
" 13	52½	24¼
" 14	52½	24¼
" 16	52⅝	24¼
" 17	52⅞	24⅜
" 18	53⅛	24½
" 19	54	24⅞
" 20	54⅜	25 1/16
" 21	54⅛	24 15/16
" 23	54	24⅞
" 24	54⅛	24 15/16

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

PORCUPINE STOCKS.

American Gold	...	...
Apex	.16	.16½
Coronation	.03¾	.04
Nor. Exploration	off	3.60
Dobie	1.25	1.30
Dome Ex.	.74¾	.75
Foley-O'Brien	.65	.72
Rea	2.58	2.62
Holinger	11.30	11.35
Monita	.14	.17
Pearl Lake	.46	.46½
Central	3.62	3.70
Imperial	.11½	.12¼
Northern	1.00 bid	
Tisdale	.07½	.08
Preston East Dome	.28½	.28
Standard	.21½ bid	
Swastika	.34	.35
United	.04	.04
Porcupine Gold	.44	.45
West Dome	1.10	1.25
Crown Chartered	.42½	.43
Eldorado	.12½	.13
Gold Reef	.16	.20
Porcupine Canada	.90	1.00

COBALT STOCKS.

	October 23rd. Bid.	Ask.
Bailey	.02½	.02½
Beaver	41¼	.42½
Buffalo	1.40	1.90
Chambers-Ferland	.11½	.12
City of Cobalt	.09	.10
Cobalt Lake	.27¾	.28
Coniagas, x div.	6.10	6.30
Crown Reserve	2.95	3.00
Great Northern	.12	.13
Green-Meehan	.01⅜	.01½
Hargraves	...	...
Kerr Lake	2.70	2.90
La Rose	3.95	4.00
Little Nipissing	.02	.02½
McKinley Darragh	1.80	1.85
Nipissing	7.60	7.75
Nova Scotia	.09	.11
Peterson Lake	.06¾	.07½
Right of Way	.07	.08
Rochester	.02¼	.02½
Silver Leaf	.02½	.03
Temiskaming	.38½	.39
Trethewey	.50	.65
Wettlaufer	.78½	.79

NEW YORK CURB.

Braden	4⅞	5
B. C. Copper	3¾	4
Butte Coalition	15¼	16¼
Ely Central	.01	.02
Ely Consolidated	¼	⅜
First National Copper	1⅛	1¼
Giroux	3⅞	3 15/16
Greene-Canadian	6¼	6⅜
Inspiration	...	...
Nevada Hills	2⅝	2 11/16
Ohio Copper	1¼	1⅜
Ray Central	1 3/16	1⅜
Union Mines	⅛	¼
Yukon Gold	3⅜	3½
Goldfields Consolidated	4½	4⅝
Nevada Consolidated	16⅜	16½
Miami	19⅜	19½
Granby	..	60
Con. Mining & Smelting	40	44½
Davis-Daly	¾	1
Con. Arizona	11/16	¾
Rawhide Coalition	..	..
Ray Consolidated	14⅛	14¼
Chino	20½	21
Chino	..	..
New Baltic	..	..
United Copper	1½	2

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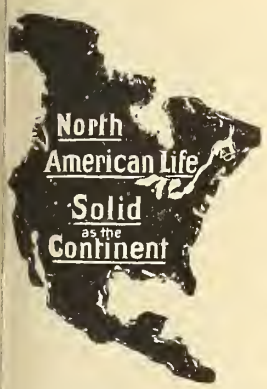

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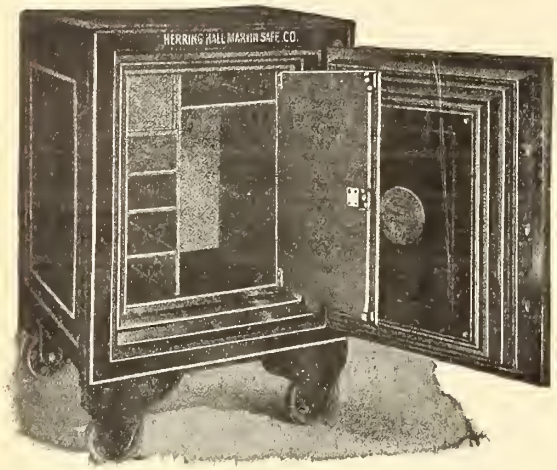

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1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map Canada, by G. A. Young and R. W. Brock.
1170. Summary Report of the Geological Survey for 1910.

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1113. Memoir No. 16. The Clay and Shale Deposits of Nova Scotia and portions of New Brunswick, by H. Ries aud J. Keele.

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1089. Map 9A. Explored Routes on Parts of the Albany, Severn and Winisk Rivers. Scale 8 miles to 1 inch.

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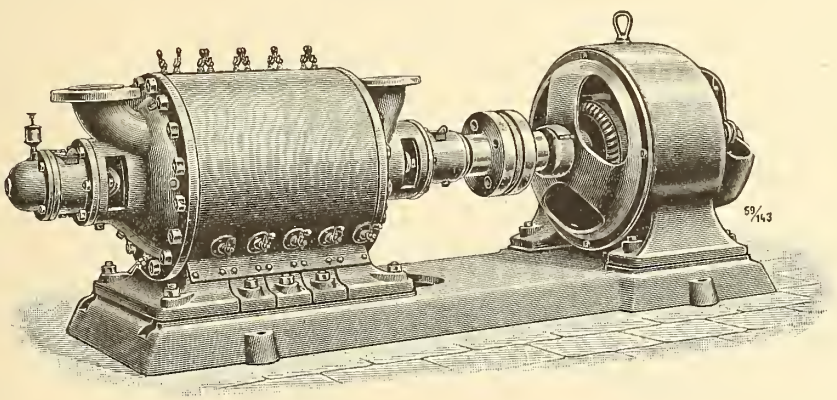

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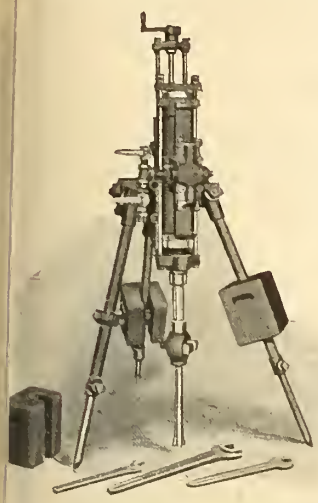

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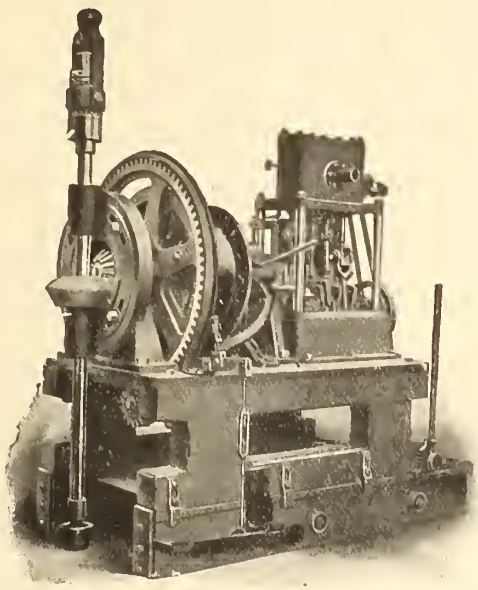

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MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of $10 an acre fo SUPERIOR METALS when more than 20 miles distant from a railway and $20 an acre when less than 20 miles.

For INFERIOR METALS the prices are $2.00 and $4.00 an acre respectively.

The attention of prospectors is specially called to the territory in the North-Western part of the province of Quebec, north of th height of land, where important mineralized belts are known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit o miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensur results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of th Province, on application addressed to

THE HONORABLE THE MINISTER OF COLONIZATION, MINES, AND FISHERIES, QUEBEC.

Nova Scotia Mines

Gold, Coal, Iron, Copper, Lead, Tin, Manganese, Tungsten, and other minerals.

The Gold District covers more than three thousand square miles. Millions of dollars worth of gold have been taken from the gold fields of Nova Scotia and millions of dollar's worth remain for recovery.

Gold mining in this Province offers good inducement for investment. Labor is cheap and plentiful: timber and fuel are abundant.

Large deposits of iron also are known to exist at various places in the Province; and considerable mining has been done in connection with this mineral, the ore being used locally and shipped to foreign ports.

Among the most important minerals occurring in economic quantities may be mentioned, Coal, Gold, Silver, Manganese, Leadsilver, Copper, Barytes, Mineral Pigments, Gypsum and Tungsten.

Licenses are issued for prospecting for Gold and Silver for a term of twelve months. The licenses are for areas 150 by 250 feet, and can be obtained for 50c. an area.

Leases can be secured for $2. an area, for a term of forty years; subject to annual rental of 50c. an area.

Licenses to search over five square miles, for a period of eighteen months, for minerals other than gold and silver, cost $30.

Leases for three renewable terms of twenty years each can be obtained for $50., and are subject to a yearly rental of $30.

Royalties are as follows:—

Gold, two per cent on the gross value thereof; Copper, four cents a unit; Lead, two cents a unit; Iron, five cents a ton; Tin and Precious Stones, five per cent; Coal, ten cents on every long ton sold or removed from the mine.

Copies of the mining law can be had gratis, by applying to the Department of Public Works and Mines, Halifax, Nova Scotia, or to Mr. John Howard, Agent General for Nova Scotia, 57a Pall Mall, London, England.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. W. H. HURST,
Minister of Lands, Forests and Mines,
Toronto, Canada.

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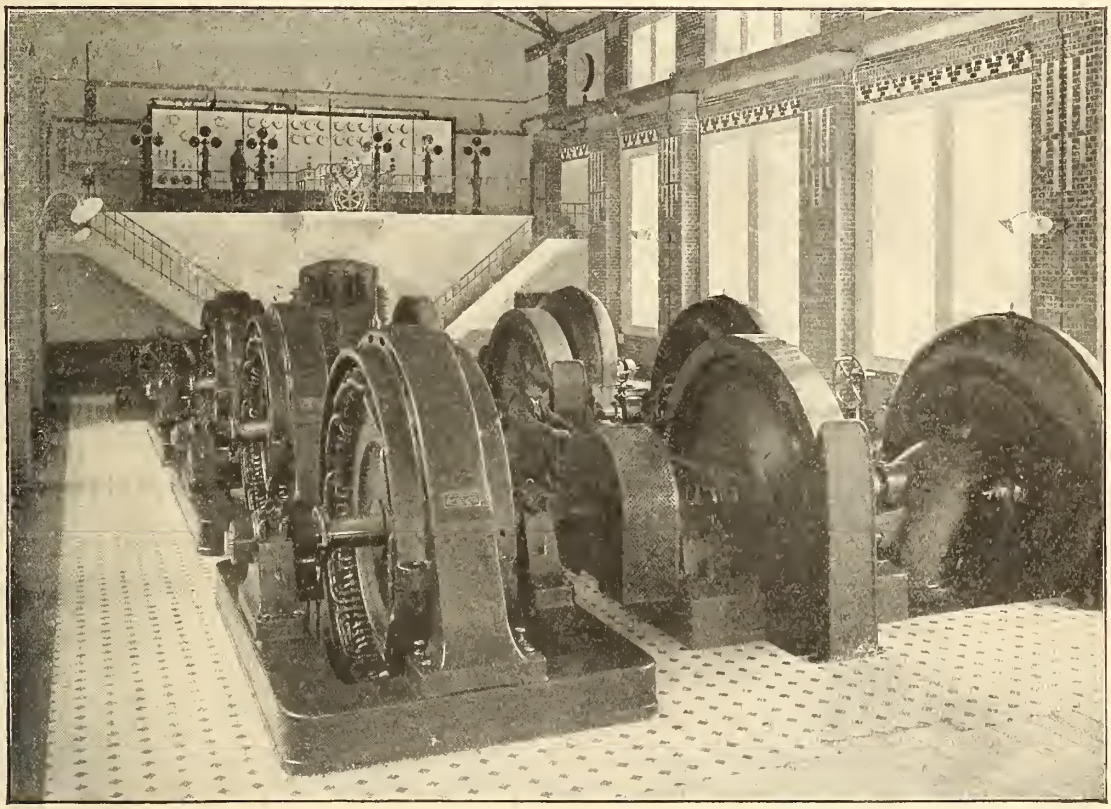

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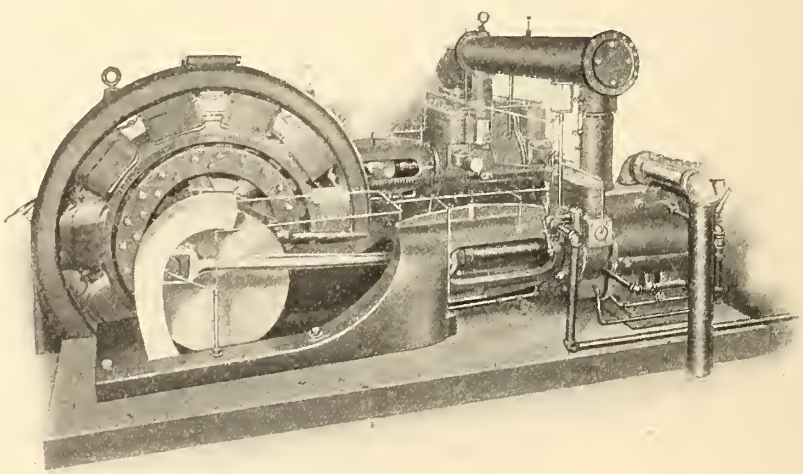

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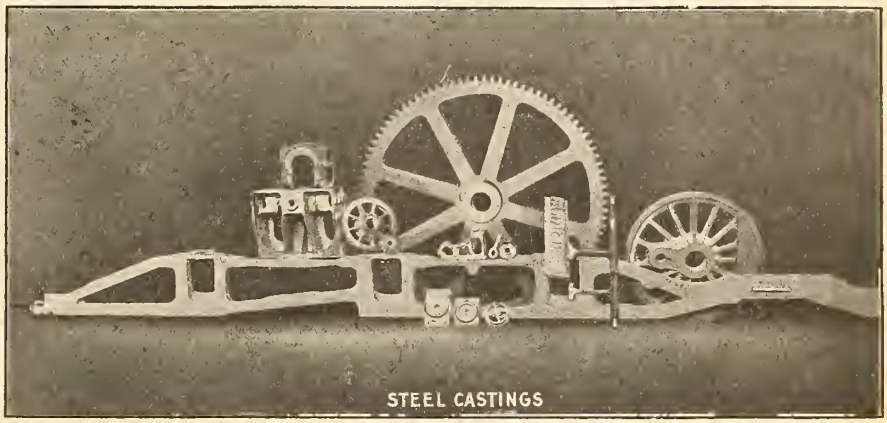
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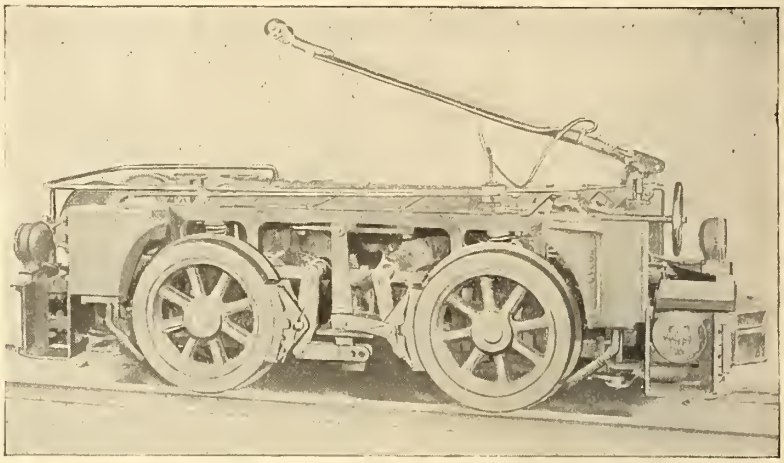

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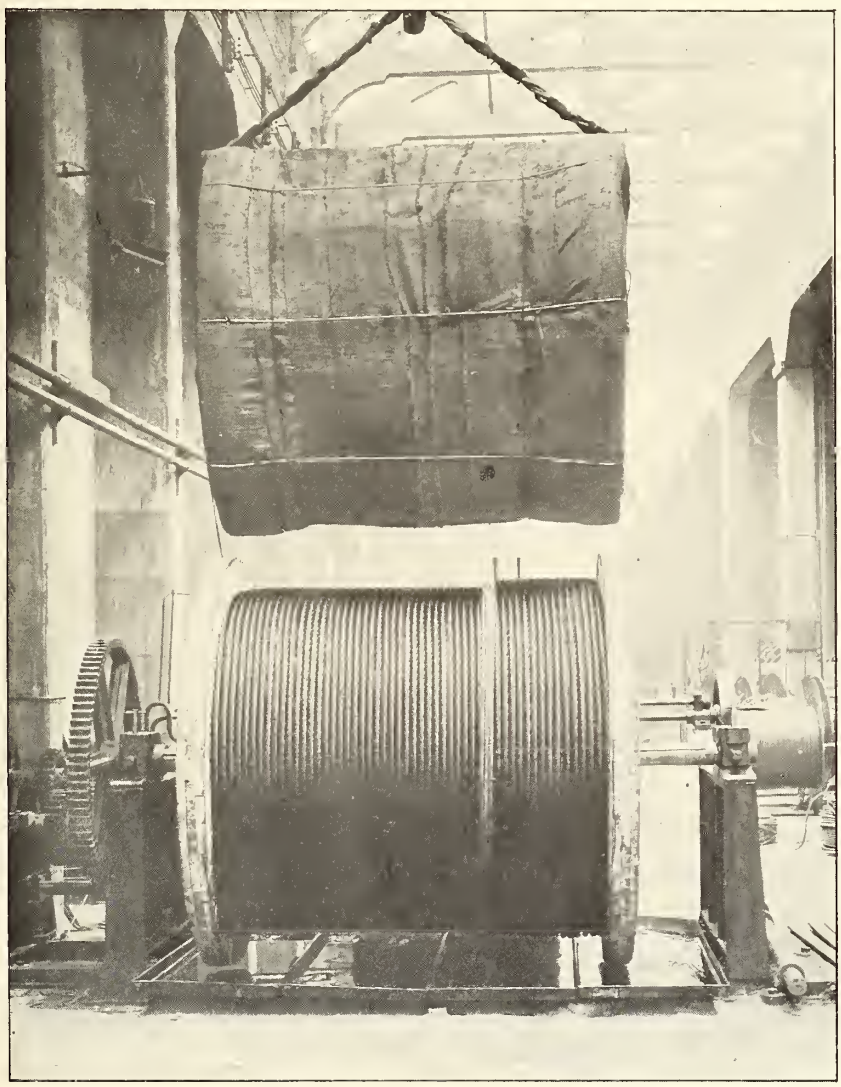

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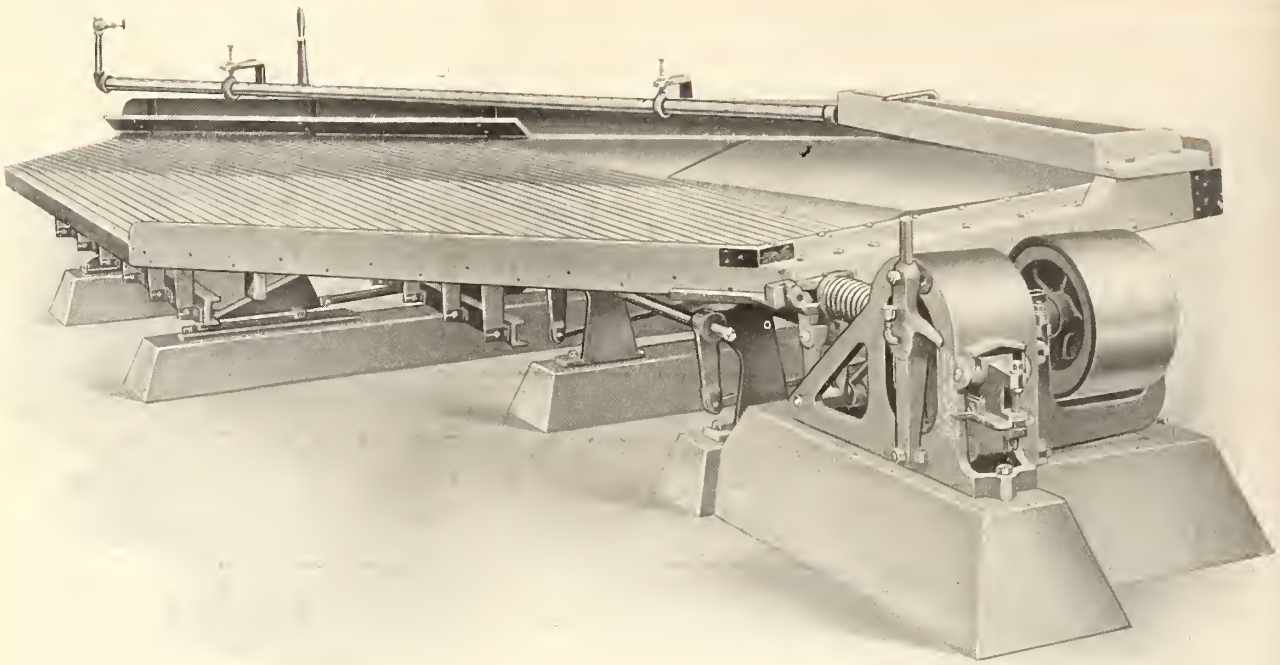

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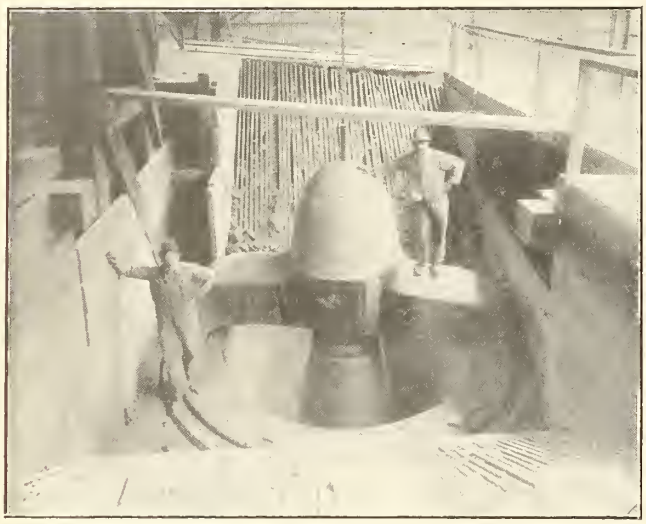
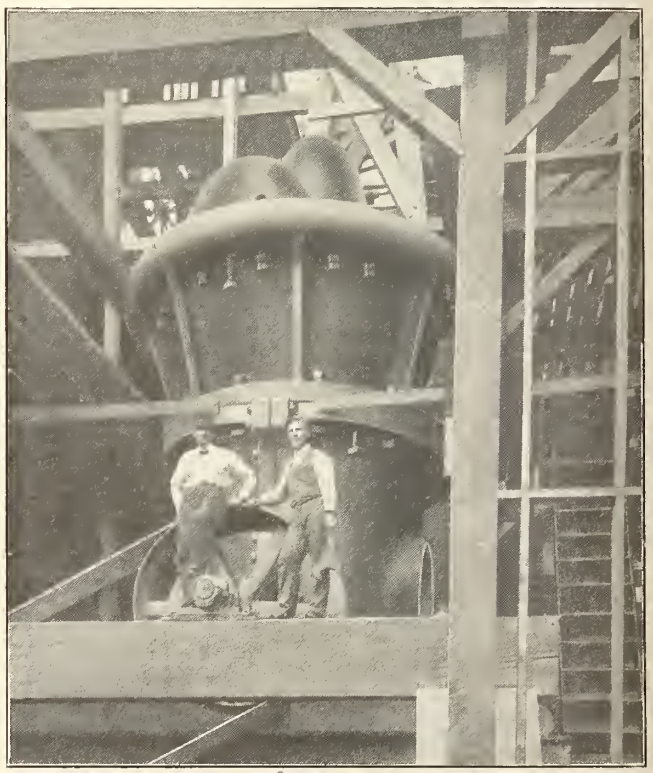


"K" No. 21

Note the high arched spider, offering a free opening and preventing any bridging of the rock. Each opening 42 ins. x 8 ft. will receive a block 3 ft. x 5 ft. x 10 ft.



"K" No. 21

The big No. 21 "K" Crusher in Laurin & Leitch's plant, Montreal, weighs 225 tons, stands 25 feet high, and has a capacity of 1,000 tons per hour.

For full particulars of these crushers see Bulletin 1141. The sample grinder is described in Leaflet 2036.

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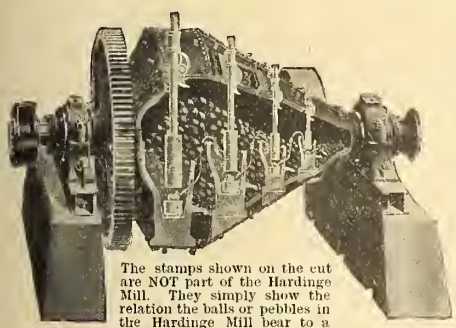

The stamps shown on the cut are NOT part of the Hardinge Mill. They simply show the relation the balls or pebbles in the Hardinge Mill bear to a number of stamps arranged for **Ideal Stage Crushing.**

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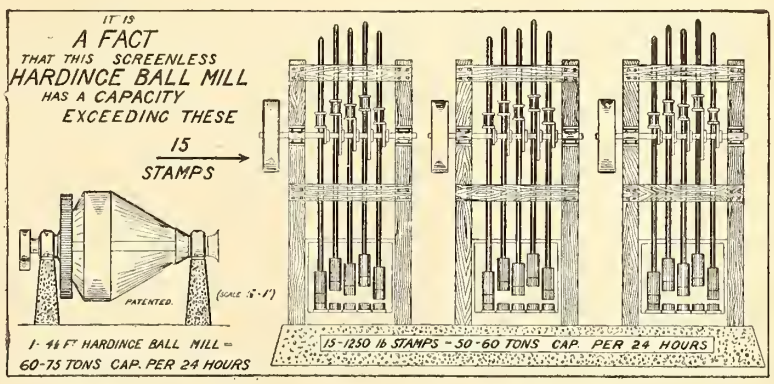

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"It is so simple and easy of operation that a fresh hand picks it up at once with ideal results.

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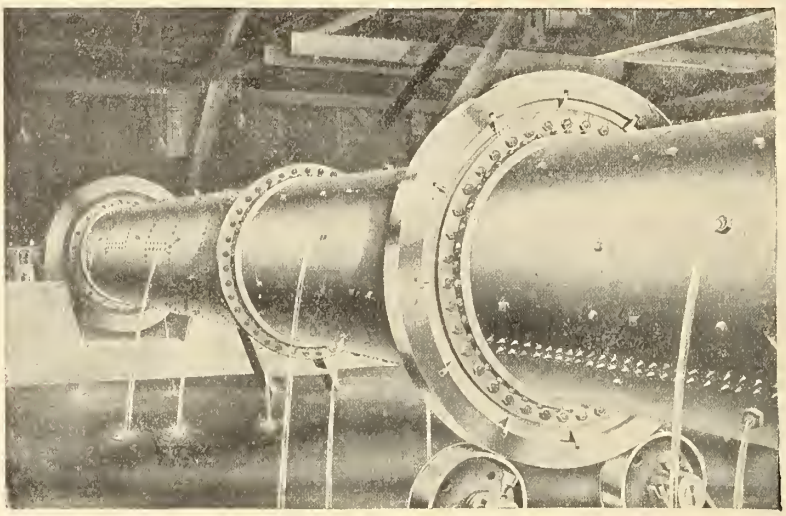

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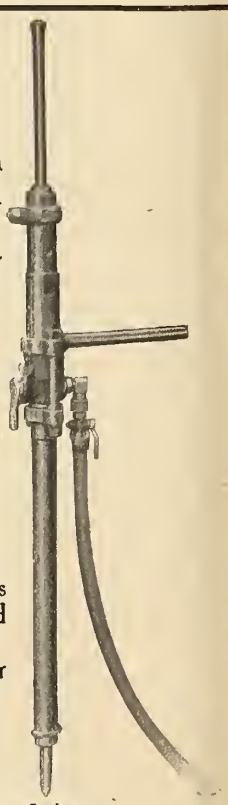
Write any of our offices for the names of these concerns and details of their experiments; or better still, ask for one or more drills for a free trial in your own mine.

Write for new Bulletin 666-C



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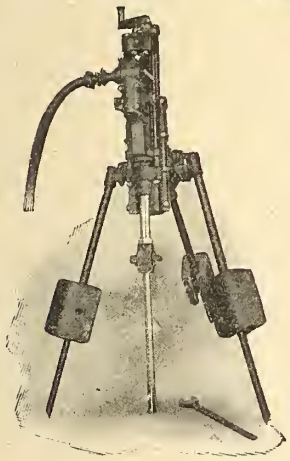
ROCK DRILLS



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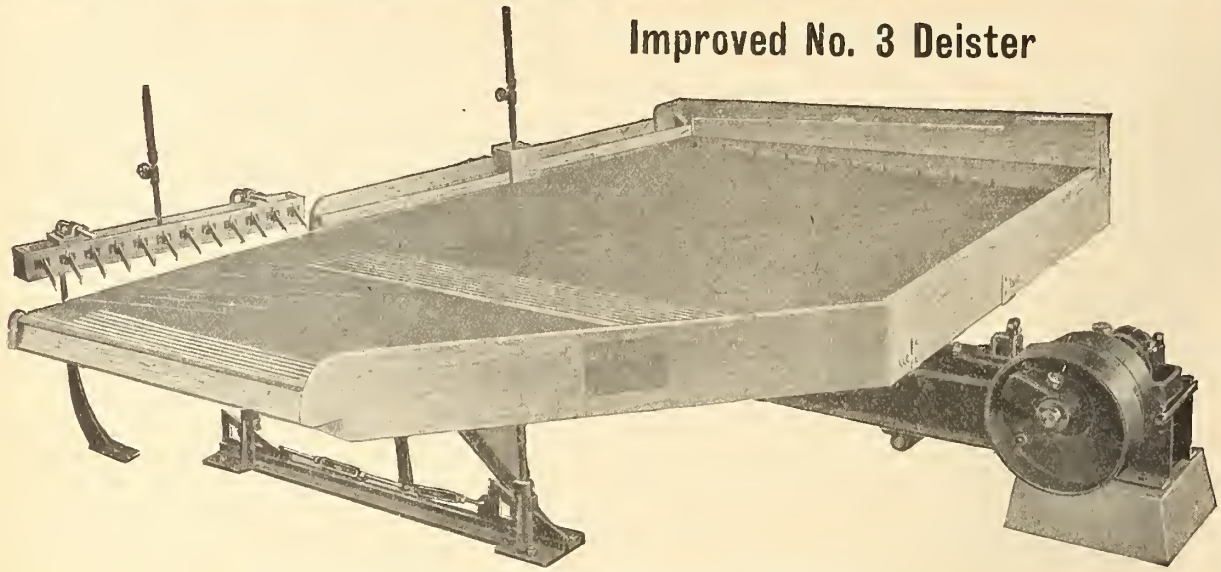

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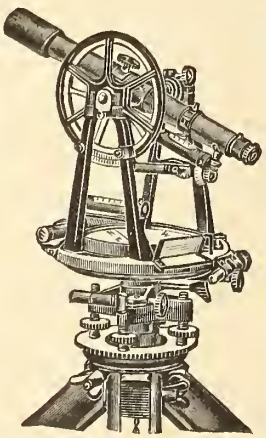

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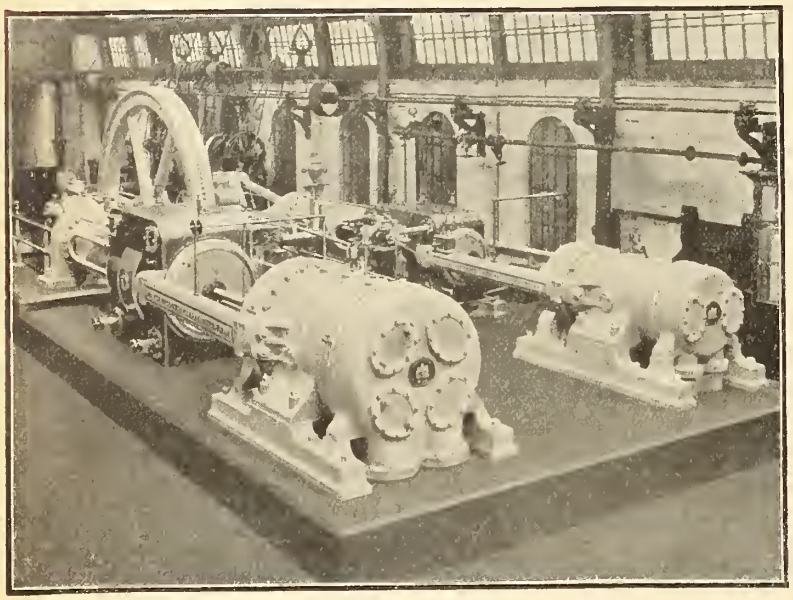

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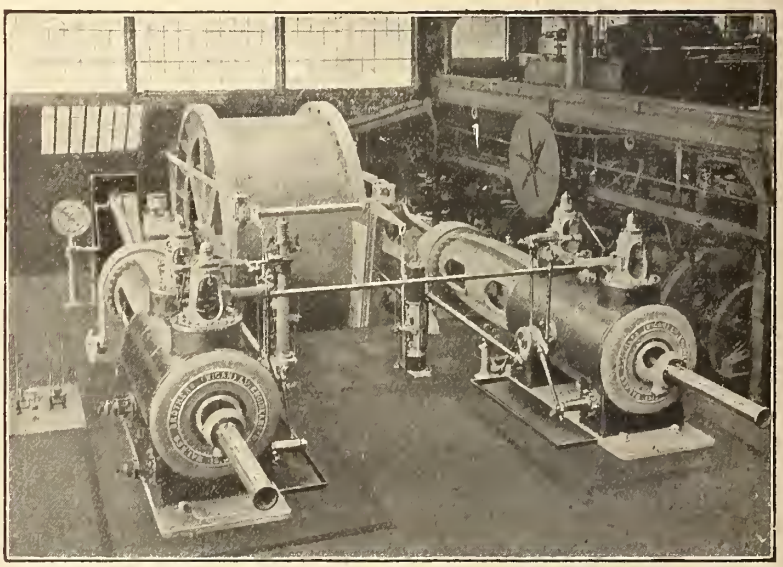

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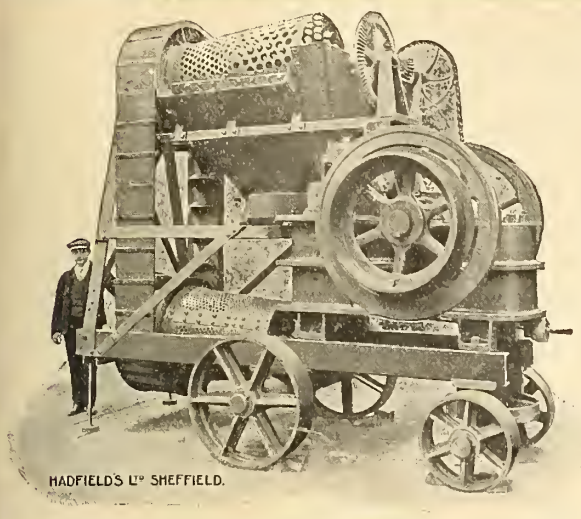

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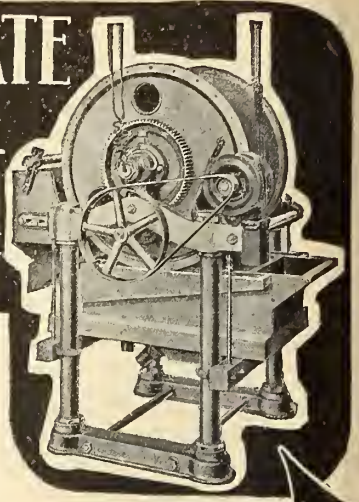

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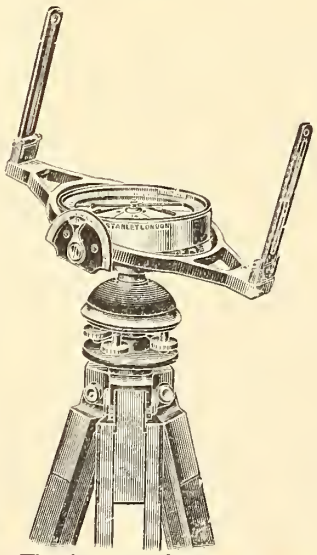

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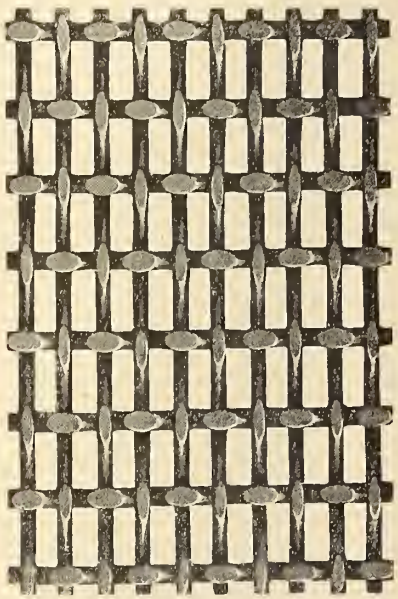

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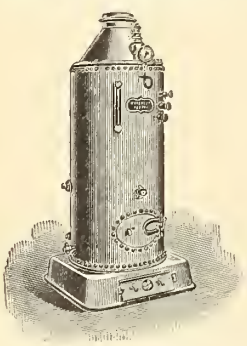

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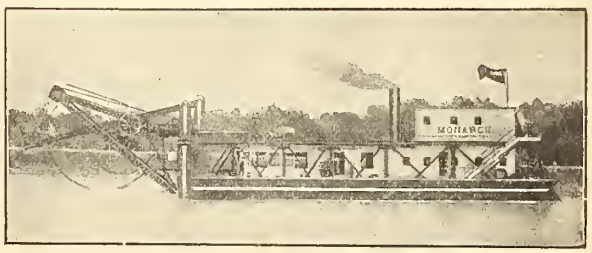

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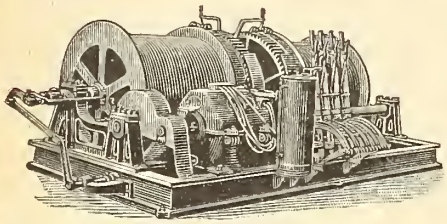

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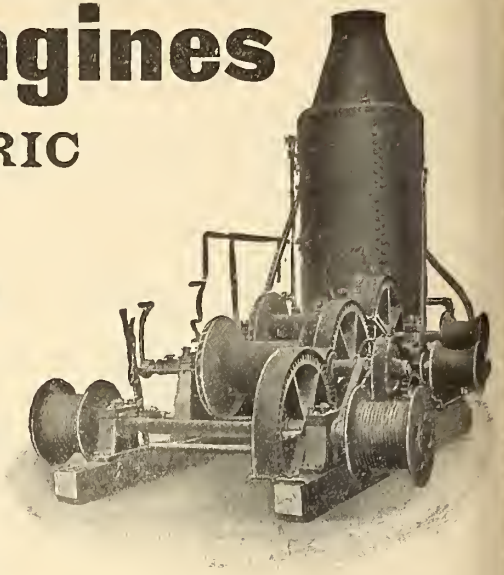

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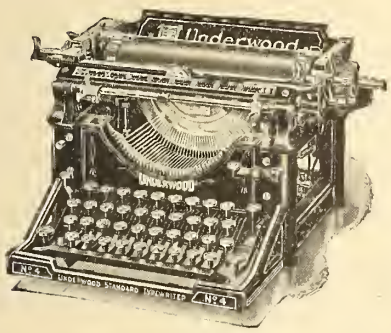

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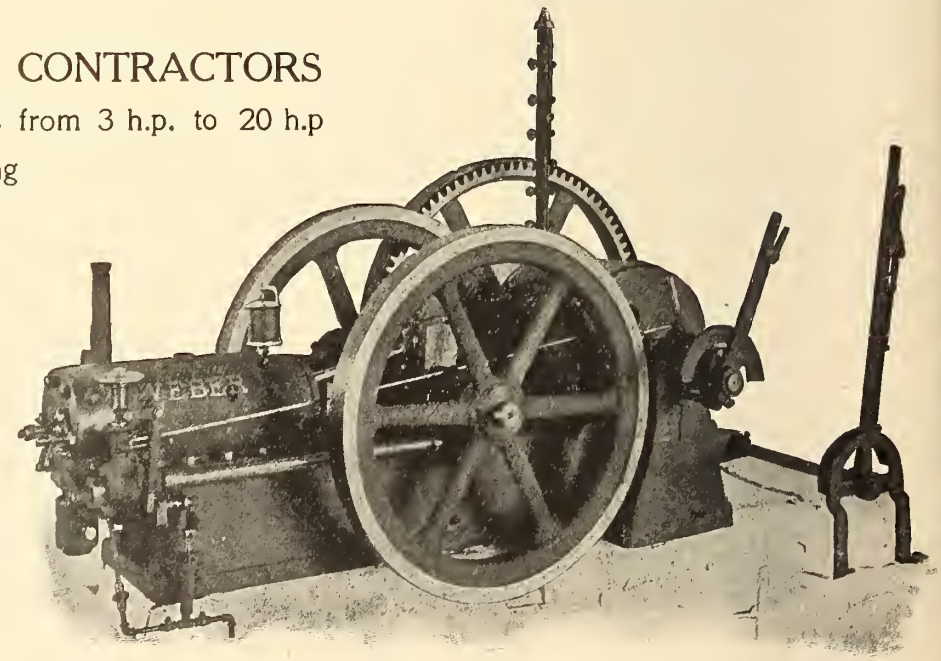

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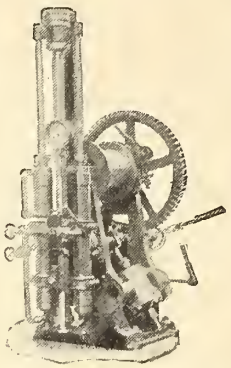

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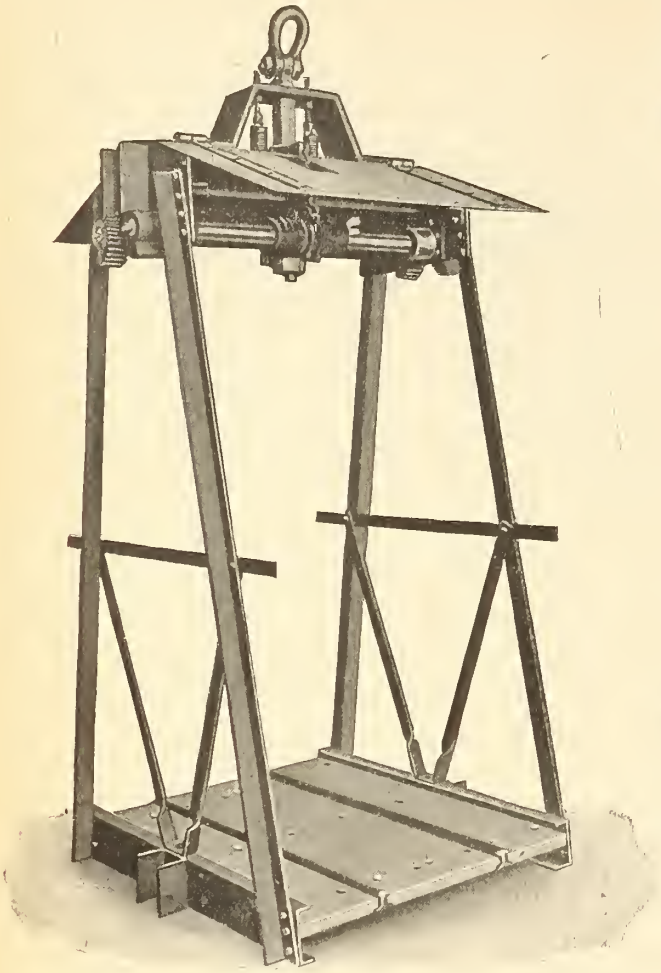

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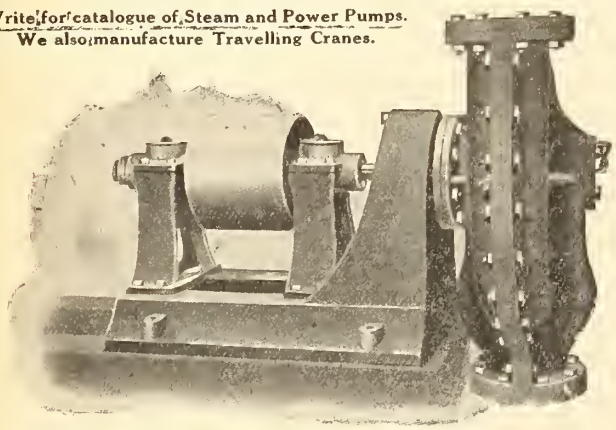

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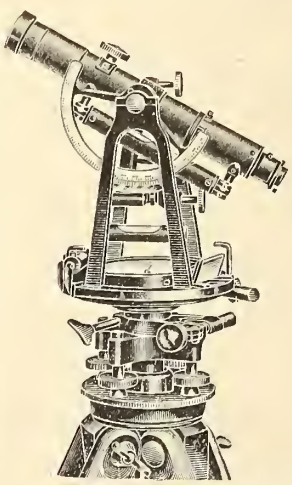

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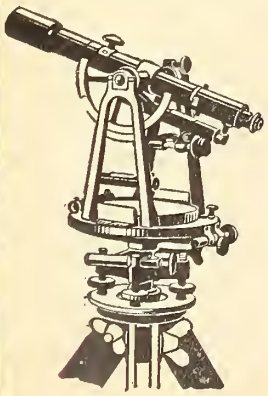

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THE CANADIAN MINING JOURNAL

VOL. XXXII. TORONTO, Nov. 15, 1911 No. 22

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THE NATIONAL MINE SAFETY DEMONSTRATION.

When the final history of social evolution is written, the first decade of the twentieth century will be noted as remarkable for the expansion of humanitarian movements.

Of all industries, that of mining has had to bear the obloquy of having the largest fatality rate. This damaging public belief is not founded on fact. The rate of casualties per one thousand men employed is higher in both the railroad business, and in the structural steel trade.

It is gratifying to know that in no industry other than mining is such radical action being taken to correct and control conditions that make for high fatality rates. In European countries, particularly in Germany, the government authorities have made it obligatory upon mine operators to provide amply for the comfort, moral well-being, health, and safety of the miner. Canada and the United States have fallen far short of the standard set by trans-Atlantic countries. So far as corporations are concerned, it is probable that among the coal mining companies the credit of the first systematic use of breathing-apparatus belongs to the Dominion Coal Company. Somewhat over four years ago that company established at Glace Bay a completely equipped life-saving station.

It remained, however, for the United States Government to take the initiative as a government. Last year, after the Technologie Branch of the Geological Survey had been organized as the Bureau of Mines, under the direction of Dr. J. A. Holmes, there was begun a national movement the object of which was to educate the miner in the use of first-aid methods and of breathing apparatus. Seven special cars were secured to cover the more important mining fields. These cars are used not only for demonstration purposes, but also for actual rescue work. Stations were established at various points, the large grounds of the United States Arsenal, an establishment dating back to 1814, being adapted at Pittsburgh.

Pittsburgh was chosen as the scene of the late National Mine Safety Demonstration. No better place could have been selected, nor could the time have been more opportune. Pittsburgh is the centre of a large mining population. The second day of the Demonstration, coincided with the Centennial Celebration of the introduction of steam navigation on the Ohio River. The presence of President Taft and of members of his Cabinet lent eclat to the occasion.

Our readers will be given in another issue of the CANADIAN MINING JOURNAL a full account of the pro-

ceedings at the Demonstration. It suffices here to accentuate the lessons that were there illustrated.

The vivid and spectacular experiments showing the danger of using any but permissible explosives in the presence of coal dust were exceedingly impressive. No one who was present at the belated explosion at the Bureau's Experimental Mine will easily forget the tremendous detonation and the huge volume of flame that resulted. Impressive also was the series of experiments at Forbes Field, and at the Arsenal. The first-aid competition at the former place was a wonderful exemplification of what training will effect. Working miners displayed a degree of skill and facility only to be expected from experienced surgeons. And, as the hundreds of competitors were selected from other thousands, the competition was doubly inspiring.

In these columns have been published many articles referring to the use of rescue apparatus in coal mines. The necessity of this work need not again be emphasized. Rather is it timely to allude to the wider application of certain newer devices.

A quite mistaken idea prevails as to the scope of the breathing-apparatus. Whilst it is quite true that in coal mines the breathing-helmet has been principally used, it is equally true that its value in the metal mine is being more and more appreciated. For instance, in fighting timber fires in large mines there is no question as to the utility of the helmet. This has been proven many a time in the last year in the western States. In fact, many metal mining companies have established trained corps within and without their mines.

First-aid is part and parcel of the work. To be able to meet emergencies it is essential that the rescue party be equipped with a knowledge of the methods of resuscitation, of dressing wounds, and of reducing fractures.

But especially to be noticed is the latest application of compressed oxygen. In many cases of gas poisoning the victim is beyond resuscitation by ordinary means. Although a feeble spark of life may be observable, artificial respiration fails to do its part. It is here that the ingenuity of the inventor has come to the aid of humanity. The pulmotor, a contrivance as simple as it is ingenious, actually performs the function of breathing for the subject who is too far gone to inhale and exhale the oxygen himself. The average sufferer from gas poisoning will respond to this treatment in a very few minutes. Whenever there is a sign of vitality there is hope. Cases that defy all other means are amenable to the pulmotor. A full discussion of the use of the instrument, written by Mr. E. T. Corkill, will be found on another page.

* * * *

The co-ordinated subjects of control of explosives, rescue-work, resuscitation, and first-aid demand national interest. The Pittsburgh National Demonstration was a wonderful exhibition in itself. Its true object, however, was to appeal to the common-sense of employers and employees, and to acquaint the public with the work of the U. S. Bureau of Mines. In this it was successful.

When the Dominion Mines Branch Station at Ottawa is constructed we would suggest that a similar public exhibition be organized.

In our next issue there will appear a complete description of each event.

FABRE TOWNSHIP, QUEBEC.

The geology of a portion of Fabre Township, Pontiac County, Quebec, is reported upon by Mr. Robert Harvie, Jr., in a late bulletin issued by the Quebec Mines Branch. Before proceeding to notice the contents of the report, we wish to compliment the Quebec Department upon the greatly improved typography and general make up of the bulletin. The colour geological map is excellently done. It is quite on par with the productions of the Ontario Bureau Mines.

Fabre Township lies on the east side of Lake Temiskaming, just within the boundary of the Province Quebec. In physiographical characteristics the country resembles the adjacent parts of Ontario.

In general, the geological features comprise types of the glacial, the post-Huronian, the Huronian, the Laurentian, and the Keewatin. There is no need particularizing on this side. We shall notice, instead, the specific conclusions arrived at by Mr. Harvie. These are interesting for several reasons, but mo especially from the facts that much activity has been centered round the whole region and many rumours of rich discoveries have emanated therefrom.

Summing up the economic aspects of the field, Mr. Harvie points out first that the veins are narrow, the average width, with the exception of a few Keewatin copper veins, being under three inches. Second, except in a few cases, the veins are short and pinch out quickly. Third, most of the veins are made up of almost barren calcite and quartz. Third, it is a matter of great difficulty to transport supplies. Fifth, no workable bodies of ore have been discovered, nor has any valuable ore been found even in the small veins. Sixth, work undertaken by responsible persons has been abandoned.

This would seem to be a sweeping condemnation of Fabre Township. And in very fact it is. While it will be a bitter pill for many prospectors to swallow there appears to be no reason for seriously qualifying any of Mr. Harvie's statements.

A gleam of hope, however, irradiates the future. There are enormous bodies of workable clay in Fabre. Some day when other industries shall have been developed, this clay may be a source of wealth.

THE CLAYS AND SHALES OF NOVA SCOTIA.

Memoir No. 16-E, issued by the Geological Survey Branch, Department of Mines, Ottawa, embodies the results of an investigation of Nova Scotian clays and shales carried on by Dr. Heinrich Ries, assisted by Mr. Joseph Keele. Certain portions of New Brunswick were also included in the survey.

The important clay and shale deposits are limited to the lower Carboniferous, the Millstone Grit, the Coal Measures, the Permian, and the Pleistocene. While few in number, these bodies are of large extent.

Of all the above-mentioned horizons, the Coal Measures comprise the most important clay and shale formations. Examination of these measures failed, incidentally, to reveal the presence of considerable quantities of fire clay. Generally, large bodies of clay and shale in north-eastern Cape Breton will yield common brick, face brick, and, in some cases, low-grade fire-brick. From the Pictou shales and clays tile and brick of very fair quality are produced. In the Inverness field, on the west coast of Cape Breton, is found a particularly good clay that could be used for pressed brick, for fire brick, and for general stoneware manufacture. Its fusing point is about 3,000 deg. F. The body is from 18 inches to nearly three feet in thickness, and would have to be worked along with a 13-foot coal seam. It is highly plastic and possesses dense burning qualities. Common brick shale is found near the Port Hood colliery. Large exposures of tile and earthenware shale occur directly on tide water between Port Hood and Judique Harbour. No work has been done in this region.

The plastic, tough, red burning clays of the Pleistocene period are the basis of most of the present establishments. These industries are spread pretty well over the Province. Common brick is made largely for local demand, although from plants situated near tide water shipments are made to foreign countries.

Dr. Ries expresses the opinion that there is positive room for development. Between Ontario and Nova Scotia there are few pressed brick plants. Ontario produces more than 300,000,000 common brick, about 50,000,000 pressed brick, nearly 4,000,000 paving brick, and about 20,000,000 tiles. Quebec is credited with nearly 130,000,000 brick, and with a considerable quantity of tile.

Compared with these figures, Nova Scotia's output is small. The official returns for the year 1910 place the number of bricks manufactured at 21,305,500; and the number of feet of drain-tile at 974,819. It is probable that Montreal is the largest extra-Provincial consumer of Ontario's products. It is obvious, also, that Quebec is not producing on a scale sufficiently large to supply her own demands. Nor, for that matter, is New Brunswick.

Apart from the possibility of developing well-situated industries at strategic points on Nova Scotia's coastline, there are other fields to exploit. The Sydney and North Sydney iron and steel plants consume large quantities of fire brick. Fire brick made at Westville by the Intercolonial Coal Company is used satisfactorily in lining ladles. There are, however, presumably large deposits of fire clay near Shubenacadie and in the Musquodoboit Valley that, with the construction of the Musquodoboit Valley Railroad, will be given industrial value.

The opinion of an expert of Dr. Ries' standing commands attention. We have long been convinced that the clay industries of Nova Scotia would repay larger investment. The wide distribution of Dr. Ries' report should bring results.

* * * *

The report concludes with a highly instructive chapter on the origin and properites of clay, supplemented by a complete statement of the composition and fusing points of Seger cones, and by an exposition on the influence of the various chemical constituents.

It may be worth while mentioning that the photogravures are hardly up to the mark. This mars an otherwise excellent publication.

THE VALUE OF A BOOM.

The mining boom is an inherent part of the growth of the industry. Much as we may deplore its attendant evils, the boom appears to be necessary to the successful establishment of any mining camp. This applies more, of course, to the mining of the precious metals. Iron, coal, and the like, can be exploited without a rise of public temperature.

The Rossland boom, the Lake of the Woods fiasco, and, in later years, the Larder Lake and other excitements, illustrated very completely the disastrous consequences of inadequate publicity and the lack of clean professional talent. To these elements must be added the presence of unscrupulous vendors, visionary promoters, and a quite unsophisticated public.

Times and manners have changed. It is not easy to "do" the Canadian public to-day. Responsible publicists, having at heart their duty towards the nation, will not permit themselves to be used by the fakir. Every flotation must meet fair criticism. The subsidized press carries less and less weight.

Yet the fact remains that the normally constituted human being wishes to be in the fashion. If one camp or district happens to hold public interest, the investor is more easily persuaded to take a chance.

Nova Scotia gold mining started in the early 'sixties of last century. There was at the time a local effervescence, a disturbance that by no stretch of the imagination could be called a boom. Inordinate amounts of gold were won from small quantities of ore, particularly at Waverly, a small settlement near Halifax. As is nearly always the case, no provision was made for the future. The mining that was done was crude, mostly open-cast. The milling was, if one

may judge from the records, execrable. Yet many thousands of dollars were netted in clear profit. It will be easily understood that no stable industrial foundations were built.

The early methods obtaining in Nova Scotian gold mining tainted the whole history of the industry down to the present day. Individual initiative, in which inadequate capital has been a restrictive factor, and foolishly inflated corporate enterprises have marked the two extremes.

Mr. F. P. Ronnan's article, re-printed on another page, is timely. Mr. Ronnan accentuates the indubitable fact that gold mining in Nova Scotia must be taken on its own merits. Unquestionably a boom is needed. But, if good is to ensue, that boom must be carefully directed in the proper channels.

If any situation can be fairly gauged in a few words, it is not beyond the mark to affirm that dozens of Nova Scotian gold mines, if properly and fully reported upon, would show up better than prospects in other parts of the Dominion that have been floated for millions.

To those investors, engineers, and others who find no resting place for their feet in the camps that are now popular, we would suggest that they turn towards the unadvertised fields of Nova Scotia.

EDITORIAL NOTES.

India's coal output for 1910 was 12,000,000 tons, of which quantity less than 1,000,000 tons left the country. The domestic use of coal is trifling. Cow dung is used extensively as a fuel in agricultural districts.

Since the year 1900, Japan's annual mineral ou has increased in value by 60 per cent. The t nominal capital of mining companies is about $1 000,000.

The Elusive Bill Miner, for whom iron bars and st walls do not a prison make, has been re-captur Bill's subliminal self was seen on a T. & N. O. t on its way to Porcupine. It is still at large.

The Toronto Branch of the Canadian Mining I tute at a recent meeting passed unanimously a r lution felicitating the Dominion Government upon appointment of Mr. R. W. Leonard to the position Chairman of the Transcontinental Railway Comm sion.

Politics apart, it rouses the ire of every decent C adian when he reads of the public utterance of J. J. A. Maedonald. In the course of a speech in American city, the reverend editor of the Globe reported to have explained that reciprocity had b defeated by the United States interests. He calm assured his hearers that Canada's verdict had b purchased for $1,500,000. The devout doctor could buy even Larder Lake with that sum. Why not cept defeat in a sportsmanlike spirit? Even Ca adian mining men possess a certain love of count and pride of race. Canadians, as Canadians, shou demand an explanation of the immoral and extrav gantly silly assertions of a man who is supposed foreigners to represent advanced Canadian thought

CORRESPONDENCE

A SUGGESTION FROM THE WEST.

THE EDITOR:—

Sir,—I see nothing original in the proposal of Robert Hedley and others to saddle the Government with the correction of bad mining companies. Such propositions assume that the Government is a wise and benevolent parent, alert to guard its children from burning their fingers with incautious mining investments. As a matter of fact, governments are almost as sinfully human as mining companies, and experience shows us often enough how easy it is for governmental interference with private industry to degenerate into persecution or downright blackmail.

The licensing of surveyors and assayers under the laws of British Columbia certainly restricts competition and increases the cost of such service; whether it improves the quality of the service is doubtful. I believe it is the common opinion that without the protection of their government certificates some men of these professions would be seeking other fields of endeavour. As it works out, every provincial land surveyor whose business warrants, employs unlicensed men to do their work, pays them at competitive rates, and by virtue of the Land Surveyors' Act, gets a rake-off from the public for each employee's services. If a profession man can not stand on his own legs, why bolster hi up with a government certificate? There is a touc of humour in the recent amendment to the Land Su veyors' Act, whereby the canny B. C. Government permitted to employ its surveyors in the open mark while the common people are required to patroniz the P. L. S.

We are all agreed that mining promotions need reg lating, but why take our troubles to an already ove burdened Government when there is a simple and e feetive remedy right at hand? In the Canadian Mi ing Institute we have a company of public-spirite gentlemen who know what they are about in minin matters as no government ever can. Let them issu a monthly bulletin by authority of the Institute, sort of Investors' Guide, wherein discreditable pro motions are plainly pointed out, with concise reason why they are discreditable. Fear of libel suits woul keep the publishers close to facts and the inevitabl criticism would induce among the Institute's own mem bers a salutary caution with respect to participatio in dubious enterprises. If the gentlemen of the In stitute should undertake such a public service without

exacting a large fee, they would appear in an rely new and by no means unfavourable light. h an undertaking would vastly increase their im- ance in the eyes of the general public and might become profitable.

WILLIAM W. BUSH.

ewart, B.C., Oct. 17, 1911.

TORONTO BRANCH C. M. I.

Toronto, November 9, 1911.

tor CANADIAN MINING JOURNAL:

ir,—In connection with the two motions passed by Toronto Branch of the Canadian Mining Institute, ts meeting in Toronto on Saturday, October 28th, following will be of interest.

he first motion was in the form of a resolution of gratulation to the Dominion Cabinet on the ap- tment of R. W. Leonard, Esq., C.E., to the office of irman of the Transcontinental Railway Commis- n. This appointment is regarded by the Toronto nch as emphatically the best choice that could e been made. I have received a reply as below from Premier, the Hon. R. L. Borden, to whom I was ructed to forward a copy.

Prime Minister's Office, Canada.
Ottawa, Ont., Nov. 6, 1911.

My Dear Sir,—

Your letter of the 31st October reached me upon my return to Ottawa. Will you kindly convey to the Toronto Branch of the Canadian Mining Institute my thanks for their resolution relative to the appointment of Mr. R. W. Leonard as Chairman of the Transcontinental Railway Commission. I am glad to learn that this appointment is meeting with the general approval of the public of Canada.

Believe me,

Yours faithfully,
(Signed) R. L. BORDEN.

W. E. H. Carter, Esq.,
Secretary Canadian Mining Institute,
85 Front St. East, Toronto, Ont.

By the second motion a committee of five members s appointed to "investigate the subject of Work- gmen's Compensation, with particular reference to rkers in mines and allied industries," and to pre- re a memorandum of recommendations from this anch to be forwarded to Chief Justice Sir William eredith, for his consideration, at the time of his hear- g of the whole subject. The committee will consider e important attitude of compensation directly in pro- rtion to investment. Furthermore, I believe it was e feeling of the meeting that any expression of opin- n should be entirely impersonal on the part of the ronto Branch of the Canadian Mining Institute, d that the aim be to devise recommendations that ll be mutually acceptable and profitable to both par- s.

Sir Wm. Meredith was notified of the action of this anch, and has replied to me as follows:

The High Court of Justice for Ontario.
Osgoode Hall, Toronto.
November 4th, 1911.

Dear Sir:—

I have yours of the 3rd inst.

I shall be glad to have the benefit of the report of your Association and shall keep the Commission open as long as possible to enable you to prepare it.

Yours truly,
(Signed) W. R. MEREDITH.

The Secretary,
Toronto Branch Canadian Mining Institute,
85 Front Street East.

Yours sincerely.
W. E. H. CARTER, Secretary.

Personal and General

Mr. G. H. Gillespie, managing director of G. H. Gillespie & Company, talc producers, Madoc, Ont., was in Toronto on Nov. 6th.

Mr. J. J. Harpell, formerly business manager of the CANADIAN MINING JOURNAL, visited Toronto Nov. 1st.

Mr. R. H. Stewart, managing director of the Consolidated Mining & Smelting Company, left Ottawa early in November for Trail, B.C.

Dr. Milton Hersey, who recently suffered serious injury to his eyes, is recovering rapidly.

Mr. T. H. Rae will make Toronto his headquarters during the winter.

Mr. H. P. Davis was in Toronto recently on his way to Cobalt, Swastika, and Porcupine.

Messrs. E. T. Corkill and J. C. Murray attended the National Safety Demonstration at Pittsburg on Oct. 30th and 31st. Other Canadians present were: the Hon. Mr. Tolmie, Deputy Minister of Mines for British Columbia; Inspector Strachan, British Columbia; Mr. J. Hudson, Mines Branch, Ottawa; and Mr. McMahon, Dominion Coal Co., Sydney.

Dr. A. E. Barlow attended the last meeting of the Toronto Branch of the Canadian Mining Institute.

Mr. W. F. Ferrier is the new chairman of the Toronto Branch of the Canadian Mining Institute, and Mr. W. E. H. Carter the secretary.

Mr. T. W. Gibson, Deputy Minister of Mines, Toronto, was present at the American Mining Congress, Chicago.

Mr. P. L. Nasmith, of Lethbridge, Alberta, general manager of the Alberta Railway and Irrigation Company, owning the Galt collieries, situated near Lethbridge, was recently in the Crow's Nest district of British Columbia.

Mr. Douglas Lay, superintendent of the Van-Roi Mining Company's silver-lead-zinc mine and concentrating mill in Four-mile camp, near Silverton, Slocan Lake, spent a holiday vacation at Spokane, Washington, last month.

Mr. James Ashworth, of Vancouver, B.C., has been engaged by the Head Syndicate, Limited, to examine and report on a coal mining property, situated on the south fork of Old Man River, in southwest Alberta, owned and being developed by the syndicate, with Mr. Leslie Hill, of Nelson, B.C., as engineer and manager.

Mr. Robert Irving, of Vancouver, B.C., secretary of the Slocan Star Mines, Limited, recently organized by Mr. R. S. Lennie, also of Vancouver, to acquire and operate the Slocan Star and Rabbit Paw groups of mineral claims, has returned to Vancouver from a visit to the property, which is in the vicinity of Sandon, Slocan.

Mr. W. C. Bayly, of Nelson, B.C., secretary of the Nugget Gold Mines, Ltd., of Sheep Creek, has left British Columbia on a trip to Europe and other countries, and will be away several months.

Mr. M. K Rodgers, well known in British Columbia in connection with the earlier development of the Nickel Plate and Hidden Creek mines, is now associated with Mr. T. D. Pickard in prospecting the Apex group, in Hedley camp, Similkameen, which property has been secured by them under option of purchase.

Mr. I. L. Merrill, president of the Hedley Gold Mining Company, is on one of his periodical visits to the company's Nickel Plate group of mines and stamp mill in the Similkameen district of British Columbia.

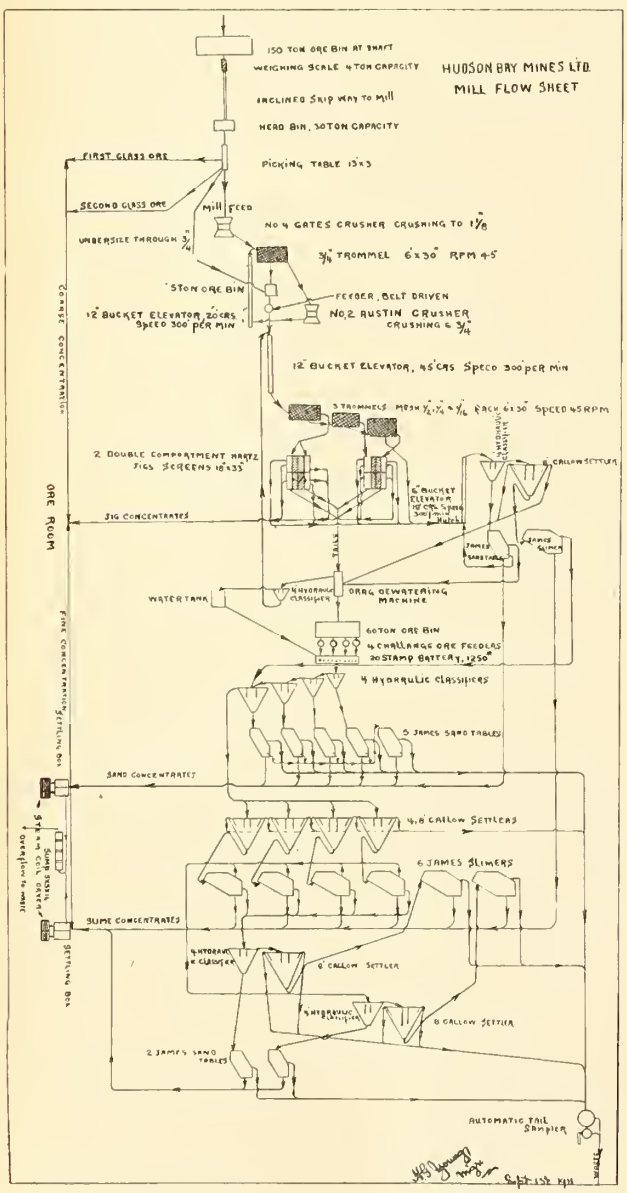
Mr. Thomas Kiddie, of Vancouver, B.C., is arranging to take a trip to Morenci, Arizona, where his e[lder] son holds an important position with one of the la[rger] companies operating in that state.

Mr. O. E. LeRoy, who has been supervising the f[ield] work of several Geological Survey parties in the K[oot]enay and Boundary districts of British Columbia, is about to return to Ottawa, the season's outdoor w[ork] having been completed. Mr. W. H. Boyd, who [has] been doing topographical work in the Blairmore-Fr[ank] district, Alberta, left for Ottawa about the middle [of] October.

Mr. Arthur Fisher announces his resignation [as] manager of the North Western Asbestos Mills C[om]pany, the Wyoming concern which has advertised [its] stock throughout Canada.

Concentration at Hudson Bay Mines, Ltd., Cobalt, Ont.

Written for the CANADIAN MINING JOURNAL by H. G. Young.



Nature of the Ore.

The silver values occur mostly in the vein as[so]ciated with niccolite, smaltite, and calcite. The co[un]try rock near the vein, sometimes for 12 inches [on] each side of it, carries leaf silver. These veins oc[cur] in the conglomerate formation.

Flow Sheet.

In our shaft house there are two landing decks, [one] fifteen feet above the other, and between the t[wo] there is installed a storage bin for mill ore, of [one] hundred and fifty tons capacity. All ore is hand[led] at the second deck and dumped from the cars into t[his] bin, with the exception of the first-class ore, which [is] dumped on the floor and high grade picked out, t[he] balance going to the storage bin. At the bottom a[nd] along the front of this bin there are arranged fo[ur] gates from which the ore is drawn off into a sk[ip] which passes under them. Underneath the track th[ere] is installed a four-ton weighing scale, so adjusted th[at] the weight reading is zero with the empty skip [on] The weight recorded for each skip is thus net ore. [By] pressing a lever the scale records the weight on a ca[rd] These cards are delivered at the office at the end [of] each shift, and the tonnage reckoned. The skip [is] then drawn up an incline to the mill by a small fr[ic]tion hoist which is belted to a line shaft in the mi[ll] where it dumps automatically into an ore bin and r[uns] turns. The ore is fed from here onto a picking tab[le] three feet wide and thirteen feet long, which is hu[ng] from supports by four eight-foot rods, and has a slo[pe] of one foot. The table is given a reciprocating m[o]tion by a Park's pusher, which is operated by a[n] At the end of the back stroke it bumps against su[p]ports which cause the ore to travel forward. In th[e] ore bin gate there is placed a roller three feet lo[ng] by twelve inches diameter, with a two-inch shaft [in] the centre. Attached to this shaft on one side the[re] is a ratchet wheel and a pawl with spring and ar[m] two feet long fits into the ratchet. The arm is a[t]tached to the table. As the table reciprocates the ar[m] travels forward and back, and causes the roller to tur[n] and feed ore evenly onto the picking table. Any firs[t] or second-class ore is picked out on this table an[d]

own into a bin. The balance drops off the end into umber four Gates crusher set to one and one-eighth hes, which is directly beneath. This ore is our mill d. We find this picking table a very good arrangeat for both hand sorting and for crusher feeding, as feed is steady and well distributed and there is no dling of the ore necessary. The first and second-ss ore is cobbed, sampled, bagged, weighed, and ged for each shift. From the number four crushhe ore passes to a revolving screen of three-quarter h mesh. The oversize goes to a number two Austi crusher, set to three-quarter inch, and the prodt returns to the screen. Thus, all mill feed passes ee-quarter inch and drops into a small bin. The ore elivered from this bin in a steady stream by a 12-h bucket elevator, which raises it to the sizing eens over the jigs. These screens give us four prots, over one-half inch, over one-quarter inch, over -sixteenth inch, and under one-sixteenth inch mesh. first three are delivered to four Hartz jigs, double partment type, with 18 by 33-inch screen, over one-f inch being split in two equal parts. The concenes are skimmed off and thrown in a box two feet 4 feet by 6 inches. This box has a pipe leading into bottom of it, which conveys the ore to a small hopin the ore room. Before sending to the ore room the ive silver is picked out and dropped in a small ked box through a hole in the top. The jig tails to the dewatering machine. The hutch joins the ersize from the one-sixteenth inch mesh trommel is raised to a four-foot hydraulic classifier, where sands are removed and go to a number two James e. The concentrates from this table go direct by ipe to the sand concentrate collecting tank in the room. A corner middling is returned and tails go he dewatering machine. The overflow from the raulic classifier passes into an eight-foot callow er and the slimes are treated on a James Simplex er. The concentrates go direct to a slime concene settling tank in the ore room. The tails go to sifier in front of the stamps. The dewatering ma-e simply drags the ore out of the water and ders it to a belt distributor of reversible type, over stamp bin. The water passes through a small er and into the storage tank behind the battery is re-used.

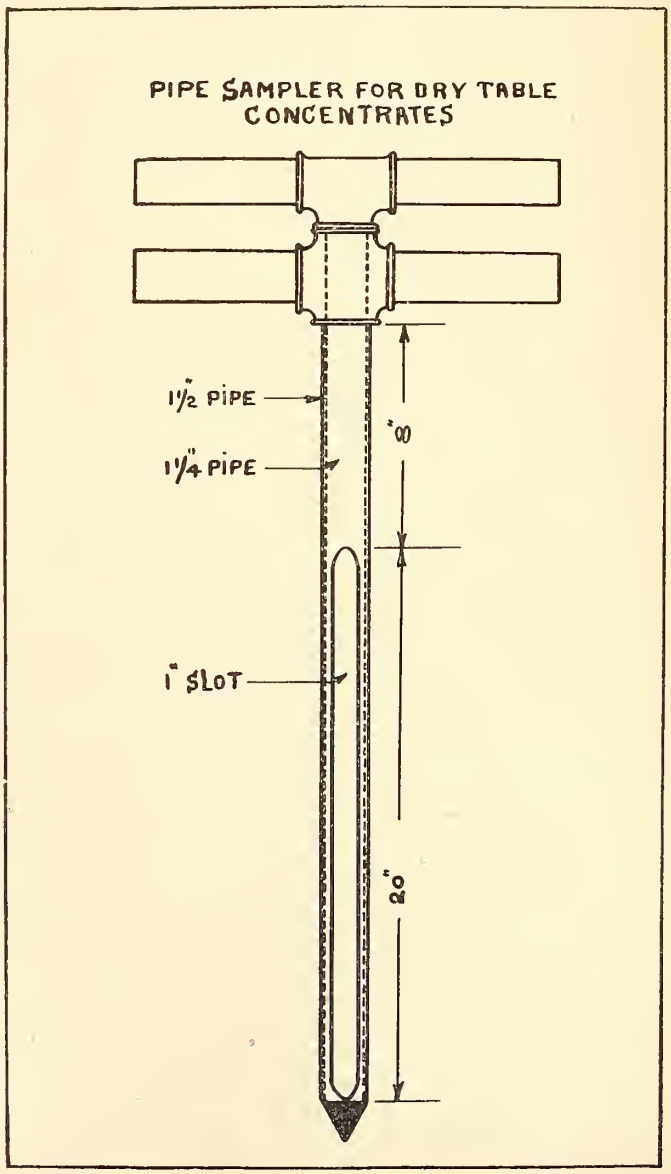
ur battery consists of 20 Fraser & Chalmers 1,250 nd stamps. The morters are the narrow type with discharge, and weigh 9,000 pounds each. They arranged with water service behind each die. We 16-mesh roll slot screen, manufactured by B. ening Wire Co. Rate of drop is 100 per minf; distance, six inches. From the stamps the pulp ses into a chain of hydraulic elassifiers. The sands delivered to four number two James sand tables. centrates from these tables go direct to a tank in ore room, and the tails to the waste launder. A ner middling is taken from each table and treated a number two table. The tails go to the waste der. The slimes are carried over and distributed four eight-foot callow settlers, the overflow going he waste launder and thickened slimes onto four plex James slimers. The concentrates are carried pipe to the ore room. The corner middling is ed and passes through a four-foot hydraulic classi-The coarse product is fed on a number two James table and the overflow passes into an eight-foot w tank. The concentrates go direct to slime coling tank and the tails to waste launder. The tails from the four slimers go through the same process as the corner middlings.

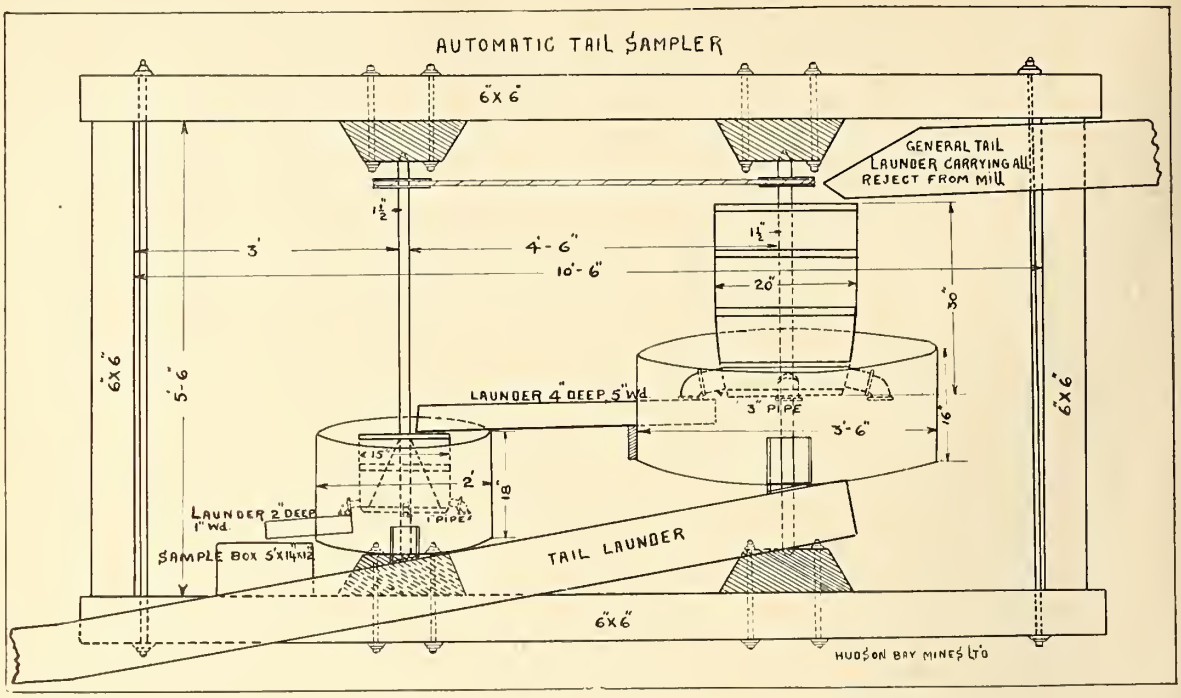
The concentrate collecting tanks in the ore room are two feet by three feet by eight feet, and there are two for sands and two for slimes. Each morning at seven o'clock the delivery pipes are switched over to an empty tank and the concentrates for the previous 24 hours are dried on a steam drier, 16 feet by 6 feet, made of one inch return pipe. The pipe rests on a quarter-inch mesh screen. As the concentrates dry, they drop through the screen into a hopper, from which they are drawn off by a gate, and bagged. They are sampled, weighed, and tagged and put away. In this way we get our concentrates almost perfectly dry, the moisture in eleven cars averaging as low as 0.6 per cent. The overflow water from the collecting tanks passes through a settling tank five feet by five feet by eighteen feet, arranged with three baffle boards. The overflow water from this goes to waste. This tank will catch on an average two hundred dollars per month, and we find it a splendid arrangement to prevent losses of ore already won.

Sampling.

(1) Dry Table Concentrates.

The above cut shows the sampler used for this purpose. It consists of a one and a quarter inch pipe in-





side of a one and a half inch pipe. A twenty-inch slot one inch wide is cut in each pipe. A bag is put over a bag filler and the sampler plaeed inside. The gate is opened and the bag filled. The inside pipe is then turned through 45 degrees and the sampler removed from the bag and held over the sample box, where the inch and one-quarter pipe is pulled out, giving you a sample for that bag. This is done with each bag filled, and the sample which represents the ore for 24 hours is sent to the assay office. You will note that this sampler gives a cut from the bottom to the top of the bag, and has given us remarkable results in accuracy.

(2) Jig Ore.

You will remember that this is delivered by a pipe to a hopper in the ore room. This hopper is about 3 feet off the floor and has a small gate in the bottom, which will, when open, let the ore discharge in a small compact stream. A bag bag filler inserted is placed under the gate and gate opened. When the ore is passing we take cuts out of the whole stream in filling one bag, this is continued till the ore is all bagged and sample sent to the assay office.

The following table will demonstrate the results tained by the above method of sampling table and concentrates:

Car No.	Mill Assay.	Smelter Assa
1	713.7 ozs.	721.3 ozs.
2	258.7 ozs.	262.5 ozs.
3	360.0 ozs.	360.4 ozs.
4	497.0 ozs.	499.0 ozs.
5	1,228.4 ozs.	1,230.9 ozs.
6	527.0 ozs.	525.8 ozs.
7	527.0 ozs.	526.0 ozs

HUDSON BAY MINES, Limited

MONTHLY MILL SHEET

REPORT FOR MONTH ENDING July 31st '11

	DATE	Ore Hoisted (Pounds)	Assay Heads	Assay Tails	Average Assay of Concentrates	Percentage Extraction	Jig Concentrates Weight	Assay	Production	Assay Heads	Assay Tails	Sand Concentrates Weight	Assay	Production	Assay Heads	Assay Tails	Slime Concentrates Weight	Assay	Production	Assay Heads	Assay Tails	Weight of Product	Hours Stamps	First Class Ore Weight	Assay	Production	Second Class Ore Weight	Assay	Production	Remarks
1																														
2									DOMINION DAY SUNDAY									DOMINION DAY SUNDAY												
3	1	382202	98	33	816.3	89.2	136	1495	4	10176		1885	676	1	6372		1234	98.2	0	1735			24				377	323	8	61.0	
4	1	506605	06	63	1106.3	87.9	077	4	16479	22856		2195	818	8	781		1107	307	8	1705			24				1261	1857	7	1171.2	
5	1	622205	16	46	709.5	86.0	232	9	8296	9643		2719	762	5	10368		1162	344	8	2003			24	2145	408	7	1438	34		
6	1	621805	32	48	891.7	86.0	196	3	11340	11139		87 2468	850	4	10493		761	398.6	1	516			24	2380	340	2	3409	87		
7	1	468204	14	41	920.3	81.2	252	8	1317	16648		2686	778	1	10951		1260	427	3	2691			24	3913	436	2	4576	89		
8	1	493104	47	65	812.8	86.2	240	1	12218	19667		2372	776	3	9203		2034	370	8	3767			23	5237	480	4	12724	1	5750	529	3	15217	
9										SUNDAY										SUNDAY												
10	1	660904	78	58	1131.2	88.3	253	3	1912	0	24215	1971	760	9	7428		1683	390	1	3288			22	5585	473	8	9	32533			
11	1	761004	93	49	1198.0	90.5	272	7	1774	7	24138	2985	953	1	11842		1430	524	2	5748			24	3166	474	1	8	75062			
12	1	703904	26	50	1198.7	88.7	269	7	1844	9	23977	160 2114	733	9	8331		1515	565	0	4279			24	3136	493	8	1	75861			
13	1	623505	55	49	776.4	88.1	265	2	1164	9	15439	2127	634	9	6796		1764	356	4	3816			23	4592	339	8	5	77172			
14	1	538003	01	40	990.7	87.3	236	2	8346	9856		2878	574	3	8264		1620	264	2	2140			24	3467	713	8	3	23745			
15	1	489302	82	63	558.3	78.5	167	6	8757	7338		2426	473	4	5747		1665	362	8	3020			23	2986	506	2	7	55548	3556	633	0	11264	
16										SUNDAY										SUNDAY				1836	349	8	3	21159				
17	1	634702	10	43	443.5	80.3	174	5	510	3	4454	2228	552	5	6134		2149	276	0	2965			22	1896	385	0	7	35541	2054	720	9	7403	
18	2	039202	26	38	730.0	83.8	135	7	1251	1	8988	2563	600	4	7639		1374	457	1	3140			24	1908	205	8	4	19637			
19	1	888005	77	42	801.4	89.3	344	9	1135	9	19875	87 2605	694	2	7870		1776	431	5	3831			24	587	253	3	1	7434	1560	554	3	4323	
20	1	761905	52	47	739.3	87.1	240	0	1107	6	13289	2456	590	9	7256		2380	521	7	6208			24	480	254	3	8	5340	1874	365	7	3426	
21	1	576905	85	48	763.9	88.1	251	0	1163	6	14613	1855	612	5	5680		2597	485	3	6301			23					787	549	3	2149	
22	1	306803	99	38	677.2	91.0	190	5	1187	3	11309	2954	592	9	8757		2118	336	1	3559			23					732	598	2	2185	
23										SUNDAY										SUNDAY												
24	1	869104	86	56	1016.7	87.3	247	9	1556	1	19287	2741	832	3	12228		1586	389	0	3086			24	865	235	0	2	10211	869	811	3	3525	
25	1	901705	37	74	1576.0	86.6	242	7	1812	9	21993	2462	1879	5	13943		696	735	9	2574			24	547	282	2	0	7718	1002	1150	1	5762	
26	1	707506	04	60	1619.6	90.4	187	8	2456	9	23070	96 2593	1528	6	19436		1320	604	0	3286			24	1277	344	6	3	22003	689	1180	7	4067	
27	1	661107	78	79	1327.2	90.2	239	6	2836	4	33980	2668	1537	5	20048		1023	785	1	4036			24					682	240	4	819	
28	1	713306	53	58	1957.3	91.3	249	2	2809	4	33740	2720	1006	9	13680		1075	366	2	3553			24					750	401	2	1504	
29	1	553507	05	62	1713.6	91.5	262	4	2486	0	32616	2631	1022	5	13450		1181	630	9	4079			23									
30										SUNDAY										SUNDAY				3213	330	8	6	51552	955	1283	5	6154	
31	1	581708	24	67	1906.7	92.2	271	6	2775	2	37687	2200	1637	9	18011		1323	697	6	4283			24	3947	361	7	6	71393	1602	1644		1316	
TOTALS	1	066734	46	525	1023.4	88.7	6933	6	157721	460418		60044	865.9		26386.8		57851	441	8	4703			590	5385	9	4	6	48909	24504	662	1	8125	

Summary

Total Ore Treated by Stamps	2041.1 Tons.
Average Capacity per Stamp per 24 Hours	4.08 "
Average Capacity per Stamp per 24 Working Hours	4.15 "
Average Assay to Mill	44.6 ozs.
Average Percentage of Extraction	88.7
Weight of Metallics 194.5 Lbs. Value in Ounces	1945.0 ozs.
Total Production for Month in Ounces	2058.30.3 ozs.

Cost of Milling per Ton #1.034

Expenses

	#
Repairs & Maintenance	330.20
Power, Heating & Lighting	640.00
Supplies	28.96
Salaries & Wages	1112.27
Plant	1296.33
Total	3407.76

H. S. Young Manager

(3) **Hard Ore.**

The first and second-class ore is cobbed by an experienced hand and the sample taken as he is doing the work.

In our mill we make five classes of ore, namely:—first-class ore, second-class ore, jig concentrates. sand concentrates, and slime concentrates. For each class of ore we use a tag of certain colour, and when each bag is sewed up and put away it is tagged. On this tag we mark the date, number of the bag, and weight. When we desire to ship a car of ore we are thus able to pick out any day's ore in the mill, and we know its assay value. Thus we can grade our shipments in order to take advantage of smelters' tariffs. Also, if when we get our assay returns, we have any reason to believe that the sampling of any class might be in error, we can always pick out that day's ore again and resample.

(4) **Tail Sample.**

All reject from the mill, consisting of sands, slimes, overflow from the callows, and wash water from the floors, passes out the general tail launder and through the automatic sampler shown in the cut. The impact of this stream causes the 20-inch barrel to revolve and the tailings discharge through four 3-inch pipes in the side at the bottom. The 4-inch launder catches the whole stream from each pipe as it passes over it and delivers into the small barrel shown. The smaller barrel revolves by belt connection to the larger one. The pulp passes out through one-inch pipes and the sample is caught in a two-inch launder, which delivers it to the sample box. This box is cleaned out every 24 hours and sample assayed.

The following screen analysis of tails will be interesting:

October 24th, 1911.

Mesh.	Per cent.	Assay.
	oz.	oz.
On 16	2.51	5.5
On 40	15.66	1.2
On 60	18.66	0.8
On 100	4.29	0.5
On 150	10.54	1.5
On 200	5.11	1.6
Through 200	43.23	6.0
	100.00%	

Average assay, 3.32 ozs.

October 25th, 1911.

Mesh.	Per cent.	Assay.
	oz.	oz.
On 16	2.63	2.3
On 40	16.68	1.0
On 60	19.71	0.8
On 100	4.40	1.6
On 150	9.53	1.6
On 200	8.74	1.6
Through 200	38.41	6.1
	100.00%	

Average assay, 3.06 ozs.

The following table will illustrate our experience with hand sampling as compared with automatic sampling of tails. In hand sampling the tails we were very careful, using a wash tub of about twenty gallons capacity and taking a cut of the whole stream of sands and slimes every fifteen minutes, and allowing it to settle carefully before decanting.

Hand sampling.

	Assay heads.	Assay tails.
April 27th	26.1	6.5
April 28th	29.5	5.5
April 29th	26.8	6.4
May 1st	20.4	5.4

Automatic sampling.

	Assay heads.	Assay tails.
May 2nd	22.1	9.9
May 3rd	20.4	8.2
May 4th	19.1	9.3
May 5th	20.3	7.0

The automatic sampler was put in service on May the 2nd, and if you work out the percentage of extraction from heads and tails you will find that immediately, as the automatic sampler came in service, we discovered that the losses in our tails were easily 10 per cent. greater than we had anticipated.

Monthly Mill Sheet.

Our mill feed is figured on the product crushed from the picking table. All ore going to the mill is weighed. Thus in our data on this sheet the weight of second-class ore recovered must be deducted from the ore hoisted in order to give us the weight of mill heads. In the line marked "Totals," for assay values these figures represent average values for the month. All first class ore was picked out at the shaft and is shown here because we keep all ore data on one sheet for convenience. All other data should be perfectly clear.

The horse power required for the mill is 130, in which is included a 30 horse power pump at the lake, supplying the mill and plant. Our jig floor only operates one shift, of 11 hours, and we find this arrangement economical in labour and power.

For each 24 hours we have an accurate and reliable sample of our loss in tails. We also have an accurate sample of dry concentrates recovered, together with the weight. We know also exactly the weight of ore put in to the mill. With this fundamental data accurate, we have every reason to believe that all data contained in our monthly mill sheet is absolutely reliable. There are days, as you will note, on which we have done excellent work. However, I wish to print only what is our average, and thus I have put in a whole month's work, which covers high and low marks.

In this paper I wish to heartily commend the work of Mr. E. Brewer, my mill foreman, who has looked after our work in a very capable manner.

A Neglected Field

By F. P. Ronnan.*

It has been estimated that the combined area of our several gold districts will equal about 5,000 square miles. To attempt to enumerate the actual number of gold bearing veins already opened would mean to use up the entire space of this issue of the Advocate, giving a line only to each gold bearing vein. It has been humorously remarked that every man in Nova Scotia owns a gold mine, and the statement, while

*Editor the Industrial Advocate, Halifax, N.S.

exaggerated, is not so far from the truth as one might think at first reading.

The average Nova Scotian believes in the gold mining future of his province — that is, in the abstract, but it is difficult work to get him down to the concrete principle of putting his capital in such ventures on a hard practical business basis, and yet, he has squandered a great deal of money in the past 43 years in mere surface work which has served only to prove the wide extent of mineralization without returning him a reward sufficient to pay him for his trouble. Now if there be one avenue of development more important than another, in which the future of this province is wrapped up it is the problem of how the full advantage may be taken of these magnificent mineral deposits. Many geological authorities have traversed its fields and have arrived at the conclusion that there are available profitable openings for exploitation. Mining engineers from various portions of the United States have arrived at practically the same conclusion. Naturally the question will propose itself, under such circumstances, why is it that an industry of such possibilities is in a backward condition? And the only answer that can be made to such a reasonable question is that Nova Scotia in her entire mining history is the one known gold mining camp in the world which has not yet enjoyed the benefits of a boom.

The word boom is used because, perhaps, it best describes the condition which appears to control the birth of world-famous camps. We all know that the so-called boom, more familiar perhaps to the west than the east, is not an unmixed blessing, yet without it the investing classes would never have been induced to furnish the capital for developing famous producers. It is not intended to advocate for Nova Scotia a boom, because there has scarcely been one movement of this character in connection with mining districts that has not resulted in a great deal of loss for many persons, yet with the redeeming feature that it has brought about the addition of many important producers of precious metal to the world's supply.

In no other part of Canada is gold found of such free milling character. In no other locality are labour conditions so favourable. Almost every known gold-bearing district is within 20 miles of the Atlantic, and the larger portions of them are directly on the coast line, thus rendering transportation of supplies a comparatively simple and inexpensive item. The size of the lodes will vary from the thickness of a jackknife blade to belts of ore bearing material as wide as 50 feet. It would be impossible to go into the structural geology of the gold occurrences of this province, nor would the average reader appreciate the conclusions and data of these learned men who have studied the methods of deposition and the genesis of our ore bodies. The average investor wants to know where he can put his capital safely and with fair expectation of obtaining as great a reward as possible. And it would seem from a close study of the various districts of this province that there exists here numberless opportunities where these conditions may be obtained, if the same qualities which safeguard ordinary business undertakings are applied and sufficient capital be at the disposal of the operator. It has been a standing wonder to many why the same plan followed by English exploration companies should not find in Nova Scotia a favourable field for its application. So far in Nova Scotia the obstacle of labour unions, in so far as gold mining is concerned, is an unknown factor, and this is no small feature to be considered in the successful opening of our deposits. There are many water powers available in various districts which would still further assist in large scale mining operations.

Twenty-five years ago the five stamp mill was the rule. Five years ago the 10-stamp mill was the prevailing size of reduction plants. Now the 40-stamp mill is generally considered to be the proper means of treating the deposits in an economical manner. It can be readily understood, therefore, that mining and milling practice in this country has not reached perfection, and on that account the forecast of what the future may have in store for this province in the way of increased developments is very greatly strengthened.

In the past, operators have confined their attention to rich streaks of pay ore, and nothing under an ounce to a ton was worth considering, and rightly too, if looked at from the standpoint of the individual miner who wants only to extract these values which are most profitable, because of the smaller expenditure for labour, etc. This is the direction in which whatever development done in the past has been extended, and, therefore, the persons who have studied mining facts in connection with Nova Scotia have more faith in the future outcome of the development of large bodies of ore which will be worked upon a large scale, and at a minimum of expense, and it is from this class of deposits that the future of the industry will be determined, leaving the richer but smaller ore bodies to be worked in conjunction, and thus add to the general tenor of the mill output.

Milling practice in this province has in a few instances been reduced to the highly creditable point of 20 cents per ton of tails, a result which is surpassed by only a few properties in the world. It is fair to ask that if a totally unorganized body of miners, shifting from one district to another as a matter of convenience or whim, following no constant objective point, hampered by the lack of capital and facing the obstacles which nature puts in the path of those who would wrest her wealth from her, can produce nearly $17,000,000 worth of gold, what should follow the operations of say a dozen groups of thoroughly organized capitalists with the necessary technical skill directing their enterprises in such a country as Nova Scotia.

Perhaps the most important point that has been raised in recent years in connection with these gold deposits, is the probability of their richness with depth. By depth is understood, say, 3,000 feet. The deepest working in Nova Scotia at present does not exceed 1,000 feet vertical, and this occurs in but two districts. The average depth of shafts in Nova Scotia does not, perhaps, exceed 100 feet, though there are many which will run 300 to 500 feet, and it does not require extensive technical education to recognize the fact that a 250-foot shaft is little better than a prospect hole. It has been estimated that the thickness of our gold-bearing strata is in the neighbourhood of 7,500 feet, and the data available at present would seem to point to the maintenance of value to at least three times the present greatest depth. On this subject a considerable amount of literature has been issued, and the question has been a fruitful one for discussion among mining men. Mr. Faribault, of the Dominion Geological Survey, who has been studying the gold measures of the province for the past 30 years, gives it as his opinion that gold will be found at that depth, and he bases his

conclusions upon certain similarities between the formations of Bendigo and those of Nova Scotia.

The Government of Nova Scotia, to encourage those who would undertake the task, has placed upon its statute books, measures which commit it to furnish one-half of the cost of underground work, including shaft sinking and crosscutting, an advantage that is offered in no other country to our knowledge, in the world. Up to the time of writing such a measure of assistance has not been taken advantage of, although several mining companies have made incomplete applications therefor.

A word or two in reference to the conditions under which mining may be carried on. With particular reference to government requirements, it may be said the tax of 2 per cent. on the gold produced, of which it is possible to obtain a refund by way of rentals, is a comparatively moderate one. Mining claims in Nova Scotia measure 150 x 200 feet. The shorter measurements being in the direction of the veins. Fissure veins occur in a number of districts and are considered as being of more promise than the usual bedded vein. Almost every district has been mapped by the Dominion geological authorities, and it is possible to obtain a great deal of detailed information regarding the size of veins, the depth of various shafts sunk in the past, and such information as would be of value to a serious investigator.

Had it pleased Providence to create Nova Scotia in the midst of an arid desert surrounded by nearly impassable mountains, peopling it with ferocious races, together with many drawbacks of climate, etc., the chances are that the adventurers of all nations could not be kept from exploring her riches by a cordon of gatling guns. This recalls the old story of the difficulty a man would have of selling newly minted gold dollars for fifty cents to the casual passers-by, who will not take time to determine whether they are genuine or not.

MEETING OF AMERICAN MINING CONGRESS

Written for the Canadian Mining Journal by T. W. Gibson.*

The 14th annual session of the American Mining Congress was held in Chicago from 24th to 28th October, President John B. Dern, the veteran gold mine operator, of Salt Lake City, in the chair. During its earlier years the Congress was not taken very seriously, but it has since developed into an important and influential body. The Chicago meeting was addressed by Dr. J. A. Holmes, Director of the Bureau of Mines, Washington, D.C.; George Otis Smith, Director of the Geological Survey, Washington; also by Hon. W. L. Fisher, Secretary of the Interior, and by President Taft himself. The body of the Congress was made up of representatives of the gold, silver, and copper interests of the western states; coal operators from Pennsylvania, West Virginia, Illinois, Ohio, etc., and a very considerable sprinkling of federal and state officials, such as geologists, mining inspectors, and others.

A number of the subjects discussed pertained to conditions peculiar to the United States, such as the Alaskan situation; the Sherman Anti-Trust law, etc., while others were of more general application. Representatives from Alaska were most vigorous in their denunciation of the United States Government's policy in dealing with the coal lands of that territory. The situation at present there is, that while there are large and valuable beds of coal in Alaska, the Government has withdrawn them from disposal, and all the coal locally used must be imported from British Columbia at a cost of $16 or $17 per ton. Secretary Fisher took the opportunity of announcing that the Government had decided upon a policy of leasing the coal lands instead of selling them outright, and intimated that railway facilities would be encouraged. It appears quite probable that the present importance of the Alaskan coal deposits has been over-rated. There are two known fields of good quality, the Behring River field and the Matanuska field, but in the former, which is the most accessible, there have been disturbances which have injured the physical condition of the coal and increased the difficulties of winning it. The Pacific coast as a market for fuel has also been largely preempted by petroleum, of which the Californian wells continue to yield enormous quantities. It is, therefore, doubtful, whether if the Alaskan coal mines were opened to-morrow the product would find an extensive sale.

Meeting in the east, the coal-mining industry received a large share of attention. Complaints from coal mine operators were loud and doleful. Competition is exceedingly keen, and profits are low, or even non-existent. West Virginia has some easily worked seams of good quality, and the price at which the product is marketed leaves little margin for mines where the coal is poorer, or more expensive to get out. All the coal operators united in denouncing the Anti-Trust law, declaring that it must be modified to allow of reasonable combinations, otherwise the trade would end in bankruptcy.

A subject that is of present interest on both sides of the line was discussed, in the shape of a proposed measure of compensation for accidents to workmen. Uniformity of law is desirable on the point, but the matter being under the jurisdiction of the individual states, it was recognized that this would be difficult to obtain. A committee appointed at a previous session of the Congress submitted a draft measure, which was approved. It provided:

(1) Compensation on a fixed scale for all accidents, regardless of their cause, "contributory negligence," etc., being practically eliminated. The maximum compensation for death was placed at $3,000.

(2) Compensation to be paid out of a fund raised by a tax of one cent per ton on all coal mined. Employees were not called upon for any contribution.

(3) The fund to be administered by a state-appointed advisory board of three members, one member to be a coal operator, and one a coal miner.

(4) Acceptance of compensation from the fund to be a bar against any suit against the employer for damages.

*Deputy Minister of Mines for Ontario.

As will be seen, the measure applied to the coal mining branch of the industry only, and did not attempt to cover the field of metalliferous mining. Some of the speakers thought the miners themselves should contribute to the fund, say on a basis of one per cent. of the monthly pay-roll. It was thought that a fixed rate per ton contributed by all mines, would give no advantage to well-equipped properties where every precaution against accident was taken, over those mines where recklessness prevailed, or which were insufficiently equipped, while if the miners paid into the fund they would have a strong incentive to guard it against depletion by fraudulent claims.

More generous appropriations to the Bureau of Mines were advocated. The opinion prevailed that while the Bureau was serving a useful purpose, its field had so far been limited largely to the problems presented by the coal mines of the east, the metal miners of the west being neglected.

Accidents, economies of the coal trade, conservation methods as applied to mining, and other subjects of interest were discussed. Not the least instructive was a paper by the veteran Canadian, Dr. James Douglas, of New York who described the Copper Queen Company's collieries and coke plants at Dawson, New Mexico, involving an investment of two millions of dollars.

The Canadian delegation this year was small, consisting of Mr. H. H. Lang, of Cobalt, and Mr. T. W. Gibson, Deputy Minister of Mines.

The Use of the Pulmotor in Metal Mining

Written for the Canadian Mining Journal by E. T. Corkill.*

Since the organization of first aid to the injured societies in Germany about thirty years ago, great progress has been made in the development of oxygen resuscitating apparatus for rescuing the lives of workmen who have been overcome with poisonous gases in the mines. Apparatus of this nature is now being largely used in the great coal-producing countries of the world. Rescue stations have been or are now being established at suitable centres of every large coal field. These stations are equipped with oxygen helmets, pulmotors, bandages, splints, antiseptic dressings, and various first aid appliances, and are placed in charge of a corps of men trained in the use of this apparatus and first aid appliances. The oxygen helmet has been used with great success in rescuing men after explosions and fires in coal mines, and has been used to a lesser degree in the extinguishing of fires in metal mines and in saving men entrapped by fire. After these explosions and fires, many of the injured, when brought to the surface, are unconscious as a result of inhaling the poisonous gases. As a means of resuscitating these men the pulmotor was invented. The apparatus consists of a cylinder in which oxygen is stored under a pressure up to 125 atmospheres, a blowing and suction valve actuated by two accordion bellows; a face mask which encloses the mouth and nose, making an air-tight connection with the face, to which a mask is attached, two flexible tubes leading to the blowing and suction valves respectively.

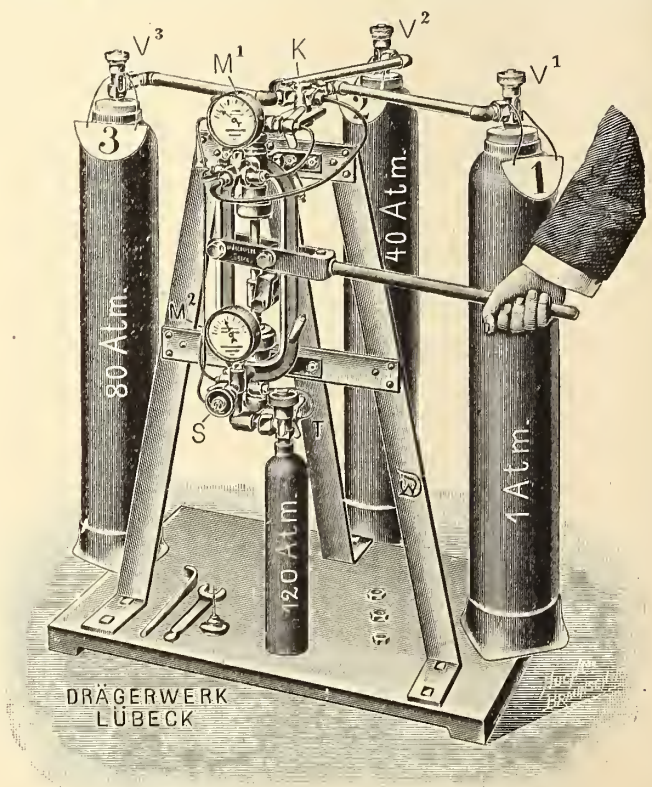
*Inspector of Mines for Ontario.

When the mask is made air-tight on the face and the oxygen turned on, the apparatus works automatically. Oxygen is forced into the lungs until a pressure of 4 inches of water gauge is reached, which pressure is in connection with one of the accordion bellows, and owing to the elongation of the bellows under this pressure, the valves are turned and the pressure in the lungs released. The suction valve immediately begins operation and continues to exhaust the oxygen from the lungs until a vacuum of 4 inches of water gauge is reached. The oxygen used for creating this partial vacuum elongates the second accordion bellows and changes the position of the valves, allowing the oxygen again to be forced into the lungs, etc. A lever enables the inflow and outflow of oxygen to be regulated by hand, independent of the automatic device.

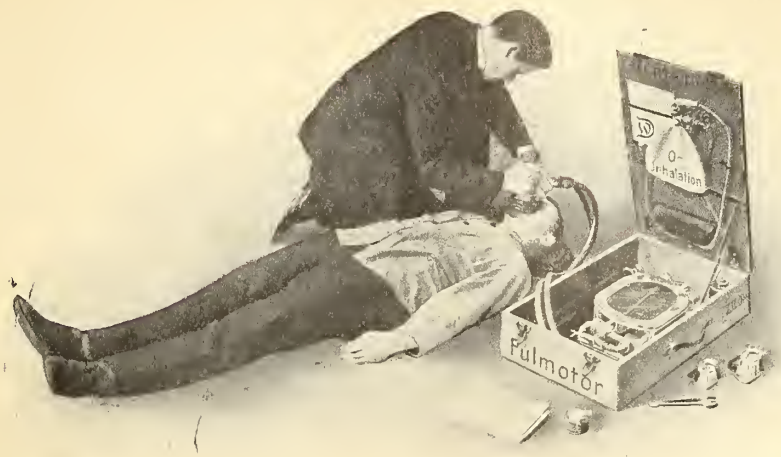
The application of this device necessitates placing the subject on his back, in which position the tongue may fall to the back part of the throat, allowing the soft palate to close the larynx. To overcome this condition, a flexible rubber tube is attached to the upper part of the face mask which will admit of grasping the tongue with a pair of forceps and withdrawing it sufficiently to raise the palate.

Another type of mask is one which fits over the nose and nostrils only, allowing the mouth to be free. With the use of this nose mask the tongue may be withdrawn and held between the teeth and lips with sufficient pressure to hold it in place and make the mouth air-tight. For the successful use of the apparatus it is necessary that an air-tight fit be made with the type of mask used.

Attached to the lid of the pulmotor is an inhalation device which may be substituted for the pulmotor as soon as the subject under treatment recovers the involuntary action of the lungs. This inhalation device is fitted with a rubber bag which holds two liters of oxygen when inflated, and a metallic mask which



The Oxygen Cylinders and Pump.



The Pulmotor in Service.

over the mouth and nose and which may be held place with a rubber band passing around the head. The apparatus has been used most successfully in resuscitation of persons who have been overcome through breathing irrespirable gases, by drowning or electric shock.

In metal mines many men are every year rendered temporarily unconscious through the inhalation of the gases which result from the explosion of dynamite, etc. In a number of cases they are not rescued in time to save their lives by the ordinary methods employed. In Ontario, during the years 1901 to 1910, 13 men lost their lives from this cause. A number of these men were not rescued until all signs of life were extinct, but there were a few who were still alive when brought to the surface but subsequently succumbed as a result of the poisonous gases inhaled. In addition to the fatalities there were a number of men who were rendered temporarily unconscious from inhaling gases resulting from dynamite explosions. These men were revived by the ordinary means of artificial respiration. If the pulmotor had been available, these men would not only have been revived sooner, but the gas would not have had as lasting effects. The best safeguard is to have the workings so well ventilated that poisonous gases cannot collect. Failing this, the next safeguard is to use artificial ventilation, such as fans, etc. If accidents then result, it is certainly advisable to have a pulmotor available for the speedy resuscitation of those workmen overcome by the irrespirable gases. The apparatus is automatic in action and any person can be trained in a very short time to its use.

The pulmotor has also proved very beneficial in resuscitating workmen who have received electrical shocks. The treatment is similar to that for poisonous gases, and if there is any heart action at all in the injured person resuscitation is very probable. Electricity is now in general use in the majority of metal mines, and accidents are therefore liable to happen from accidental contact with the wires no matter how carefully the wires, switches, etc., are insulated and guarded. It is, therefore, the duty of the operators to provide the best remedies obtainable for aid to the injured.

Stock Value and Mine Value

Written for the CANADIAN MINING JOURNAL by Dr. A. C. LANE.*

Continued from our Last Issue

I assume, then, that an unlisted copper mine figuring simply on its yield will, and should fairly, sell between well-posted business men at a price that would represent the payments to be received from it discounted at 7 per cent. compound interest.

Average Return from Listed Copper Mines 6 Per Cent. to 7 Per Cent.

I next take up the effect of increasing the marketability of copper mines in the raising of their price measured by the reduction in the yield. Taking the mean price of leading Lake Superior mines and comparing them with the return in dividends we find the average annual return in dividends on the mean annual price of the Lake Superior copper mines for 14 years between 1891 and 1910 to be almost exactly 7 per cent., varying in different years from 5.3 per cent. to 11.4 per cent. The figures for value given by Stevens are the average of the highest and the lowest price for the year, a mean value which is not technically the average value. It is sufficiently near the average, however, for our purposes, and these average values have been checked somewhat by comparison with the state valuations.

*Professor of Geology, Tufts College.

The statement that the average yield of a Michigan copper mine is close to 7 per cent. on the money invested may also be checked thus. The total assessments (money paid in on the stock marked thereon according to Michigan law) were $78,497,700 up to 1909 and the dividends $183,073,816. A mine, however, never begins to pay its dividends until four or five years after its organization and initial assessments. The most prominent dividend payers like the Quincy and Calumet have been paying for a long time, respectively since 1862 and 1870. These two alone are responsible for two-thirds of the dividends. Thus, without undertaking the colossal work of estimating the worth at an even date of all the assessments and dividends, it is clear that the dividends have certainly not followed the assessments on the average as promptly as if they were evenly distributed over the 28 to 34 years following organization. This would imply in the former case a return on the mine assessments of 7 per cent., in the latter case of 6 per cent.

Yield of St. Mary's After Listing.

The St. Mary's Canal Mineral Land Company was followed and succeeded by the St. Mary's Mineral Land Company, and, though by its holdings of copper stock this has become no more a purely land speculative company, it will be interesting to see the effect of listing and making a market for it. The opening of the Baltie lode increased very much the value of the company's property. Since 1903 it has received a steady income from the Champion Company. Accordingly, in 1901, a new company was organized with 200,000 shares at $20 a share, of which $6 went to each old share with a right to subscribe to one more, which sold at a premium. Thus the new shares made the old worth from $150 to $250, and, while this was during an epoch of inflation in the stock market generally, St. Mary's stock has never sold for less. Thus it can not be said from the stock market point of view to have been inflated. If we take the statement of the assets and liabilities in the first report of the St. Mary's Mineral Land Company and correct the value assigned to the holdings of the Champion mine stock from $19 to $67 or $80 a share to agree on a 7 per cent. basis with what it actually has yielded, we find the shares issued in 1901 were worth $42 to $55 a share on a 7 per cent basis. A share bought that year at the time of issue of the new stock would probably have cost about that figure. Computing the dividends for the next few years up to 1906, when say 10,000 more shares were issued, and supposing the stock were sold in 1906 at the price of the new stock which sold at a small premium, it would have been worth in 1901 $41.50, supposing that the intermediate dividends and the sale in 1906 had been discounted on the 7 per cent. compound interest basis; whereas if it sold for the high price that year it could have made much more. We see then that the yield after listing St. Mary's came down to a 7 per cent. basis something like other Michigan copper stocks.

Increment of Value Due to Marketability Similar for Stable and Unstable Securities (50 Per Cent.)

If the effect of listing and making a market for copper stocks is to reduce the yield from near 10 per cent. to 6 per cent. or 7 per cent., and, therefore, to increase the value by the same proportion, it is interesting to notice that the increase of value is in very nearly the same ratio as in the safer stocks already mentioned—guaranteed railroad stocks—as against mortgages. In the latter case the proportion is 42 to 63, or 67 to 100, instead of 69.8 to 100. It would seem fair to say that organized speculation increases the value of stock about 50 per cent., from which, of course, must be deducted the cost of the organization itself.

Fluctuation Factor.

Not closely dependent on volume of sales.—But whil the average effect of listing is thus given, it is not th same for all classes of stocks. This will come out bet ter as we study the next factor—the activity factor.

I at first attempted to analyse this by taking the vo ume of sales in 1899 (the first year given by Stevens and arranging the stocks in the order of the volum of the sales. I arranged them also to show the amoun of fluctuation. To show this fluctuation I divided th highest price of the year by the lowest, obtaining wha we may term the fluctuation factor. I was disappoint ed to find little apparent correlation between the vo ume of sales, if measured by number of shares sold, an the amount of fluctuation. Some mines of which ver few shares are sold have a wide range, others wher there is much sale have no range at all.

More closely dependent on price of stock.—But i must be remembered that the order of absolute num ber of shares was no sign of the order as to money in volved. Five shares of the Calumet and Hecla sellin at $500 or more is as great amount of activity, so fa as actual money is concerned, as five hundred share of a $5 stock.

For instance, in 1903 one of the most active stock was Allouez, of which there was 152,262 shares, a from $3.13 to $7.50 a share. This really involved n more money than the sale of 5,375 shares of Calume and Hecla at prices ranging from $550 to $400. I als plotted the weekly prices and sales of Copper Rang from 1903 to 1909, but no correlation was apparent.

If we rearrange the mines, however, multiplying th total sales by some figure that we shall take as a mea price (though it would be more strictly correct t take each transaction, multiply the number of share by its price and thus obtain the total amount of mone involved in the sales of the year) we find that the fluc tuation factor depends much more strictly on the pric of the share than the amount of sales, which, indeed may be neglected. The greater the price of the shar the less the fluctuation. Setting off in the table fo 1903 the names of the mines more or less to the righ according to their fluctuation factor, we find the mor expensive shares least set off.

Michigan Copper Stocks.

Fluctuation Factors and Sales in 1903.

1,226,030	2.03	Copper Range.
301,086	2.65	Centennial.
181,253	2.46	Winona.
152,262	2.40	Allouez.
120,526	1.87	Mohawk.
98,842	8.16	Arcadian?
83,419	1.84	Osceola.
67,078	2.70	Elm River.
65,717	6.00	Mass.
54,552	3.84	Wyandot.
52,925	6.00	Victoria.
44,485	3.50	Isle Royale.
34,087	2.14	Atlantic.
29,087	2.53	Michigan.
28,794	1.43	Wolverine.
23,522	2.72	Phoenix.
23,377	2.08	Franklin.
15,239	2.53	Tamarack.
15,634	5.00	Mayflower.

15,815	5.00	Rhode Island.
7,505	4.50	Tecumseh.
6,438	1.58	Quiney.
5,371	1.37	Calumet and Heela.
4,582	3.80	Arnold.
2,240	3.33	Washington.

Division of Copper Stocks Into Two Classes at $10.00.

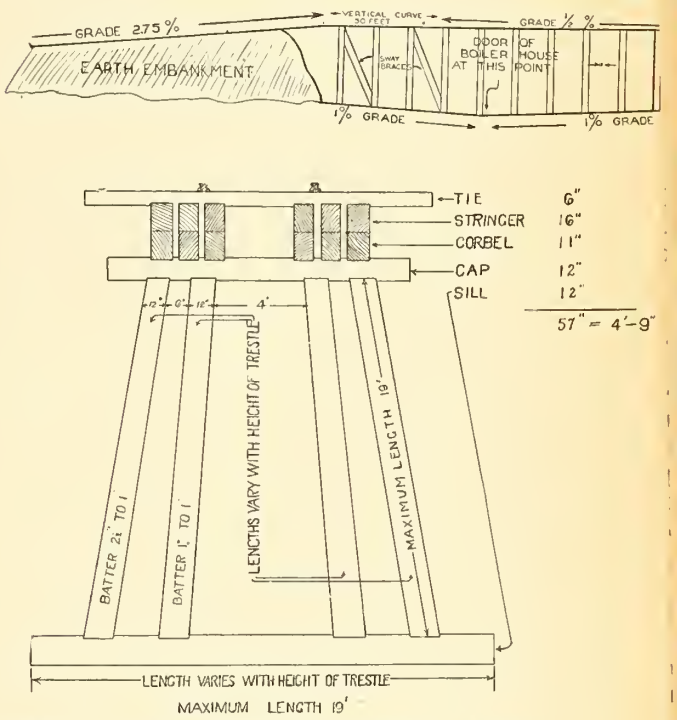
Class A.—Mines successful, dividend paying with average fluctuation factor 5/3. Rarely over 2.5.—In the table of sales for the year 1903 (where the mines are arranged in order of the number of shares sold, the fluetuation factor prefixed to each mine and the name indented in proportion to the range of the fluctuation faetor) I underscored those mines which in 1899 at no time sold below $10, and though I took this line arbitrarily I found I had with but one exeeption made a natural group (Class A). The mines which at no time sold below $10 in 1899 were with this exeeption all mines that had been proved to be able to produce eopper with profit, and they agree in several other striking features beside the fact that they did not sell below $10. Only the exeeption (the Arcadian) did not sell above $10 in 1901. This mine (the Areadian) was an illustration of a mine that at a time of frenzied boom was held at an artificial price through a whole year. In no other year was its lowest price above $10, and it has never paid any dividends or produced eopper to speak of or otherwise come into the class of the properties concerned. It should be excluded from the class, but I have not done so as it makes no qualitative differenee as to our conclusions. If one studies the mines of Class A one finds that the fluctuation factor averages 1.67 for 1899 (Bowen made it 1.631), and not only in that year, but in other years, it very rarely goes above 2.5.

(To be Continued)

SIMPLE COAL TRESTLE OF UNSQUARED TIMBER

By P. B. McDonald, of Negaunee, Mieh.

The accompanying sketehes show a coal trestle for use at mine boiler houses, to be constructed prineipally of logs. The grades of the rails for railway ears and the 1 per cent. grade of the floor to facilitate hai tramming the coal to the boiler house door, have bee found to be convenient in aetual installations. Swa braees, to prevent the bents toppling over like a ro of dominoes, are shown in two of the spaces. Plank may be nailed diagonally across each bent if desired and some engineers prefer to rest the sills at eithe end upon pieces of railway ties sawed into thre lengths. To obviate using corbels under the stringe which are 12 feet long, the stringers are sometime made 24 feet long, making joints upon alternate bents two double rows of stringers are run, one row makin joints upon even bents and one row upon odd bents over each bent the two rows of stringers are bolte together for greater security.



SIMPLE COAL TRESTLE OF UNSQUARED TIMBER

ELECTRICAL ACCIDENTS IN MINES: THEIR CAUSES AND PREVENTIONS

By H. H. Clark.*

Introduction.

One of the purposes of the work carried on by the Bureau of Mines is to make mining safer. For this reason the bureau is investigating the causes of mine accidents, the methods by which such accidents may be prevented, and the best ways of rendering aid to those who are injured or put in danger by accidents. This circular tells what are the chief causes of electrical accidents in mines, briefly points out the precautions that should be taken to avoid or prevent these accidents, and gives directions for treating persons suffering from electric shock or burns.

*Miners' Circular No. 5, U. S. Bureau of Mines.

Definitions.

To make this circular clear to persons not familiar with electrical matters, the following terms are defined:

Electric conductor.—An electrie conductor is something through which electric current may flow, just as a pipe is something through which water may flow.

Electric Circuit.—An electrie circuit is a system of electric conductors joined together so that electric current may flow through them, as water flows through a system of pipes.

Complete Circuit.—A complete circuit is one in which the current may flow freely, with nothing to stop it.

Current strength.—The strength of a current is its amount. A large current may be considered as stronger than a smaller one, because it has more effect upon man's body.

Alive and live.—Alive and live are terms that mean 'charged with electricity,' and are used in speaking of conductors, circuits, and machines that are in condition to give an electric shock.

Insulator.—An insulator is something that stops the flow of electric current, just as a dam stops the flow of water.

Voltage.—Voltage means electric pressure. Voltage causes electric current to flow, just as water pressure causes a current of water to flow.

Chances for Shock in Mines.

In handling live electrical machines or wires, or in working near them, care must be used to avoid getting a shock. This is especially true when the wires or machines are underground, because, as a general thing, there is little space, little light, and much dampness in a mine, and these are conditions which help to make electrical accidents possible.

The fact that the earth is used as a return circuit for the electric current places the miner in the position of standing upon one terminal of an electric generator; therefore, if he touches only a single point connected to the other terminal of the generator (such as the trolley wire, a metal part of a switch, a bare place on a mining-machine wire, or a live part of a motor) he is likely to receive a shock, the effect of which will vary with conditions from a severe jolt to a bad burn or even death.

General Causes of Shock.

A man's body is an electric conductor, although it is not as good a conductor as a trolley wire or a track rail, and current will flow through the body if it is made part of an electric circuit. The effect that such a current will produce depends upon its strength. The current may be so small that it can not be felt; it may be only strong enough to give a slight shock; it may be so strong that it will burn the body; or it may be strong enough to produce insensibility and death.

The amount of current which will flow through a man's body when it is made part of an electric circuit depends upon two things:

(1) The voltage or pressure of the circuit.

(2) The completeness of the contact between the man's body and the circuit.

Under the same conditions more current will flow from a large voltage than from a smaller one. A single-cell battery giving 1 to 2 volts can cause a current to flow through the body, but the current is too small to be felt. Much more current will flow through the body from contact with a 110-volt circuit. Such a current will give a slight shock. Contact with circuits of higher voltage allows even stronger currents to flow, and these give more severe shocks.

If a perfect insulator could be found, a man might stand upon it and place his hand upon a 500-volt trolley wire without receiving a shock, because the circuit through his body would not be complete and no current could flow. If a man should stand upon damp earth and handle a live trolley wire with gloves that were moist with sweat he would probably receive a severe shock, because a circuit would be completed through his body. If he wore no gloves the shock would be heavy enough to knock him down and might even kill him, because the circuit through his body would be still more complete. There are some men, but not many, to whom this last statement does not seem to apply.

It is most important to realize the extreme difficulty of so insulating the body that a circuit can not be completed through it. There is no such thing as a perfect insulator, although for practical purposes a number of things may be so considered. The most that can be done is to so insulate the body that the current which passes through it will be so small that no shock will be felt. The difficulty of doing this becomes greater as the voltage that is handled increases.

The most common voltages used underground are 110, 250, and 500 to 600 volts. The first voltage, which is used very rarely, is not hard to guard against, and the conditions under which it will give a severe shock are seldom, if ever, met. It is much more difficult to protect the body from 250 volts, and in working about circuits of 500 to 600 volts great care must be used in order to escape shock, especially when the earth is used as one side of the circuit, as it very often is in mine work.

Some Direct Causes of Shock.

Trolley Wires.

The reports of the mine inspectors of several States indicate that most of the shocks received in mines result from contact with trolley wires. These wires have to be bare of insulation, and they can not easily be shielded from passers-by throughout their entire length. A trolley wire must often be strung less than a man's height from the floor, with a track rail almost directly underneath it. Everything combines to make it dangerous to travel in the same entry with a trolley wire, especially if tools are being carried or things are happening that distract the attention. Great care is necessary to avoid shocks in crossing over trips of cars or entering or leaving them from the trolley-wire side. In such cases a man's head must pass close beside the wire at the time that his attention is given to watching his footing.

Accidentally Charged Equipment.

Next to contact with trolley wires, the most likely cause of shock is contact with parts of machines or equipment that are not supposed nor intended to carry current, but are accidentally charged with electricity. This charging is caused by the failure of insulation or by a live wire coming in contact with equipment. The frame of a motor or cutting machine or the iron casing of an inclosed switch may become alive and may then give as bad a shock as a trolley wire. Such a condition is especially dangerous because it is unexpected.

The frame of a locomotive is usually so completely in contact with the track rail that a man can not get a shock by standing on the rail and touching the locomotive, but this may not always be the case. If for any reason there is a great deal of sand on the rails the locomotive frame may be almost completely insulated from them. In that case a shock may be received from the locomotive frame or the draw-bars of cars coupled to the locomotive.

Other shocks are caused by contact with those parts of equipment that are known to be alive but are touched by accident while handling apparatus or repairing it. This applies to connections made to the trolley wire while it is carrying current, to the ad-

justment of motor brushes, and to all repairs made to pparatus that is alive.

Precautions.

The best way to avoid electric shock is to show due espect for the electric current. Indifference to the angers of electricity does not indicate courage or isdom, but poor judgment and ignorance. The fact hat a man does not get hurt when he is careless in andling electric wires does not prove that he is leverer than other men, but rather that he is more ortunate. The worst feature of such acts is the bad ffect that they have on those who see them or are old about them. Those who know about electrical pparatus and are employed to handle and repair it hould try to teach others to be careful instead of encuraging them to be careless.

The only sure ways to escape shock are to keep way from the trolley wire, especially when carrying ools; to avoid touching electrical machines unnecesarily; and to provide and use some means of insulatng the body when making repairs on electrical aparatus. If there is a way to cut off the current from pparatus the current should be cut off before the pparatus is handled. If it is necessary to work on pparatus that is carrying current, every precaution hould be taken to insulate the body from the ground.

It is impossible to tell whether conditions are safe nless the workman has made them so himself. No ne can tell by merely looking at a motor whether or ot the parts that carry current have come in contact ith the frame of the machine. A workman can not e certain whether the place where he must stand to epair live apparatus will sufficiently insulate his body om shock. The only way for him to be safe is to rovide something suitable to stand on while making epairs. In doing this he should remember that dryess is the most desirable quality. Dry boards, free om nails, are good for the purpose.

Rubber gloves or leather gloves in good condition nd without metallic fastenings will protect the body om shock. If the rubber covering of the gloves is orn thin the gloves give almost no protection. The me is true of leather gloves that are damp with ater or sweat. Rubber boots without nails in the les or heels are good protection when new, but if e soles are worn or cracked, their insulating value doubtful.

The position of the body is an important matter in ndling apparatus that is carrying current. If a an has merely to make some adjustment he should se but one hand, if possible. He should also try to lace his body so that the involuntary recoil from a ssible shock will remove his hands from the apratus instead of causing them to grasp it.

The use of rubber tape on the handles of pliers, rew drivers, and wrenches can not be depended on nless the tape has been freshly and carefully apied. Rubber coverings for the handles of such tools e a protection if the coverings are new and in good ndition, but even then the chances are great of uching the hand or the fingers to an uncovered part. nsulated tools should not be trusted to give entire rotection.

There is one practice that can not be condemned too verely, and that is the wilful giving of electrical ocks to others. This may be done impulsively or ay be deliberately planned, but it is always dangerus. The effect of such a trick can not be foreseen ecause there are so many things to consider. The person who is given the shock may be so placed and so constituted that serious and even fatal results will

Explosives and Electricity.

Great care should be used in handling explosives near electric current. It requires only a very small electric spark to set off powder. An exceedingly small current passed through the powder itself will explode it.

In carrying explosives in mine cars care should be taken to keep the packages off the floor of the car and away from the iron fittings, as these frequently receive current from the draw-bars, especially when the motorman is using sand on a slippery rail. Packages of explosives should be kept closed, and should not be taken into cars that are near the locomotive, as sparks are often thrown down from the trolley wheel.

The safest thing to do is to keep explosives as far away as possible from all electric current. If explosives must be handled near the current, use every precaution to protect the packages.

Some Suggestions.

The following suggestions given below, will help to lessen the number of electrical accidents

(a) Suggestions for Mine Foremen.

Don't allow explosives to be carried in cars near

Don't allow inexperienced men to handle electric wires.

Don't fail to protect the trolley wires at crossovers and partings.

Don't allow wires to be installed in a slipshod manner.

Don't fail to have wires promptly repaired after roof falls.

Don't allow explosives to be carried in cars near the locomotive.

(b) Suggestions for Electricians.

Don't fail to set a good example for less experienced men to follow.

Don't work on live apparatus if it is possible to cut off the current.

Don't stand directly on the ground and work upon live apparatus of any kind—get something dry to stand on.

Don't rely upon gloves for protection, unless they are perfectly dry, free from holes, and without metal parts.

Don't, under any circumstances, work on live apparatus that is charged with a voltage greater than 650 volts.

Don't handle wires carelessly just because they are insulated.

Don't send an inexperienced man to work on or about live apparatus.

Don't neglect to inspect your equipment regularly.

Don't ever cause anyone to receive an electric shock.

(c) Suggestions for Miners.

Don't think that it is smart to get an electric shock. Every time a man gets a shock it shows that he has been lacking in care or knowledge.

Don't be ashamed to be careful. You owe this not only to yourself but to others who may follow your example.

Don't handle wires or electrical apparatus of any kind unless you are told to do so.

Don't get off or on trips from the trolley-wire side.

Don't carry tools on your shoulders when crossing under the trolley wire or when travelling in the same entry with it.

Don't travel in the same entry with the trolley wire if you can avoid doing so.

Don't get your explosives near electric wires.

Don't allow packages of explosives to come in contact with the metal parts of cars.

Don't carry explosives in cars near the locomotive.

Don't ever cause anyone to receive an electric shock.

Don't ride on electric locomotives.

Don't fail to report when you find that electric wires are down.

Don't install temporary lights — leave that work to the electrician.

Treatment for Electric Shock.

When a man has received an electric shock that leaves him senseless, two things should be done as soon as possible.

First, remove the victim from contact with the electric wire.

Second, rivive him or "bring him to," by getting him to breathe.

While removing the victim from the electric circuit, be careful not to get a shock yourself. If there is a switch right at hand, cut off the current at once; but if there will be any delay in cutting off the current, remove the body from the circuit by means of a piece of dry wood, used either to roll or push the body aside or to lift from the body whatever is carrying current to it Tools with dry wooden handles, such as picks or axes, may be safely used for this purpose.

The body of the victim can be safely grasped if your hands are protected by several thicknesses of dry cloth, or if you stand upon a piece of dry wood.

When you can do nothing else, you may be able to short-circuit the line with which the victim is in contact, and thus blow the circuit breaker or fuses which protect that part of the electric system.

A short circuit may be made by placing an auger or drill or a piece of pipe so that it will connect the two sides of the electric circuit. For example, in case the victim is in contact with a trolley wire, the auger, drill, or pipe should be thrown across the trolley wire and track rail, so as to be in contact with both. In doing this, be sure that the auger, drill, or pipe leaves your hand before it touches the current-carrying part of the circuit, as otherwise you will get a shock yourself.

When the victim has been removed from contact with the current, turn him on his back, loosen the clothing from around his neck, chest, and abdomen, and place a small log, a rolled-up coat, or something of similar size and shape under his shoulders in such a way as to throw his head back and his chest up.

The next thing to do is to draw out the victim's tongue, which can best be done by grasping it with a piece of dry cloth. This act clears the windpipe, and unless it is done, the victim can not be made to breathe. If the rescuer is alone, he will have to keep the tongue in this position by tying it with a handkerchief or a bandage passed over the tongue and under the jaw.

The tongue must be held in this position while giving artificial respiration.

There are several methods of giving artificial respiration, but the one most commonly used is the Sylvester method. Kneel behind the head of the victim, grasp the forearms just below the elbows, and dra them slowly backward until they are extended as f as possible over his head, and hold them there f about one second.

Then slowly push the elbows forward and dow ward. Next press the chest and hold them there f about one second so as to drive out the air from t lungs.

Do not perform these movements hurriedly; pum ing the arms up and down is a waste of time. To co plete one series of movements should take about fo seconds. A very good way to time yourself is count, very slowly, "one, two, three, four," wh making the movements. Count "one" as the victim arms are being extended, count "two" while they a being returned to his side, and count "four" wh exerting pressure on his chest.

Usually a victim of electric shock can be made breathe within an hour, and the artificial respirati should be continued at least that long, even if t patient does not show any signs of being "broug to."

If other persons are at hand, have them assist relieving you at short intervals, and have them ke the victim warm by covering him with coats or an thing else that may be at hand. After the victim l gins to breathe, the assistants should rub his lim briskly and toward the heart, keeping their hands u der the covering while doing so. This will help restore the circulation of the blood, which has be for a time suspended.

While arrangements are being made for removi the injured man to his home or to a hospital, tre any injuries that the victim has received. Treat el trie burns exactly as ordinary burns. Before the a rival of a doctor it is proper to cover the burnt pla with several thicknesses of picric-acid gauze. Th gauze is now being used in nearly all mines and ho pital emergency rooms.

In case no picric-acid gauze is at hand, the bur may be covered with clean gauze, preferably tak from sterile packages, and covered with vaseline, ea bolized vaseline, olive oil, linseed oil, or what is knov as carron oil, which is a mixture of linseed oil a lime-water.

Cover these dressings with plenty of cotton a protect this in turn from the outside air with oil paper or anything that will keep out the air wh the victim is being taken home or to a hospital.

Bandage all dressings lightly, so as to cause as l tle pressure as possible upon the injuries.

Magnesia rarely occurs in brick clay in larger p portions than one per cent.

A convenient item in the prospector's equipment the oiled silk tent. For the man who is travelling h himself, or with but one companion, the canvas te is heavy and cumbrous. Light loads mean a great de to the man who has to cover virgin territory.

The care of belting for power transmission is a mo important factor in industrial establishments. Th individual electric motor drive has not displaced t belt drive. The mathematics of the question have n been fully developed; but it is known that the tensi is an extremely variable quantity, a quantity affect by atmospheric moisture, by the age of the belt, a by other uncontrolled factors.

High Grade Ore Deposits of the Portland Canal District.

(By an Occasional Correspondent.)

There are fashions in mining as in millinery. The ublie favour turns from Cobalt stocks to California d with as little apparent reason as is incident to a hange in style of bonnets. A leaching process is in ogue, and every mine manager tries to apply it to is partieular problem until some new 99.99 per cent. rocess supplants it. It is interesting to watch some chnieal term making the rounds of the trade and ientific publications. For some time in this district ie low graders have not only held the centre of the age, but have pretty well monopolized the whole ow, more capital having been found for their exloitation — the usual undiscerning human deference large expenditures of money. Disparaging refernces to "high assays" have been fashionable. Even ie Provincial Mineralogist seems to have fallen in ith the popular mood. In the last annual report of ie Minister of Mines, he says: "The camp contains a rge number of properties from the prospect workings which exceptionally high assays have been obined, giving rise to unwarranted hopes and statements which can not be borne out on a strict examiation. . . . In the opinion of the writer this porion of the camp will be comparatively low grade conntrating propositions, from $10 to $20 ore, the high ade minerals being difficult to concentrate and not fficient in quantity to dispense with this process." It ould be singular if a large number of properties elded exceptionally high assays without here and ere a workable deposit of high grade ore. In view the fact that the Provincial Mineralogist visited ne of this class of properties, and that at the time of s visit none of the low grade properties had repaid cent of their large capital expenditure, his statement manifestly unfair and wholly unwarranted, and it the purpose of this article to remind the investing blic that the ores of Portland Canal are not all low ade; that the initial expense of operating high grade operties is negligible in comparison with the cost of cessary equipment for exploiting low grade ore; and at it is by no means proven which class of properties this district will develop the best dividend payers.

In an inhospitable country where the economic pressre is greater than in the Coast district, no doubt conderable ore would have been produced from discovies of equal promise. But living is easy on the Coast, e prospector has been pessimistic regarding his disveries or inexperienced as to economical methods of ploiting them; transportation difficulties have been eat, and so he has preferred to sit back and wait for e boom and the capitalist, rather than take the risk mining and brave the winter's snows in the lonely nyons of the hills. Now that transportation facilis have been greatly improved and the stock market no longer an Aladdin's Lamp, it is probable the sucding years will see shipments of high grade ores of creasing commercial importance.

I include under the head of high grade ores, all es that can be brought to market at a profit without eliminary treatment and by a primitive mode of nsport — in short, "rawhide" ores. The minimum say value of such ore under present transportation cilities would be in the neighbourhood of $50 per ton. ere are a considerable number of properties in the district, silver-lead chiefly, that belong in the rawhiding class. Among them may be mentioned, on Glacier Creek, the "Lakeview," the "Francis," and the Rush-Bagg-Nelson group; on American Creek, the "Bonanza." The Lydden and Eusch claims and the holdings of the Northern Terminus Company. The "Mountain Boy" carries lenses of splendid ore along with large bodies of concentrating material. At the Northern Terminus a trail has been built to the Red Cliff to connect with the railroad; ore is being sacked and a camp is being equipped for mining and rawhiding ore during the winter. On Salmon River, Seattle parties have been doing quiet but effective development work on a grey copper property belonging to Linderbourg Bros. High grade ore is also reported from the Upper Salmon, Bitter Creek, and Upper Bear River. This list does not pretend to be complete.

Tunnel and Ore Dump, Excelsior Mine.

Among the high grade properties of the district the Rush-Bagg group of claims, situated between the north and south forks of Glacier Creek, occupies a place of leading importance by reason of their extent, values, and advantageous position. With this section the writer has considerable familiarity, and a discussion of its characteristics may be of interest. Rush and Bagg's main camp is reached by horse trail 3½ miles from the Portland Canal mill. The "Ben Bolt" mine, Sir Donald Mann's property, uses the same trail for 2½ miles. The camp is situated at an altitude of 2,000 feet in a heavily timbered cleft in the hills, on the

banks of the Middle Fork. R. G. McConnell describes this section as a region of basic intrusives. For a cursory examination this is as accurate as could be expected. It will be found, however, that the main structural differences between this section and adjacent country are: (1) the entire absence of granite; (2) smaller areas of argillites and larger areas of intrusives; (3) the presence of a bluish to greenish siliceous limestone that blends into the intrusive and may be mistaken for it. The intrusive will usually be found to be a diabase. A basic porphyrite occurs, probably formed from the same magma. Successive bands of slate (argillite) show the formation to be regular, striking and dipping as in the adjacent country. Faults are unusual. Quartz veins frequently accompany the slate bands, carrying ore similar to that found in the Ben Bolt and Portland Canal mines. Veins of this class are found on the "Sentinel" and "Jupiter" claims. The whole region is criss-crossed with barren or sparsely mineralized quartz veins, without any regularity of strike or dip. Ankerite occurs but is not important as a gangue. Rusty "blowouts" are common, especially on the Excelsior and Eagle claims.

Upper Tunnel, Evening Sun Mining Co.

But it is the high grade veins in which we are particularly interested. These veins invariably cross the formation and dip at a steep angle. They divide themselves into two classes: (1) Siderite veins (striking N.E.). A vein of this class is found outcropping on both sides of the creek at Rush & Bagg's camp. It has been traced down one hillside and up another, through the "Columbia," "Evening Sun," and "Silver King" claims. The vein is very regular, free on both walls, and up to 10 feet in width. The gangue consists of siderite, quartz, and sheared country, softened and transformed by mineral solutions. The sulphides, pyrite, arsenopyrite, galena, zinc blende, stibnite, and grey copper are disseminated throughout the vein, and are frequently found concentrated in lenses and shoots of solid sulphides, varying from clean ore to combinations of every degree of complexity. The chief value of the ore is its silver content, which is found associated with galena, zinc blende, and what is locally called "grey copper,' probably freibergite. The last-named mineral has been found, when pure, to assay up to 3,950 ounces silver per ton. Two 75-foot drifts have been driven on the Evening Sun, and a 35-foot drift on the Columbia — far too little work to prove the ground when the capricious nature of high grade silver deposits is considered. One tunnel shows better ore than the surface, and the other two vice versa. On the Silver King the same vein has been opened up by three tunnels, two of which have developed shipping ore. A spur vein on the Evening Sun is 5 feet wide and shows a strong shoot of the usual character of ore.

The Excelsior, situated one mile east of the Ben Bolt camp has two similar veins or vein systems about 1,000 feet apart. The south vein has about the same width as the Columbia vein, and has been traced upwards of 1,000 feet, outcropping for about half that distance. It is not so regular as the Columbia vein but its ore and gangue are almost identical. There are several tributary veins, two of which at least carry high grade ore in some quantity. The development

Open Cut, Columbia Mining Co.

consists of a number of open cuts and trenches and two short drifts, one on the trunk vein and one on a spur. The north vein is rather a wide vein zone with successive parallel lenses of ore and spurs into the adjoining country. It has been traced 400 feet by a line of outcrops connected by float. Beside the usual ore and gangue there is considerable chalcopyrite. Development is limited to a series of open cuts.

(2) Quartz veins (striking N.W.). On the Katherine claim of the Rush-Portland Mining Company, a vein of this class has been traced some 500 feet, varying in width from 1 to 5 feet. The mineral content of the vein are similar to those of the siderite vein with the exception that there is less lead and antimony and more arsenic. A tunnel has been driven on the vein for 110 feet, developing throughout its length ore similar to that found on the surface. A small tri

shipment has been sacked that samples $160 per ton in gold, silver, and lead. The same company has a similar vein on the Elsie claim on the opposite side of the ridge. This vein appears to carry some native silver in a finely divided state, in addition to the usual sulphides. The lowest opening shows 3 feet of quartz with heavily mineralized paystreaks, along both walls. A drift has been started. The convergence of this vein, with a tributary just after the vein leaves the bluffs and disappears under the talus, makes it appear probable that the best of the vein is covered. Two strong veins outcrop on the Ne Plus Ultra claim, but they have not been prospected even superficially.

Lack of funds has hitherto prevented the companies operating in this section from doing any considerable amount of exploratory work, but enough has been accomplished to demonstrate the existence of rawhide ores—"Slocan" ores in some quantity. Any person who is well informed regarding the Portland Canal district, knows that such ores are of rather frequent occurrence throughout the camp. When a fraction of the money that has been spent here on low grade ores has been used in developing these high grade deposits, it will be early enough to pass judgment upon their value.

NOTES ON MINERALS FOUND IN THE SLOCAN DISTRICT, B.C.

The following paper was prepared by Mr. Wm. Thomlinson, of New Denver, B.C., and read at a meeting of the Western Branch of the Canadian Mining Institute, held in the Slocan Lake District last September. Mr. Thomlinson stated, in his introductory remarks, that he intended to deal more with some things not generally known concerning the mineral occurrences of the Slocan, than with the ordinary commercial ores of the district. He then proceeded, as under:

High-Grade Silver Ores.

As the high-grade character of the silver-lead ores of the Slocan is now so well known, I shall refer but briefly to these, for my chief aim now is to give information relative to other minerals also found in the district.

First, though, I would mention that I think the high silver content of both the silver-lead and the "dry" ores of the district is due mainly to their containing freibergite, or grey copper, a variable and complex variety of tetrahedrite, which is, in this district, usually rich in silver. Other high-grade silver minerals, such as argentite and pyrargyrite, also occur in the ores, but, I think, are not generally so important as the freibergite. As examples of ores rich in silver I give herewith analyses of two samples of freibergite from the Slocan Star mine, situated near Sandon:*

	Sample A.	Sample B.
Silver, per cent.	19.57**	15.14***
Copper, per cent. ..	14.57	11.27
Zinc, per cent.	10.53	8.15
Iron, per cent.	7.51	5.81
Antimony, per cent..	22.91	17.72
Sulphur, per cent....	24.91	20.13

*From the "Report of the Commission Appointed to Investigate the Zinc Resources of British Columbia, Mines Branch, of the Department of the Interior, Canada, 1906."

**A—19.57 per cent. silver equals about 5,706 o per ton of freibergite.

***B—15.14 per cent. silver equals about 4,415 o per ton freibergite.

Zinc Ores.

As to the zinc ores of the district — sphalerite, o blende (sulphide of zinc) is practically the only zi mineral found. It occurs in considerable quanti associated with all classes of silver and silver-lead and is seldom of shipping grade as crude ore, or out having first been concentrated. Much of th of the Lucky Jim mine is a notable exception, a paratively large quantity of this ore averaging than 50 per cent. zinc, having been shipped in its c state.

Other Minerals.

Regarding other minerals found in the Slocan, shall, for the sake of brevity and clearness, place the under subheads, as follows:

Gold.—A majority of mining men and the gener public outside of the district think there is no gold "the Silvery Slocan." To some extent this is a mi take. Fine specimens of free gold have been found c claims situate on Lemon Creek, and samples of di ore from Springer Creek, Eight-mile Creek, Four-mi Creek, and the north fork of Carpenter Creek, hav been found to run high in gold. Two cars of ore fro the Kile group, on Lemon Creek, gave smeltery r turns of nearly $80 per ton in gold. About 15 yea ago two prospectors shipped from a prospect on Eigh mile Creek five tons of gold-bearing quartz, which shi ment was made in my name, so that I can vouch fo the accuracy of the statement that the returns re ceived from the smeltery showed a gold content of value of $125 per ton.

In the Slocan gold occurs chiefly in the dry ores, bu there has been one prominent exception within the si ver-lead producing area of the district, for at th Monitor mine, near Three Forks, carload lots of silve lead ore were found to contain as high as $15 per to in gold, and even the zinc concentrate of ore from thi mine assayed from $2 to $12 per ton in gold.

Silver.—The principal silver minerals of the cam are: (1) freibergite, (2) pyrargyrite, and (3) argen tite; their importance being, I think, in the order her given. These minerals are often found in a decom posed condition, as dark stains, or powdery masses i the vein gangue or selvage. In such cases the term "black sulphurets," or simply "sulphides of silver," is used. Alteration of freibergite or grey copper usu ally gives green and blue stains through the ores and in most cases, these indicate the presence of much sil ver, especially in the so-called dry ores.

Chlorides and bromides of silver are said to occu here, but I have never seen these minerals in the dis trict, so, like the Scotsman, I "hae ma doots"

Native silver occurs at many places, especially i the dry-ore belt, from Four-mile Creek southward t Lemon Creek.

Fine specimens of arsenical ruby-silver ore (prous tite) have been found on prospects on the north side of Ten-mile Creek, and from the same claims speci mens showing cobalt bloom (erythrite) can be ob tained.

Lead Minerals.—Of course, galena, the sulphide of lead, comes first, as it is the main lead mineral of the district.

The secondary lead minerals, carbonate of lead (cerussite) and sulphate of lead (anglesite) are not plentiful, although the carbonate ore does occur in shipping quantities.

The hard, clear, crystalline variety of carbonate is rarely found here, the commoner form being as granular or powdery masses intermixed with oxides of iron, gangue vein matter, etc.

Zinc Minerals.—As already stated, blende, the sulphide of zinc, is the only zinc mineral of importance found here. In the Slocan, as elsewhere in the northern corner of North America, the secondary zinc minerals appear to be almost entirely absent. Whether these ore deposits in this part of America are of comparatively recent origin or the climatic conditions have been unfavourable for the alteration of the sulphide to carbonates and silicates of zinc, I shall leave to abler men to determine.

Copper Minerals. — Copper minerals occur here, but, to date, no ores of copper have been produced. However, there are great possibilities, even in this direction, especially on Eight-mile Creek, south of Silverton.

Yellow copper (chalcopyrite) occurs all over the district, and associated with all classes of lead, silver, zinc, and gold ores. In the dry ores, yellow copper is closely associated with the grey copper, and at the Arlington mine, on Springer Creek, yellow copper served as an indication of the presence of high-grade silver ore. I have noted a similar connection in ore from the Standard mine, on Four-mile Creek, near Silverton. Some specimens show chalcopyrite enclosed in freibergite, these associated metals occurring as eye-like inclusions in the galena.

Secondary copper minerals are not plentiful in the district, although green and blue stains — carbonate of copper — are often seen in the local ores, resulting, I think, from the alteration of the copper-bearing freibergite. On Eight-mile the secondary copper minerals, malachite, azurite, and cuprite, are conspicuous along the outcrop of a large mineralized zone of eruptive rock. In this zone, chalcopyrite, iron pyrite, and, I believe, nickel-bearing pyrrhotite, are also found. Some good specimens of carbonates and red oxide of copper can be obtained here, and they give clear proof of their secondary origin, as they occur on or near the surface of the mineralized rocks, and are found containing inclusions of twigs, roots, pebbles, etc.

Iron Minerals. — No ores of iron are found here, but pyrite, pyrrhotite, and oxides of iron are all closely connected with the local ore deposits.

Vein Fillings. — In the silver-lead producing area the vein material is usually quartz, calcite, and siderite, with graphitic rock and talcose-clayey selvage. Veins in the granite or grano-diorite area have a filling of quartz, feldspathic rock, calcite, and siderite, also with a clayey-talcose selvage.

Antimony.—Stibnite, the sulphide of antimony, occurs at several places in the district, the largest deposit yet found being on the north fork of Carpenter Creek. A car lot of high-grade antimony ore was shipped from there a few years ago, when antimony was selling at 25 cents per pound. The property from which it was taken is not at present being worked.

Molybdenum. — Molybdenite (sulphide of molybdenum) is found in small quantities at half a dozen or more places in this district, but the deposits have not yet been developed, or even examined closely.

Tungsten. — Scheelite (calcium tungstate) has been found at the Meteor mine, on Springer Creek. The occurrence is small, but this mineral may have been frequently overlooked in properties near the Meteor, in the same granite formation, owing to the resemblance of the pinkish-coloured scheelite to the inclusions of reddish feldspathic rock in the veins there.

Other Minerals.—I believe that some nickel and cobalt minerals occur on Eight-mile Creek, but cannot yet speak with certainty as to this.

Native arsenic and arsenopyrite are found on the L. H. group of claims, situated on Red Mountain, south of Silverton, and here, as elsewhere, gold is associated with the arsenical iron.

Heavy spar, barytes, sulphate of barium) occurs at two places on Four-mile Creek, in one instance closely associated with lead ores, on the Robin claim, near the Standard mine.

Both fluorite and kaolinite are found near The Mountain Chief mine, about two miles from New Denver.

As an illustration of the fact that the mineral possibilities of this old mining camp are not even yet fully known, I may add that during a quite recent prospecting trip in the granite area, I looked over two unworked mineral claims, and on one I found huelandite, a member of the zeolite family of minerals, while on the other I found tourmaline, a well-known associate of tin ores.

A brief discussion followed the reading of this paper, and Mr. Thomlinson was complimented upon the instructive and interesting nature of the information he had presented before the meeting.

Cuban Iron Ore Deposits

Written by Dwight E. Woodbridge.*

On the north coast of Cuba there are iron ore deposits in the nature of laterites, amounting to something more than 200,000,000 tons. Six years ago the existence of these ore bodies was not known. They lie in the Province of Oriente, near the east end of the island, and adjacent to the sea. They are owned by various steel-making interests in the United States, and one of these steel-making concerns is using about 1,000,000 tons of this ore a year in the manufacture of high-grade, low phosphorus nickel steels.

This north coast Cuba iron ore is peculiar in several respects. It is a brown ore, high in moisture and alumina, very low in silica, with practically no phosphorus, and carries about .7 per cent. in nickel. These ores are upon the top of the ground; that is, they form the soil, and the average thickness of the ore beds is

*Mining Engineer, Duluth.

ot far from 20 feet. They are nowhere distant more an ten miles from the sea. All of these considerations ake them of exceptional value.

Let me emphasize the fact that no surface of soil xists over these ores; that, indeed, the ore itself is he soil, upon which grow either pine forests or a haracteristic tropical jungle. On the lower elevations nd in the better drained of the upland interior, pine redominates; inland, where the rainfall may be heav-r, and wherever it remains more persistently after alling, the verdant jungle enters. It closely resem-les the jungles of northern South America, with its

posed entirely of this material, it is usually carried in a matrix of soft ore, and it was the original design, at the time of discovery, to wash this hard ore from the surrounding red soil and ship a product of indurated iron ore. This scheme was impracticable. During the course of experiments having in view the washing of this material, it was found that the soft matrix was as good as the hard ore, and when this fact was fully realized the great size and vast importance of these deposits were appreciated and their possibilities were realized.

Mining Iron Ore by Steam Shovel, Mayari Fields, Cuba.

ough, cord-like creepers, its strange arboreal growths, nd its dense poisonous and prickly shrubbery. It is ard to penetrate unless one has in his hands that mnipresent weapon, the machete. In the belief that thin capping of surface-soil and humus might lie bove the ore in these jungles, I took many samples n these woods at varying depths, which showed on nalysis that, when found at all, the ore extended to he surface, whether it was timbered or not. No strip-ing of these ore bodies is necessary to fit them for ining, and during the dry seasons a lighted match ay be applied to the forest-floor and the fire will lean off all organic matter above the ore, leaving it ree and fit for immediate mining by the steam shovel r other means of excavation.

A typical analysis of these ores dried at 212 degrees, is about as follows:

	Per cent.
Silica	3.37
Fe	43.67
Al_2O_3	13.07
Cr	1.745
Ni, Co	0.8025
P	0.008
S	0.107
Combined H_2O	11.59

Hygroscopic moisture varies with the seasons, but may average about 15 to 20 per cent.

Loading and Nodulizing Plant, Mayari

Scattered about the surface of these deposits are boulders, flat sheets, pellets, and nodules of hard iron ore, somewhat dehydrated, and varying from masses of many tons to pieces the size of minute bird-shot. Natives call the pellets "shot-soil," a name warranted by their appearance and by the use to which they sometimes have been put, both in peace and in war. While the upper inch or two is occasionally com-

About two years ago the Pennsylvania Steel Company began smelting these ores, after an investment of several million dollars in railway, beneficating plant, piers on Nipe Bay, etc. It found the ore admirably adapted to all uses which an ordinary low phosphorus ore might be put to, and, furthermore, found that the nickel alloy gave the steel greatly added strength and elasticity. Up to the present time the major portion

of shipments have been nodulized ores, but the company is now shipping ore in its natural state more heavily than before, and is operating a large blast furnace exclusively on the raw ores. This company is the chief owner of these north coast Cuban ores, having a tonnage variously estimated at from one thousand million tons upwards.

During the last four or five years very extensive explorations have been carried on in these ore bodies I was in charge of an exploration that measured and tested grades on some 750,000,000 tons, no slight addition to the world's reserves. By reason of the character of this ore the process of exploration is unusually rapid, simple, and cheap. As has been said above, the ores are claylike, and the walls stand remarkably well. Pits dug several seasons ago still show on their vertical sides the marks of the pick. In exploration the ore is bored by an ordinary two-inch auger-bit, that is driven down by hand. These bits are forged on the end of a sectional rod some four feet long. As a hole is driven down additional threaded sections are screwed on the rod, making it any desired length. On each end of each rod, except where the bit is shaped is a backing-nut screwed down hard, in order to prevent the rods from working too tightly into the sleeve nuts when turned into the resisting ground. In most cases ore can be bored by this simple tool with comparative ease, and when hard blocks and boulders are encountered underground, they are sometimes cut by the substitution of a cutting chisel-bit for the auger point; in other cases the men will move a few feet away and drive another hole, experience having shown that a very short distance will usually be sufficient to avoid a boulder. The hole is started through the drift top soft ore or nodules on the surface, a little water is poured in, the bit lifted and driven down by the combined strength of two men, and then turned in the ore. The work is a combination of churning and boring. Every few feet the tool is lifted, the ore adhering to the bit is cleaned off by pressing a stick into the point of the bit and revolving the tool, and saved for analysis, and all sludge that has collected above the bit is scraped off. If the hole is sampled in sections, all ore taken out of each section by the bit is saved to make

On line of Railway from Mine to Harbor

A Railway Bridge

a full sample; but if the hole is sampled as a whole, the ore is all piled upon a cloth and afterwards mixed and quartered down with the ever-ready machete to make a suitable sample. The drilling is hard work in deep or difficult holes, or where nodules are frequent —as hard as any labour that a man can comfortably endure. It is done almost entirely by Spaniards, mostly from the Province of Galicia, who become very expert and earn good pay.

The presence of nickel and chromium has been shown in the analysis noted. The former is found in quantities increasing towards the floor of the deposits. In my own analyses of several hundred samples for this element, the highest percentage found was 1.28 per cent., and the lowest 0.44 per cent., with an average not far from 0.80 per cent. I need not emphasize the economic importance of an iron-ore averaging 43 per cent. of iron, and carrying 0.80 per cent. of nickel. Several hundred tests from chromium showed an average of 1.75 per cent., a serious matter if it were not that a simple metallurgical process will eliminate this element at one stage of the reducing-operation. These ores are of Bessemer grade, lower in silica than the average Mesabi, and not higher in kaolin than some Mesabi ores. Phosphorus exists in very slight proportion. Sulphur is negligible. The high alumina adds to fluidity in the blast furnace and assists reduction. At Felton, on Nipe Bay, the Spanish-American Iron Company, operates a large works for the beneficiation of this ore by drying it in cylindrical, rotating, horizontal kilns heated to a high degree, which reduces, by 33 per cent., the weight of raw ore charged. Against this cost of nodulizing, which may be given at about $1.25 per ton of product of the kilns, are to be placed the saving in freights and duty, and the advantage to the furnace-man of receiving for treatment a partly-prepared material.

With no over-burden to be removed, the deposit situated close to the sea, with stream-valleys cutting through the ore-beds and running directly to deep water, and with an average thickness suitable for about one shovel-cut, these ores should be mined at low cost by ordinary steam-shovel, or drag-line excavator. One block of 75,000,000 tons, assaying several percentages better than the average of the district and of a thickness of about 70 feet, can be connected with deep water by a railway 4,000 meters long, without excessive gradients. Ore so situated can be delivered on board ship at an actual operating cost not to exceed 20 cents per ton. The average cost of mining and rail-transport to the sea for the entire tonnage in sight should be but little more than this amount, if operations are conducted on a scale of magnitude commensurate with the importance of the undertaking.

It is interesting to make comparisons with this ore and that of the great Mesabi district of Minnesota. Cuba has the advantage in known tonnage, 2,000,000,000 tons, against, say, 1,500,000,000 known on the Mesabi. But the latter is not yet completely explored, and half a billion tons more may be found. With water extracted the ores are of nearly the same percentage of iron, with a slight advantage in favour of the Mesabi. The latter is both bessemer and non-bessemer, with its average phosphorus 8 to 10 times as high as this Cuban ore. Mesabi ores lie from 20 to 150 feet below the surface, while those of Oriente pro- are 80 cents a ton to Lake Superior, 60 cents from lake ports to Lake Erie, and $2.60 more if the ore is taken to Atlantic ports. These Cuban ores can be gotten to the sea at a transportation charge of 10 cents, and an ocean freight of 70 cents will take them to Atlantic American furnaces, or $2 to British ports. The Mesabi range will have shipped to the close of 1911 a total of about 250,000,000 tons at a profit of, say, about $350,000,000, including royalties. The north Cuban mines are beginning what is doubtless a most important career.

While these are not the only irons in Cuba, they are, naturally, by far the most important. Mining has been under way on the Caribbean Sea, near Santiago de Cuba, for many years, by the Pennsylvania and Bethlehem Steel Companies, and until the discoveries on the north side these Santiago mines were the chief source of supply for those companies. These are hard, high-grade ores, and are in comparatively limited quantities, though probably many million tons remain to be mined.

Estimates of the total iron ore reserves of the world are, for a tonnage, reduced to metallic iron, amounting to 10,000 million tons. Of this these new north Cuban reserves constitute about 8 per cent.

PROPOSED BASIS OF SETTLEMENT OF COAL MINE STRIKE IN ALBERTA AND EASTERN B.C.

The District Ledger, which is the official organ of District No. 18, United Mine Workers of America, and is published at Fernie, Crow's Nest Pass, British Columbia, on October 28th printed the following statement, which it said is "a copy of the understanding of the situation upon which negotiations would be resumed" between the Western Coal Operators' Association and the official representatives of District No. 18, U. M. W. of A. This statement was "given in the letter signed by Hon. Robert Rogers, Minister of the Interior for Canada," and acknowledged as correct by five officials representing the U. M. W. of A. and Messrs. Lewis Stockett and O. E. S. Whiteside, representing the Western Coal Operators' Association. The statement follows:

"In reference to the various interviews I have had with your committee regarding the settlement of the dispute existing in the coalfields of Eastern British Columbia and Alberta, my understanding of the basis of agreement arrived at is as follows:

"That an agreement is to be drawn up, taking the Gordon award of the Board of Conciliation as a basis.

"In this it is understood that an open-shop is conceded to the operators and a non-discrimination clause inserted in the same similar to the one now on file with the Department of Labour at Ottawa.

"That a uniform day wage scale of wages shall apply, applicable to all mines in the Association; said scale to be the scale of the Western Coal Operators' Association of the last agreement with the increased percentage by Dr. Gordon added.

"Contract rates to be the same as provided in the last agreement with the following exceptions:

"1. An increase of three per cent. in contract rates at Lethbridge.

"2. A differential of five cents to seven cents per ton on all pillars presently without a preferential, the application to be made by mutual consent.

"3. An adjustment of the contract rates at Lille mines so as to make the rate proportionate to the thickness of the seams.

"The operators agree to make deductions from union members' wages for union dues for such amounts

as they have given definite orders from the individuals, with specified sum as limit of deduction.

"The management of the mines is to be fully vested in the various companies.

"All employees connected with the management of the mines are not to be under the jurisdiction of the union or members thereof.

"The term of the agreement to be for three and a half years, expiring March 31, 1915."

In the matter of the settling of the prices on new work, which were not determined at the expiration of the last agreement, and of the differential on pillars which was to be determined by mutual consent, it is understood that the committee for each side appointed to complete this agreement determine these prices at once. If they fail to agree, an independent chairman shall be called in to do so. If the committee fail to agree on a chairman, the Minister of the Interior shall be asked to appoint one immediately

The District Ledger added the following comme

"Messrs W. B. Powell, president; C. Stubbs, vi president; and A J. Carter, secretary-treasurer, members of the executive of the Mine Workers, n the Operators to-day for the purpose of discussing tails of the proposed agreement.

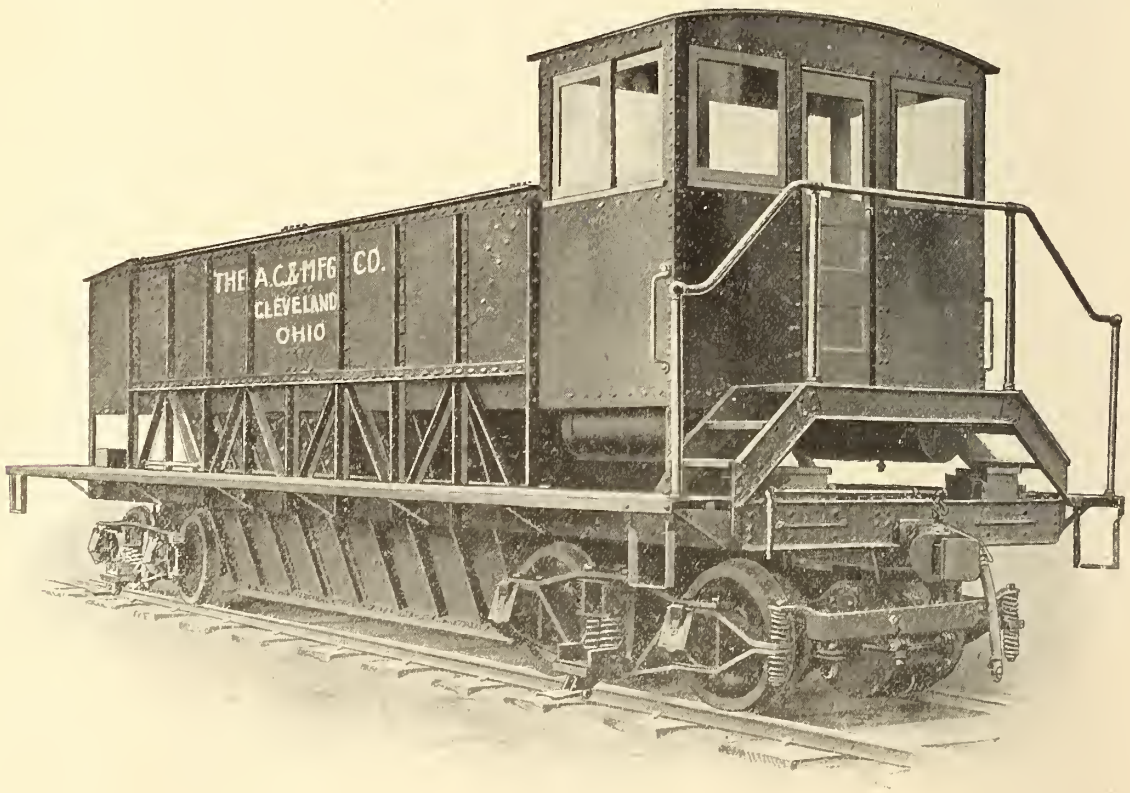
"As there are many matters of detail to be cons ered, these will occupy the attention of the parties terested so that they may be drafted out clearly f presentation to the members of the organization whom they must be submitted so that a referend vote may be taken.

"We may add that it is understood that the m will be given the same working places as they h prior to April 1, provided, of course, that applicati is made within a time to be specified later."

Industrial Section

A NEW TYPE OF ORE TRANSFER CAR.

A number of new features in construction and electrical equipment have been brought out in an ore transfer car being built by the Atlas Car & Mfg. Co., Cleveland, Ohio. This car was originally designed for handling zinc ore; it is, however, adapted to any other ores.



The car is rigidly constructed. Box girders support the body, and the sides of the car act as trusses to transfer the weight of the contents to the body bolster. The trucks are of the arch-bar type and are of a very heavy design. Four doors in the bottom of the car are operated in sets of two each by compressed air and easily discharge the load. As the weight of t contents has a tendency to force the doors open aft the toggle keeping them closed is released, only small amount of air is required for this purpose. T tight joint which eliminates the loss of fine ores made possible by the design of the doors, and wh closed they are positively locked. A stationary apr running under the car on either side, prevents th scattering of the load, so that the contents are dumpe between the rails, eliminating loss.

A cab is placed on each end of the car. The opera or's cab is at the forward end, and here are locate in convenient positions the air valves, master co

roller, and minor operating equipment. The auxiliary cab at the rear end contains a contactor controller, resistances, series relay, main line switches, etc.

The power for propelling the car is taken from third rail shoes attached to the trucks. Two 220-volt series relay type motors, which are spring-suspended, propel the car. The motors are rated at 53 h.p., based on a 75 degree centigrade temperature rise in one hour over the normal temperature of 25 degrees.

The controlling device is an important feature of the car. It consists of the various switches and relays, which are mounted on slate panels and assembled on a switchboard having an angle iron frame and sheet iron covers, which entirely enclose the apparatus. This equipment enables both motors to be operated, either in series or in multiple, in either direction, all the changes being secured magnetically. The control equipment includes a double pole main line service switch, two double pole magnetic switches for reversing the motors from series to parallel operation, individual auxiliary switches, cast grid resistance, a drum type master controller, and an overhead coil or current limiting relay. This coil protects the motors and is so constructed that when it operates the motors are disconnected from the line. It is reset automatically by bringing the master controller to the opposite position. The equipment provides seven speeds in either direction. Four of those are with the motors arranged in series and three with the motors in multiple. All of these speed variations are controlled by the operator, but if he so desires the master controller can be thrown to the full series position and the motors will be automatically accelerated by a series relay which limits the current employed to a safe amount. This arrangement can either be used for changing from full series to full parallel operation.

Principal dimensions and specifications of the car are as follows: length over all, 36 feet; width over all, 11 feet six inches; height from rail to top of cab, 13 feet; height from rail to top of body, 10 feet; capacity, 100,000 lbs.; capacity, 800 cubic feet; diameter of wheels, 33 inches; gauge of track, 56½ inches; weight of car, 63,000 lbs.

The equipment of the car includes an air compressor, an air brake and a pneumatic sanding device. Rolled steel wheels are used and a running board is provided on either side of car.

The Michigan copper ores as mined in the year 1910 average 1.025 per cent. copper.

The average lead and zinc tenor of Missouri ores in 1910 was 2.3 per cent.

Silicon bronze, in which silicon replaces phosphorus, is stronger and more ductile than phosphor bronze and does not rust.

The output of the Nova Scotia Steel and Coal Company for October was higher than ever before. 52,675 tons of iron ore were mined; 75,521 tons of coal; 7,253 tons of pig iron made; 6,456 tons of steel billets; and 4,718 tons of bars and plates. The October shipments of finished steel and forgings were 5,500 tons, as compared with 4,909 tons during September.

To ensure the complete combustion of petroleum, it is necessary that it be either sprayed or gasified. Most oils used for fuel are heavy and viscous. At higher temperatures the viscosity disappears. This makes it good practice to pre-heat the oil, using exhaust steam for the purpose.

Lithophone is a very white pigment precipitated by the double decomposition of zinc sulphate and barium sulphide. An intimate admixture of the two decomposition products is formed. Barium sulphate and zinc sulphide are the mixed products. 70 and 25 per cent. are the relative proportions of the two.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Purchase of Timber Limits by the Dominion Steel Corporation.

It is announced that the Dominion Steel Corporation has purchased the Montgomery timber areas near Dalhousie, N.B. These areas, together with extensive holdings in Newfoundland, and the very valuable lumber properties taken over by the Steel Corporation from the Cumberland Coal and Railway Company, will make the Corporation a considerable factor in the maritime lumber industry. The quantity of lumber needed in the operation of the steel works and particularly the collieries, is nothing less than immense, and the management of the Corporation has done a wise thing in tackling what bids fair to become one of the most pressing problems of the allied industries. The cost of pit-timber is an annually increasing charge, and as the demand enlarges there will be an actual scarcity with present methods of lumbering. There is no necessity for this condition to arise, however, as the vast uncleared lands of Cape Breton and Nova Scotia would yield an indefinite supply of suitable pit timber if proper methods of forestry are in the future adopted.

Eight Hours' Act in England.

When the question of an eight hour day in the mines of Nova Scotia was being pressed, your correspondent ventured to affirm that it would be just as well to see how the eight hour day worked out in practice in the English mines before enacting similar legislation in Nova Scotia, and the course of events has proved that the position then taken was a proper one. Nothing in recent legislation connected with coal mining has caused so much trouble as the Eight Hour Act in Great Britain. In the Midlands Coalfield of England, the triple shift and eight hour day has been in operation for many years, and almost all the mines there are designed to be worked in this way. In this district naturally the Act has not made any appreciable difference. In the north country, however, it has caused infinite trouble, and there is more to come. In many respects the conditions under which coal has been mined for generations in Durham and Northumberland resemble those attending coal mining in Nova Scotia. This is partly due to the fact that coal mining in Nova Scotia under the General Mining Association was largely directed by men who came from the north country, and it is interesting to-day to notice the great similarity between the mining terms used in Northumberland and in Nova Scotia. Again, the market of the north country is for sea-borne coal, and it is affected by the season of open navigation in the Baltic, as the Nova Scotian market is affected by the state of navigation in the St. Law-

rence River. In the north country they have worked for generations on the two-shift system, and they take very unkindly to the domestic upset which the triple-shift system necessitates. For many years the north country miners remained obdurate and would not agree in the efforts made by the Miners' Federation to bring about a general compulsory eight hour day in mines. Recently, however, the opiuions of the miners of the Midlands have gained the ascendancy over those of the Durham and Northumberland men, aud they reluctantly acquiesced in the eight hour legislation. The Miuers' Federation, it is understood, intends to stand behiud the demand of the Northumberland men for a return to the two-shift system, while, on the other hand, Sir Christopher Furness has stated at a shareholders' meeting that his company will close their collieries rather than revert to the two-shift system under a compulsory eight hour day. The conditions which have made the eight hour day such a failure in the north country in England are even mcre acute in Nova Scotia, and coming events in England will prove with even greater certainty than at presetit that the Magill Commission was perfectly correct when it reported that the adoption of a compulsory Eight Hour Act in Nova Scetia would be disastrous to the coal industry of the provinec.

One of the chief factors in the present unrest amongst English miners is the reduction in their earnings which has been directly caused by the Eight Hours Act; and the threatened strike, if it comes about, will be an endeavour to get the same wages for eight hours that were formerly earned in nine or ten hours.

Renewal of the P. W. A. Agreement.

The P. W. A. has accepted the Dominion Coal Company's offer of a renewal of the Two Years' Agreement on the same terms and conditions as formerly, and the term of the agreement has been extended until the end of 1913. The first long-term wage agreement betweeu the Coal Company and the P. W. A. was made in 1904 for a term of three years. At the end of this period a Conciliation Board was asked for by the P. W. A., and sittings were held under the benign chairmanship of Professor Shortt, a gentleman whose able and conciliatory guidance is still remembered in Glace Bay. On the result of the Shortt Board's award a two years' agreement was entered into betweeu the compauy and the P. W. A., which expired at the end of 1909. This was renewed at the end of 1909 for a further period of two years, and, as just mentioned, has once more been renewed. The various agreements, therefore, cover a space of nine years.

The local leaders of the U. M. W. have announced their intention to protest against the renewal of the agreement, and are once more endeavouring to create dissatisfaction. The net result of the recent U. M. W. strikes was the utter impoverishment of the strikers, strangely accompanied by a noticeable increase in the worldly goods of the salaried leaders, and it is suspected that the present activity of these same gentlemen is actuated more by the desire to make their own calling and election sure, than by solicitude for the welfare of those they aspire to lead.

Dominion Coal Outputs.

The individual outputs of the Glace Bay collieries during October were as follows:

No. 1	50,120
No. 2	63,110
No. 3	12,650
No. 4	35,590
No. 5	25,550
No. 6	22,460
No. 7	17,600
No. 8	14,610
No. 9	35,680
No. 10	16,270
No. 12	26,970
No. 14	20,220
No. 15	5,580
No. 16	1,990
No. 21	1,600
Tons	350,000

This tonnage has been exceeded only once in the month o October, namely, in 1906. The total output for the year to th end of October amounts to 3,323,791 tons, compared with 2 938,085 tons at the same date last year.

The shipments were fairly high, amounting to 365,000 ton The St. Lawrence season is almest over, and it is expected t reach 1½ million tons, the largest shipment yet attained by th Coal Company during the season of open navigation. Th coal banks are all lifted in good time, and geuerally the sea son has been a good one. Both in outputs and shipments new series of records has been established.

The Springhill output for October was 36,060 tons. Th output steadily increases, and will continue to do so durin the wiuter. An air-compressor is being installed, and it is in tended to operate a number of shearing machines. Up to th present time no machine-cut coal has been mined at Spring hill. By shearing or "nicking" the coal in certain places larger and stronger coal will be produced. No explosive i used in getting dowu the coal at Springhill. So far as it analysis and calorific value is coucerned, the Springhill coa leaves little to be desired, but it is a friable coal which pro duces a great deal of slack in the mining. This slack with suitable binder would make an ideal briquette, and it woul not be surprising to know that a plaut of this kind was in con templation.

ONTARIO.

Cobalt and Elk Lake.

While the shipments from the camp iu the box car ar gradually decreasing, the consignments of bullion by expres creep up and up. Next year there will be very little low grad ore, indeed, sent out at all from the camp, it being the inten tion to treat it on the spot. The Nipissing has found the re duction of its high grade ore to bullion so profitable that Mr Chas Butters is now working to discover a process that wil recover the values in the low grade ore with economy.

The Drummond has experienced a second birth. During th year Mr. E. V. Neelands, who is now in charge, in addi tion to the low grade ore that he has been shipping from th old workings, has sent out $40,000 in high grade ore. He has also discovered on the surface by prospecting, several excellent new veins, which will be crosscut for this winter. There is a very considerable amount of life in the Drummond yet.

The Temiskaming and Hudson Bay Mining Company has de clared the 35th dividend of 300 per cent. The company has now paid 19,000 per cent., or a total of $1,474,590. Mr. Horace T. Young has resigned the management of the property and Mr. A. H. Brown, who has directed the development of the Pike Lake claims at Swastika for the past six months, takes his place.

The City of Cobalt Mining Company has taken a lease of the King Edward mill, which has been shut down now for about a year. The capacity of the mill is 50 tons per day. From the City of Cobalt to the King Edward, at Cross Lake, there is a haul of a mile to a mile and a half. Since the contract with the Northern Customs mill expired the City has been obliged to leave the low grade ore on the dumps, where a considerable tonnage has already accumulated.

The mill report of the Buffalo Mines for the month of September showed that over 100,000 ounces had been recovered from 32.95 ounce ore. The report reads: mill ran 561 hours; ore milled, 3,732 tons; average assay, 32.95 ounces; ounces re-

covered, 102,336; mill expenses, $11,466; ounces paid for, 105,988.

A good discovery of silver is reported from the Donaldson claims at Elk Lake. A shaft was sunk on a two-inch vein of calcite which is reported to have widened considerably and to have more than maintained its surface values.

After many rumours, found to be groundless, the Hitchcock, at Elk Lake, is at last reported to have despatched ten tons of ore to the smelter. Some of the ore will run high in silver, but the shipment, taken as a whole, is low grade.

R. B. Stewart, for the Ontario Bureau of Mines, has made a report to the Government on the Shining Tree gold discoveries. The report is non-committal, the geologist being of the opinion that not enough work had been done to warrant any definite statement.

The Casey Cobalt mine, in Casey Township, north of New Liskeard, has made a shipment of 20 tons of high grade ore and 23 tons of low grade.

The Green Meehan has also shipped some concentrates.

After a long and animated sitting, the La Rose decided not to declare an extra disbursement in addition to the usual 3 per cent. A number of the directors wished to reward shareholders with some of the big cash surplus, but the majority were in favour of maintaining the present large reserve until it is seen what is the outcome of the extensive exploration scheme in search of new bodies on the Lawson and the La Rose proper. At the La Rose proper the winze is being put down to the 400-foot level, from which point very extensive exploration work will be undertaken.

The position of the La Rose on October 20th was: cash in bank and ore at smelter, $1,401,668; ore ready for shipment, $91,182; total surplus, $1,492,849.

The financial standing of the Nipissing on October 20th was: cash in bank, $999,894.59; ore in transit and at smelter, $131,782.94; ore ready for shipment, $197,653,; total, $1,329,330.53.

The Beaver has now reached the 460-foot level, and a station in the main shaft has been cut at that level. The foundations for the new mill are completed and every attempt will be made to rush forward the work.

The McKinley-Darragh is now producing at the rate of 250,000 ounces per month, and will at the end of the year have shipped or despatched to the smelters 2,500,000 ounces. The output would have been considerably larger if the lack of power at the beginning of the year had not handicapped work.

Porcupine and Swastika.

The first fall of snow has come in Porcupine, and frost has stiffened the ground so that all surface work and prospecting will soon have to be abandoned. The last two months of surface exploration has yielded generously in new finds. From this time forward till next spring the main activity will be in the erection of buildings and underground development. The mines losing their camps in the big fire are completing their permanent buildings and getting out of the tents in which they have been obliged to work all summer. Thanks mainly to the spur it ran into its property, the construction work on the Dome plant has progressed very favourably, and the forty stamps should be dropping soon after the new year comes in. At the Hollinger there has been no attempt to get any mine machinery into the camp, but the construction of new buildings has made great headway. The office, the assay house, and the bunk house are completed, while the manager's house, the mine captain's house, and the club house are well under construction. The foundations of the mill have been laid and the walls are now going up. The slide of 400 feet of grade into Pearl Lake from the T. & N. O. will not permit the completion of the line into the Timmins Townsite at the earliest before January, but the railroad company is going to provide a siding near the McIntyre, from which point the Timmins and other adjoining companies can team their supplies over the winter roads.

The Northern Ontario Light & Power Company has taken over the assets of the old telephone company, and will instal a new system as quickly as possible. There is a keen competition developing all over the camp between the British Canadian Power Company and the Northern Ontario Light & Power Company, and rates should be light. The Northern Ontario Light & Power Company is now connected with the Porcupine Power at Sandy Falls, on the Mattagami River, and they are lighting both towns, but have not an exclusive franchise. The British Canadian is rushing in machinery as fast as the roads will permit, to Waiwaitan Falls, where they are developing power. It will be ready to give service some time next year.

The sensation of the month followed the announcement of Col. Weatherley, an Alaskan operator, that he had made a wonderful find on the Brydge claim next to the Preston East Dome, and now known as the Little Pet mine. On the surface the discovery consisted of a number of stringers of quartz, rich in coarse gold, running through a big porphyry dike. Two shafts have been put down on them. The No. 1 shows that the quartz stringers have widened out into two seams of quartz from 6 to 17 inches wide, very spectacular. In the other shaft the vein has widened very materially also, and is now about five feet of quartz and schist, the quartz carrying much coarse gold. The owners took a sample of the quartz porphyry and obtained an assay of $11 per ton from it. The visible gold appears to be contained exclusively in the quartz stringers and in the seams of the porphyry.

Mr. Chas. D. Taylor is reported to have bought the controlling interest in the Porcupine Imperial Mining Company in Deloro. The Dome Mining Company was at one time in negotiation for the property, but the deal did not go through.

Mr. Burr Cartwright and his associates have thrown up the option on the Brydge McAuley claims in Bristol township after doing a considerable amount of work and making several small payments. The price under the option was for $500,000, but payments were spread over two years and were for the first two or three months very small. The Dome Mining Company will also abandon its lease on the Josey Woods claims in the Cripple Creek district in a few days. The full price here was $250,000, but initial instalments were quite small. The shaft was sunk to 50 feet, where the vein split. These two failures to proceed with work on the two most important properties west of Pearl Lake will delay development of this part of the country.

The Dome officials paid a hurried visit to the property at the end of last month. They wished to see over the property before the snow hid the surface discoveries. Mr. Ambrose Monell, general manager of the Dome Mining Company, stated that the results of the diamond drill work had been most satisfactory as proving that there was good ore over a wide area and for a considerable depth. Values in the cores varied so greatly that it was as yet impossible to strike an average, but it was much better than they expected. So far underground operations had shown that the ore ran on an average higher than the assays from the cores would lead to believe. The mill is rising fast, nearly all the brick finished buildings are completed, and by the first of the month the Dome will completely have recovered from the fire and will be in a position to turn out gold bricks.

Mr. Frank Armstrong and a party of friends have been inspecting the camp during the first week in November. Mr. Armstrong is directly interested in the Dobie and the Plenaurum, and more time was spent at these properties than anywhere else. Some remarkably spectacular ore has been taken off the Deloro claims of the Dobie Mining Company, and during the winter months very active operations will be carried

on there. Two shafts will be sunk a thousand feet apart to prove up the length and depth of the ore body.

J. T. R. Laurendeau, a director of the Crown Reserve, has purchased the controlling interest in the Hughes Porcupine gold mine. Mr. Mowery Bates has been appointed manager and he has already commenced to sink a shaft on the vein and put up camp buildings for a big force of men. The Hughes has one of the most remarkable surface showings in the Township of Whitney, but so far little beyond assessment work has been done on it.

At a meeting of the Foley-O'Brian Mining Company, the treasurer reported that there was cash in hand, $144,930 available for development purposes. It was stated that at 140 feet a number of small veins in the schist ran $12 to the ton over a width of 18 feet.

It is extremely likely that C. H. Poirier, manager of the Vipond property, will be offered and will accept the position of consulting engineer to the Rea Consolidated mines. He will still retain his position at the Vipond if he does obtain the Rea.

In the first week of November the main vein of the Rea was cut at the 300-foot level, 35 feet from the shaft. At this point it was 30 feet wide, of almost solid quartz. While the vein pans gold it does not show any free gold. No representative assay had been taken at the time of writing. It is very probable that the Rea will shortly commence the erection of a ten or twenty-stamp mill.

SOUTHERN ALBERTA.

The following notes were obtained about the middle of October. As it was reported late in that month that a basis of agreement had been reached between the Western Coal Operators' Association and the officers of District 18, United Mine Workers of America, representing the employees, it is possible that before these notes shall be published work will have been resumed at the various coal mines and coke ovens at which it was suspended at the close of last March.

Galt Collieries.—Work at the Alberta Railway and Irrigation Company's Galt coal mines is still restricted to keeping the pumps going at both Nos. 3 and 6 mines, and making additions and other improvements to the surface plant at the latter. A third 500 h.p. unit of Babcock & Wilcox water-tube boilers is being put in. Other additions to plant being prepared for are a third compressor, 200 k.w. generator, and another Webster 1,000 h.p. vacuum feed water heater.

Diamond Coal Company.—While miners are on strike, plant and machinery is being thoroughly overhauled and put in condition for active operations immediately after settlement of labour troubles.

Chinook Coal Company.—Much progress has been made with work of putting in surface plant and equipment. The tipple is completed; it is a steel structure with modern coal-handling machinery, and screening and picking appliances. Erection of masonry boiler and power-houses is finished, and machinery is being placed in position. Underground development is also being energetically proceeded with.

Lethbridge Collieries, Limited.—This company's colliery is situated about 7 miles from Lethbridge. During the last 12 months two shafts have been put down 600 feet to the coal, and openings made therefrom preparatory to mining the coal. A steel tipple building, with rotary tipple, has been erected by the Wisconsin Bridge and Iron Company; the tipple has been equipped with screening and other machinery by the Link Belt Company. Large boiler, power, and other brick buildings have been erected, and much plant and machinery put in. The boiler equipment consists of two 500 h.p. batteries of Babcock & Wilcox water tube boilers with chain grate stokers, induced draft fans, etc. In the power and hoist-houses are large compressor, generator, powerful hoisting engine, and much other machinery. The whole constitutes a complete and thoroughly modern bankhead equipment, designed by Mr. Charles Fergie, of Montreal, and erected under the supervision of Mr. N. C. Pitcher, resident construction engineer. About 300 men are employed, some in doing underground development work and others on surface improvements. Mr. Wm. Maxwell is superintendent.

Leitch Collieries, Ltd.—This company's south mine, at Passburg, is still being worked, but with fewer men than in the past. Operations at its north mine, near Police Flats, are now having most attention. Owing to the labour troubles, affecting the whole district, only about 100 men are employed which is but one-third of the number that will be required to operate mine and coke ovens at full capacity. Erection of 10[illegible] rectangular coke ovens, Mitchell type, has been completed; also of a 1,500-ton per day Roberts & Schaefer Company tipple and a Luhrig jig washery .

Davenport Coal Company—This company's mine is at Burmis, on the Crow's Nest Railway. Its output capacity under ordinary conditions varies up to 450 tons per day, with 90 men employed, but this production is not being maintained at present, for the mine is being operated with less than a full working force of men. Six seams occur on the property, but coal is being mined from two of the six seams prospected on the property; the average thickness of the coal is 10 feet.

Breckenridge & Lund Company.—This company's mine is at Lundbreck; its normal output ranges up to 400 tons of coal per day with 80 men employed. Coal is being mined from two of the six seams prospected on the property; the average thickness of the coal is 10 feet.

Canadian Coal Consolidated.—This company (formerly the Canadian-American Coal & Coke Company, Ltd.) owns coal lands at Frank. The old company was the first to mine coal in this district. Pending settlement of the coal miners' strike, coal is being mined for market, but production will be resumed as soon as shall be practicable after existing difficulties with the employees shall have been adjusted.

West Canadian Collieries, Ltd.—Large holdings of coal lands in Blairmore-Frank district are possessed by this company, the chief share interest in which is held in France. Ordinarily the company operates three collieries, namely, those known as Lille, Bellevne, and Blairmore, respectively, but only the last-mentioned is now producing, with non-union men employed.

International Coal and Coke Company.—The mines and coke ovens of this company are near Coleman. At present only necessary upkeep work is being done, but production will be resumed as soon as this shall be possible.

McGillivray Creek Coal and Coke Co.—Ordinarily output from this company's mine, situated at Carbondale, one mile west of Coleman, is 400 to 500 tons of coal per day, but work is suspended at present. When the driving of a rock tunnel shall be completed, output capacity will be substantially increased. Surface plant includes a modern steel tipple with a capacity of 2,500 tons per day; it is equipped with a F. C. Greene dump, and produces slack, run-of-mine, and lump coal. At Ottumwa box car loader has just been put in.

Other District Mines.—Other coal mines in what is officially known as the Crow's Nest district are those of the Hillcrest, Maple Leaf, and Galbraith companies, respectively. About Lethbridge, the Pioneer (Ashcroft), and New Barnes, two small mines, are together supplying about 100 tons of domestic coal per day to Lethbridge consumers, while the Royal Collieries, Ltd., also near Lethbridge, has its mine idle through the miners' strike.

In South Fork District.—Several development companies have been prospectin coal lands situated in the vicinity of the south fork of Old Man River. Of these, the operations of the Head Syndicate, Limited, an outline of whose property and work was published in the Canadian Mining Journal of September 1, are the most important. Two adits

have been driven on the coal from near the company's camp on Lynx Creek. A crosscut adit, designed to cut the several seams, was commenced last July; after passing through 280 feet of mostly hard rock a large seam of coal was entered on October 21. When visited on the following day 12 feet of coal had been cut without the farther wall having been reached. It was expected this seam would be proved to be 15 feet in thickness, all good coal.

BRITISH COLUMBIA.

Slocan.—A new company, known as the Slocan Star Mines, Limited, has been organized to acquire two groups of mineral claims—the Rabbit Paw and Slocan Star groups, respectively—situated near Sandon, Slocan mining division, together with the Slocan Star concentrating mill, water rights, etc. Briefly, the Slocan Star, Silversmith, and Heber fraction claims have been developed to a depth of 600 feet. The present workings consist of six levels, with various intermediates. Generally speaking, the high grade ore has been nearly all extracted down to the fifth level, so far as the Slocan Star vein is concerned. There are, however, numbers of places where ore mixed with gangue has been left standing, and this should yield a profit if dealt with in conjunction with ore of higher grade from other orebodies, if such shall be developed. The company's consulting engineer has recommended that an adit of 430 feet vertically and 600 feet on the incline, below the present fifth level. The most of this development work is estimated at about $40,000. It is understood that the engineer's recommendation has been adopted and that the work will be commenced shortly.

Sheep Creek.—The Mother Lode Sheep Creek Mining Company, a State of Maine incorporation, the principal stockholder in which is Mr. John McMartin, of Cornwall, Ontario, is making progress with the erection and equipment of its 10-stamp mill, in Sheep Creek camp, Nelson mining division. In designing and equipping this mill, the aim of the management has been to make it one of the best gold mills in the world, and it is confidently expected by those chiefly interested that this object will be attained, for the best talent available has been employed in connection with both design and equipment, and this after adequate experimentation with ore from the Mother Lode mine, to determine the most effective method of treatment so as to secure the highest results practicable. Erection of the mill building was commenced last June; it is now being roofed, and machinery and plant is being put in place. The expectation is that a commencement to crush ore will be made by the end of the current year. It is thought a crushing capacity of 70 tons per day, with ten stamps dropping, will be developed after the machinery shall be in good running order. In designing the building and plant, provision has been made to allow of doubling the treatment capacity of the mill at comparatively small expense, whenever conditions shall make this advisable. The Mother Lode mine has been developed to a depth of 500 feet below the outcrop of its main vein, and it is estimated that there is sufficient gold ore blocked out to keep the mill supplied continuously for three years.

Rossland.—From the recently published sixth annual report of the directors of the Consolidated Mining & Smelting Company of Canada, Limited, it is ascertained that during its last fiscal year the production of the company's Centre Star group of mines, in Rossland camp, was 193,223 tons of ore, which contained 81,348 ounces of gold, 60,200 ounces of silver, and 2,318,456 pounds of copper, together having a gross value of $1,980,112. The general average metal contents of the whole of the ore produced during that year, as above, were as follows: Gold, 0.421 ounces, and silver, 0.312 ounces per ton, and copper 0.6 per cent. The average gross value per ton was a fraction under $10.25. The footage of narrow work done during the period under review in those mines was as follows: Drifting and crosscutting, 11,298.5 feet; raising, 1,803 feet; sinking, 290 feet; total, 13,383.5 feet. There was also 25,622.3 feet of diamond drilling done. The managing director's comment was: "In our Rossland mines ore developed and shipments have about balanced. Although the tonnage developed is numerically less than for the previous year—194,000 tons as against 245,000 tons for the year 1910—the average value of the ore developed this year on the lower level is considerably higher. In the Centre Star and Idaho mines no ore has been developed in the lower levels and but little work done, most of the development having been confined to levels above the 10th. In these a number of small orebodies have been opened, and one or two larger ones of lower grade. The same is true of the Iron Mask. The greater part of the new ore that has been found has been in the lower levels of the War Eagle. A winze sunk from the 12th level opened ore to a depth of 150 feet and of a length at the bottom of 200 feet. The value of this ore is very good. The 10th and 11th levels are also producing a large tonnage of good ore." Other comment of the managing director concerning property in this camp was the following: "Since the close of our fiscal year, arrangements have been completed with the liquidator of the Le Roi Mining Company for the purchase of all the property of that company at Rossland. This property still has a large amount of low grade ore, and some prospects of finding ore of a better grade, and we believe that the purchase will be a profitable one."

Trail.—The Consolidated Mining & Smelting Company's annual report shows that during the last fiscal year 388,735 tons of ore were smelted at the Trail smeltery. The valuable metal contents of this ore were: Gold, 119,067 ounces; Silver, 1,458,758 ounces; lead, 24,026,015 pounds; copper, 4,421,988 pounds. The gross value of these metals was $4,437,901.

During the month of September of the current year the Consolidated Company received 24,713 tons of ore, and smelted 24,713 tons. The total gross output for the month was valued at about $593,000; of this total value, 67 per cent. was in gold. The total gross output for the quarter ended September 30th, was $1,460,000, and the proportion of gold in this total value was about 63 per cent.

The aggregate tonnage of ore treated at Trail during all years to June 30th last is 2,847,469 tons, and the aggregate gross value of the metals recovered $47,083,926. The total quantities of the several metals were: Gold, 1,017,123 ounces; silver, 13,458,631 ounces; lead, 224,898,570 pounds; copper, 47,875,802 pounds.

Boundary.—The British Columbia Copper Company has continued operating its mines and smeltery without intermission, notwithstanding the long continuance of the strike of the coal miners and coke oven workers in the Crow's Nest district, whence it had long obtained its supply of coke for metallurgical purposes. The largest proportion of the ore required to keep its three blast furnaces supplied has been obtained from the company's Mother Lode mine, while a much smaller quantity, of oxidized ore, came from its Wellington group mine. The Rawhide and Athelstan, both owned by the New Dominion Copper Company, controlled by the B. C. Copper Company, supplied the greater part of the remainder of the ore smelted, the former in large and the latter in small degree. Pennsylvania coke has been used at the company's smeltery at Greenwood, ever since the supply from the Crow's Nest district was cut off.

The B. C. Copper Company has relinquished its bond on the McKinley mine, in Franklin camp, north fork of Kettle River, and ceased work thereat. Two neighboring mineral claims were afterwards taken under option of purchase, and these have since been under development, but work was lately suspended for the winter, under arrangement to resume operations next

With the promise of an early settlement of the coal miners' strike has come assurance that the Granby Company will re-

sume mining and smelting ore as soon as sufficient coke shall have been received to admit of the furnaces being kept in blast. During the summer preparations have been made for a new system of disposal of slag, by water granulation and conveyance thereafter by means of a system of belts to a sufficient elevation to allow of a new dump being thereby secured. Only two of the eight furnaces have as yet been connected by flumes with the new system, and if it shall be found that this works well the remaining six will be similarly provided with facilities for slag granulation and the present method of hauling molten slag in large pots by steam locomotives be done away with altogether. All arrangements for crushing ore at No. 3 tunnel outlet from the mines at Phoenix and loading direct into railway cars have been completed. These take the place of crushing and shipping facilities destroyed or rendered useless by fire last year.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—The Nictaux, Annapolis Co., iron ore concentrating mill, in course of erection for the Canada Iron Corporation, will soon be ready to be placed in working order. The low grade magnetites and the higher grade red hematites will be jigged and brought up to about 57 per cent. iron content. The product will be commercially free from sulphur.

ONTARIO.

Cobalt.—After building up a surplus of over $1,300,000, La Rose is now proceeding to spend considerable money in exploration work for new ore bodies. La Rose found its main vein at 200 feet, but it did not contain values. In his recent work in Cobalt camp, Prof. Miller figured there was one main fissure vein down the centre of Cobalt.

From this vein McKinley-Darragh is still producing. Right of Way paid all its dividends, and La Rose mined millions. Government geologists figure there has been a throw of 400 feet, and La Rose to-day is sinking to the 400-ft. level to endeavour to pick up values again. In the meantime, good ore is being produced from subsidiary veins on La Rose property. Lawson is producing about 50,000 ounces a month, and Princess 40,000.

Cobalt, Ont.—The mill report from the Buffalo Mines for the month of September shows a record treatment for the year of ore milled.

During the month in the 561½ hours that the mill was running, a total of 3,732 tons were treated in the concentrator and cyanide plant of the property. The general average monthly treatment of the property is around 3,200 tons, so that the September treatment is a record in its line.

The average grade of ore is slightly lower than last month, being 32.95 ounces to the ton, as compared with 34.49 ounces for the preceding month. A total of 102,336 ounces were recovered by the process of concentration, the largest amount in three months.

The report for the month, as compared to the August report, is as follows:

September—Mill ran 561½ hours; ore milled, 3,732 tons; average assay, 32.95 ounces; ounces recovered, 102,336; mill expenses, $11,466.11; ounces paid for, 105,988.68.

August—Mill ran 592½ hours; ore milled, 3,093½ tons; average assay, 34.49 ounces; mill expenses, $9,439.76; ounces paid for, $144,446.06.

The last dividend paid by the Buffalo was October 2nd, and was for 5 per cent.

Cobalt.—The Casey-Cobalt Mines, whose property lies in the centre of one of the best agricultural belts in the Dominion of Canada, just north of New Liskeard, has just made two shipments of ore, the third during the present year.

The recent shipment included 40,415 pounds of high grade ore and 46,224 pounds of low grade material.

The high grade ore was sent to the Delore smelter at Marmora and when the final assays are received the mine expects that the car will run better than 3,500 ounces to the ton, or nearly 70,000 in the car. The low grade was screenings sent to Denver. It will run in the neighbourhood of 400 to 500 ounces.

Cobalt, Nov. 5.—Within the past week there has been a general improvement in the position of La Rose Consolidated. At Lawson crosscut, half way up the stope from the 180-foot level on vein 8, what appears to be another ore shoot has been encountered to the west. It will average some thousands of ounces, six inches wide, and, after being drifted on for 15 feet, is as good as ever in the head of the drift. The Lawson has never this year produced less than $40,000 per month, and is likely to produce much more now.

At the Princess a new vein two inches wide, of 6,000 ounces of ore, has been crosscut 30 feet up in the slope from the 135-foot level, and has also been encountered on the level itself, so that it holds for some distance.

At Fisher Eplett, where previously nothing had been found, a foot-wide vein of quartz and calcite has been uncovered for 50 feet. In it occurs two patches of high grade silver, a foot long by a couple of inches wide. The vein will be sunk on at once.

Cobalt, Nov. 2.—Mr. R. B. Watson has made another unexpected strike on vein No. 8 on the Lawson property. The strike promises to pan out uncommonly well and gives every indication of producing a great deal of high value ore.

A strike almost equally good has been made on the Princess property.

Toronto. Nov. 2.—The City of Cobalt Mining Company has taken a lease of the King Edward concentrator on Cross Lake, and will treat its low grade ore at this point in future, teaming it from property to mill. King Edward mill was built three years ago by the mining company, but last winter it was decided to close operations at the time for an indefinite period and the mill has been lying idle ever since.

Matheson, Nov. 7.—Two gold bricks of 50 ounces left Matheson yesterday from the American Eagle mine, in Munro Township. These bricks represent $2,000. Within the past two months the Gold Pyramid has sent out seventy ounces, so that this season the properties in Munro and Beattie, to the east of here, have produced 170 ounces, or approximately $3,400 in gold. Both properties have been working some years.

MANITOBA.

Winnipeg.—General satisfaction prevailed throughout the west when the news of the settlement of the coal strike was published. An indefinite coal famine would have ensued if the settlement had not been so timely. Now that the mines are again in operation the danger of a fuel famine is averted, this affecting both producer and consumer to a very great extent. It will also have the effect of keeping the price of coal down to normal.

Fernie, Oct. 31.—Chief Justice Gordon Hunter is here today to preside at the fall assizes of the Assize Court. But one case is upon the docket for trial, that of A. J. Carter against

W. G. Barclay, in which the latter is charged with making damaging statements regarding Mr. Carter's action in the matter of securing relief supplies for the miners. S. S. Taylor is appearing for Mr. Barclay, and L. P. Evkstein for Mr. Carter.

The scales committee of the operators and miners are meeting at Frank to-day, to take up the arrangement of a new scale of wages in accordance with the outline laid down at Lethbridge last week, when Hon. Robert Rogers succeeded in bringing the two sides to the controversy together again after a long wait following the Macleod conference with the boards of trade convention.

The task of arranging a new scale should not be a lengthy one, since all details have been gone over so many times, and the basis arrived at being clear and well defined. If this work is accomplished within a few days, the vote upon the proposition can be taken in one day all over the district and the mines can be opened within the next week.

A few men have already gone to work at Coal Creek, cleaning up, preparatory to active operations.

Fernie, Nov. 3.—The Riot Act was read in Fernie last night by Mayor Bleasdell after a violeut outbreak on the part of the miners, when a train arrived from Coal Creek with men on board who had gone to work in the mines without waiting until the agreement now under consideration at Frank has been signed and ratified.

Large numbers of miners were on hand when the train reached here, and the men who had worked were greeted with hisses and derisive language. One man was hit upon the side of the face by a stone thrown by some one in the crowd.

Trail, Nov. 1.—During September the Consolidated Company received 24,717 tons of ore, and smelted 24,713 tons. The total gross output for the month was valued at about $593,000, of which 67 per cent. of the values were gold. The total gross output for the quarter ending September 30th, was $1,460,000, about 63 per cent. of the values being gold.

Nelson.—Supported by a group of Spokane capitalists, W. E. Zwickey, manager of the Rambler-Cariboo mine, is preparing to open up the famous Payne mine in the Slocan, a property which at one time ranked among the greatest producers in the province. Already Mr. Zwickey has a force of men at work cleaning out the tunnels and carrying on other work preparatory to operating the mine.

The Payne mine was located on September 9th, 1891, by Eli Carpenter, and Jack Seaton. They sold it to Steve Bailey for $20,000, who disposed of it after some development had been carried ou, to A. W. McCune for $125,000. Mr. McCune, it is said, took a milliou dollars' worth of ore out of the mine, and then sold it to an eastern company, from whom Mr. Zwickey has taken a bond, for $1,000,000.

The development of the mine under Mr. Zwickey's management will probably include the driving of a lower tunnel.

Rossland, B.C., Nov. 1.—The following report has been received at the Londou office of the Vau Roi Company from the manager in Rossland:

Mill Report for September.—Total amount crushed, 3.700 tons; average assay: 12.6 ounces silver, 3.6 per cent. lead, 8.9 per cent. zinc, yielding 200 tous of lead concentrates, assaying 96.8 ounces silver, 65.4 per cent. lead, and 10.1 per cent. ore, assaying 110 ounces silver, 14.7 per cent. lead, 22 per cent. zinc. Total, approximate value, $20,940. Mill ran 565 hours.

Estimated expenditure for corresponding period — Development, $2,393; ore production, $9,524; milling, $4,336; total, zinc; and 330 tons zinc concentrates, assaying 33.8 ounces silver, .9 per cent. lead, and 46.0 per cent. zinc; 6 tons picked $16,253.

Mine report for September — Shipped 260 tons of lead concentrates and 456 tons zinc concentrates. The net receipts for 280 tons lead concentrates shipped are 90 per cent. of full payment, $14,855; the net receipts for 369 tons of zinc concentrates shipped are 80 per cent. of full payment, $4,065; total, $18,920. Main vein level 5 advanced 45 feet, poor. Main level 3 advanced eastward 58 feet, of which 58 feet average 36 ounces silver, 3⅜ per cent. lead, 12½ per cent. zinc, over an average width of 2 feet 3 inches. Breast still in ore.

Nelson.—The Slocan Star Mines, Ltd., is the new company under which are consolidated the mineral properties at Sandon previously owned by the Byron N. White and John M. Harris interests, the most noted of which is the Slocan Star. The consolidation was recently affected through the efforts of Mr. Lennie, and it has permitted the operation of the important mines long locked up by litigation.

Work has now been started on No. 6, or lower tunnel, on the consolidated properties. This tunnel will tap the downward continuation of the chief ore bodies, including the one formerly in dispute, at a depth of 600 feet below the present No. 5 tunnel of the Slocan Star mine, on the dip of the vein. The work will take some time to complete, as it involves a tunnel 2,300 feet in length, but as the tunnel will pass through virgin territory it is expected that valuable veins will be uncovered. In addition to the work on this tunnel, operations will be pushed on the upper levels, and it is expected that shipments of ore from these will commence within 90 days.

UNITED STATES.

Cripple Creek, Colo., Nov. 1.—October closes as the greatest financial period in the history of the Cripple Creek district, as for the first time since the inception of the camp the dividends of the month are in excess of the gold production.

These dividends, with close corporations placed at the lowest figure and with profits of lessees not included in the total, amouut to $1,322,500 paid out by miniug companies during October, and not only break all records in Cripple Creek, but establish a new record in the state.

The output of gold ore during the month was 77,728 tons, carrying a bullion value of $1,318,199. This production is 1,000 tons in advance of that of September, with an excess valuation of $21,500. Quite an increase in tonnage over the previous month is shown by the United States Reduction & Refining Company, and gains appear all the way dowu the line of the local plants.

Salt Lake City, Utah.—Dividends from the Utah mines thus far this year amount to $5,169,687. This is from the mines alone, and does not take into consideration the profits from the International, American, and United States smelters and allied interests, which derive their profits from the local mines and from properties owned by these companies.

COMPANY NOTES

DOMINION STEEL.

Mr. J. H. Plummer presided at a meeting of Steel directors on Nov. 1st. Those preseut were: Sir William C. Van Horne, Hon. Robert Mackay, George Caverhill, Hon. R. Dandurand, Sir H. Montagu Allau, F. L. Wanklyn, William McMaster, W. G. Ross, and Jas. Reid Wilson.

The president gave the Steel Corporation returns for the month of October: Pig iron, 24,356 tons; steel ingots, 29,675 tons; rails, 15,587 tons; rods, 6,817 tons.

Mr. Plummer also stated that matters were progressing very satisfactorily at Springhill, the output of coal being larger than before the strike began. One day last week the output reached 1,600 tons.

STATISTICS AND RETURNS

WEST AFRICAN GOLD YIELD.

The West African Chamber of Mines announces that the gold yield of the colony during September was 26,717 ozs., valued at £109,039, an increase of 1,332 ozs., or £5,286, compared with the preceding month. Last month's return is a record as regards value, being £2,796 above the previous highest, which was £106,243 in March, 1908.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending Nov. 3, and those from Jan. 1, 1911, to date:

	Nov. 3. Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger	.....	55,200
Bailey	.....	40,000
Beaver	.....	1,520,217
Buffalo	.....	2,212,863
Chambers-Ferland	64,000	1,150,900
City of Cobalt	64,000	727,980
Cobalt Lake	114,430	3,760,920
Cobalt Townsite	53,004	1,142,514
Colonial	.....	183,410
Coniagas	188,334	3,630,487
Crown Reserve	51,080	2,003,080
Drummond	60,000	1,080,000
Green-Meehan	.....	145,800
Hargraves	.....	161,100
Hudson Bay	.....	1,255,824
Kerr Lake	60,000	2,233,670
King Edward	.....	40,000
La Rose	144,800	6,233,480
McKinley-Darragh	212,704	5,598,040
Nipissing	58,908	5,010,868
O'Brien	.....	1,257,958
Peterson Lake, Little Nip.	.....	58,430
Provincial	.....	151,950
Right of Way	.....	1,190,805
Silver Cliff	.....	106,680
Standard	.....	102,813
Temiskaming	138,830	1,587,282
Trethewey	41,613	1,159,663
Wettlaufer	.....	117,232

The shipments for the week were 1,251,793 pounds, or 625 tons, against 281 tons the previous week.

The shipments from Jan. 1 to Nov. 3 were 43,810,434 pounds, or 21,905 tons.

B. C. ORE SHIPMENTS.

The ore shipments for the week ended Oct. 21st totalled 18,954 tons, and the smelter receipts 16,310 tons. For the year to date the shipments total 1,293,206 tons, and the receipts total 1,192,437 tons. Following are the figures:

Boundary Shipments.

Mother Lode	6,900	250,483
Rawhide	2,893	36,330
Jack Pot	282	21,698
Athelstan	181	6,795
Unnamed	1,507	7,320
Other mines	.....	637,617

Rossland Shipments.

Centre Star	3,244	161,053
Le Roi No. 2	442	22,856
Le Roi No. 2, milled	300	12,600
Le Roi	457	13,383
Other mines	.....	457
Total	4,443	210,349

Slocan-Kootenay Shipments.

Sullivan	98	15,579
St. Eugene, milled	420	22,296
Richmond-Eureka	32	1,911
Queen, milled	420	17,430
Granite-Poorman, milled	250	10,510
Nugget, milled	110	4,620
Emerald	35	1,637
Knob Hill	84	4,029
Athabasca	14	51
Molly Gibson	85	945
Van Roi, milled	800	31,449
Molly Gibson, milled	300	4,200
Other mines	.....	7,957
Total	2,648	122,614

B. C. Copper Co.'s Receipts.
Greenwood, B.C.

Mother Lode	6,900	250,483
Rawhide	2,893	36,330
Jack Pot	282	21,698
Oro Denoro	181	6,795
Unnamed	1,507	7,320
Other mines	.....	10,652
Total	11,763	333,278

Consolidated Co.'s Receipts.
Trail, B.C.

Centre Star	3,244	161,053
Le Roi	457	13,383
Le Roi No. 2	442	22,856
Sullivan	98	15,579
Molly Gibson	85	945
Knob Hill	84	4,029
Granite-Poorman	35	338
Emerald	35	1,637
Richmond-Eureka	32	1,911
St. Eugene	21	5,992
Athabasca	14	51
Other mines	.....	39,972
Total	4,547	268,746

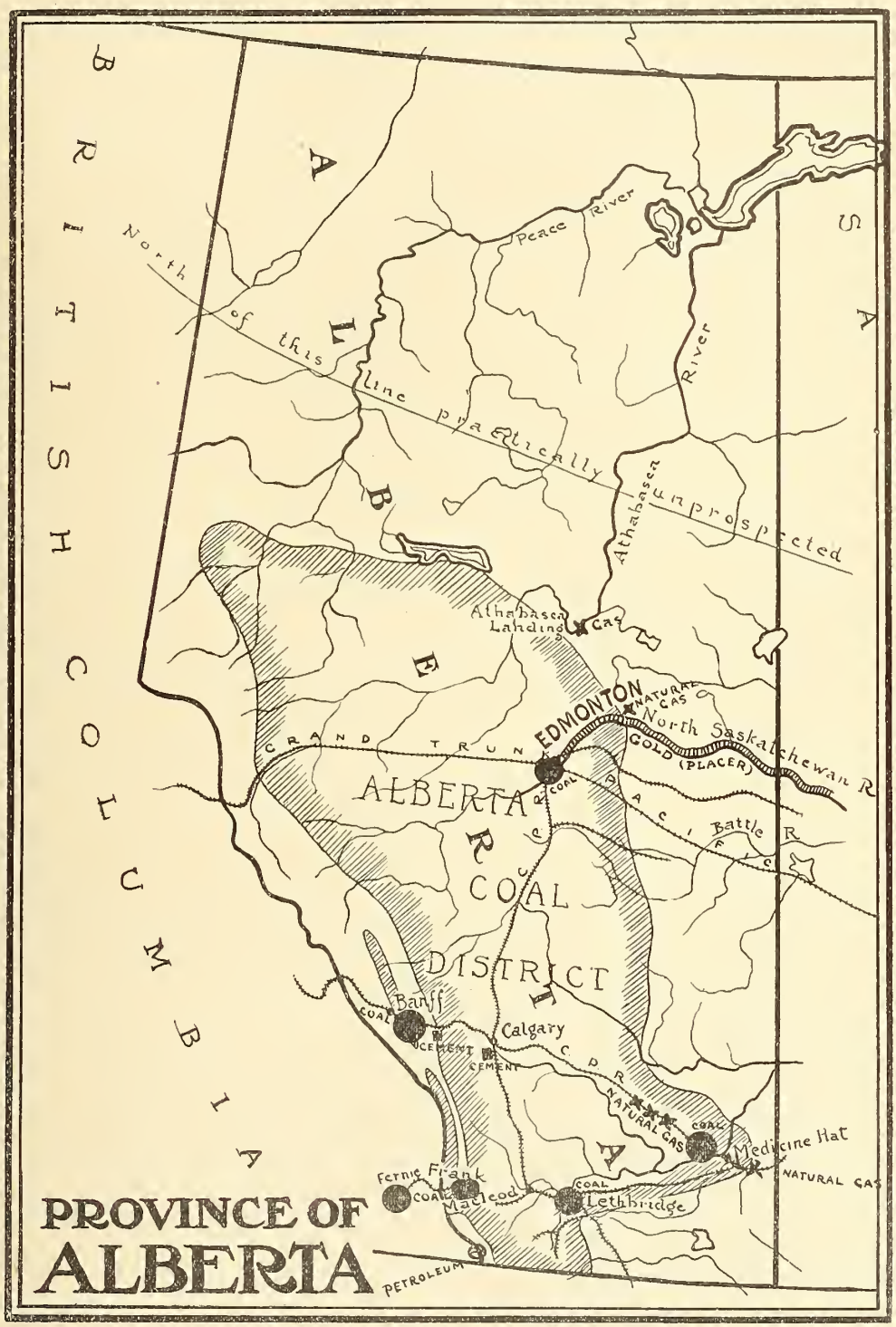
MINERAL MARKETS.

Acids—
Muriatic, tank cars, $1.15 to $1.55 per 100 pounds.
Nitric, $0.04 to $0.05 per pound.
Sulphuric, $0.01 per pound.
Chrome Ore, 50 per cent., ton of 2,240 lbs., $15.
Fire Clay, $2.50 to $5 per short ton.
Fluorspar, lump, $9 per long ton.
Fluorspar, ground, $12 to $15 per long ton.
Graphite, lump, 4 cents to 10 cents per pound.
Gypsum, short ton, ground, $4 to $7.50 per ton.
Magnesite, crude, 95 per cent., $7 to $8.50 per long ton.
Molybdenite, commercially pure, 25 to 30 cents per lb.
Pyrite, lump, arsenic free, 10 to 12½ cents per unit.
Pyrite, fines, arsenic free, 8 to 11 cents per unit.
Tungsten ore, 50 per cent., $7.70 per unit.

TORONTO MARKETS.

Nov. 9.—(Quotations from Canada Metal Co., Toronto):
Spelter, 6.50 cents per pound.
Lead, 4.25 cents per pound.
Antimony, 7 to 9 cents per pound.
Tin, 43 cents per pound.

Nov. 6.—Tin, Straits, 41.75 cents.
Copper, Prime Lake, 12.50 cents.
Electrolytic copper, 12.40 to 12.45 cents.
Copper wire, 13.50 cents.
Lead, 4.25 to 4.30 cents.
Spelter, 6.40 cents.



Copper, casting, 12.85 cents per pound.
Electrolytic, 12.85 cents per pound.
Ingot brass, 7 to 12 cents per pound.

GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼ inch lump.

Sheet zinc (f.o.b. smelter), 8.00 cents.
Antimony, Cookson's, 8.00 cents.
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" 26	54⅝	25 3/16
" 27	54¼	25
" 28	54⅜	25 1/16
" 30	54⅜	25 1/16
" 31	54⅜	25 1/16
Nov. 1	54⅜	25 1/16
" 2	54⅜	25 1/16
" 3	54⅜	25 1/16
" 4	54¼	25
" 6	54¼	25

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B. C. Copper	3⅞	4
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Ely Cons.	¼	⅜
First National Cop.	1	1⅛
Giroux	4⅜	4½
Green-Can	7⅛	7¼
Inspiration	8⅛	8¼
Nevada Hills	2⅝	2¾
Ohio Copper	1 3/16	1¼
Ray Central	2 3/16	2¼
Union Mines	⅛	¼
Yukon Gold	3½	3⅝
Goldfields Cons.	4½	4⅝
Nevada Cons.	16⅝	16¾
Miami	19⅜	19⅝
Granby	off	60
Cons. Mining and Smelting	..	..
Davis-Daly	⅞	1
Cons. Arizona	1/16	⅛
Rawhide Coal.	..	..
Ray Cons.	14¼	14⅜
Chino	20½	20¾
New Baltic	..	..
United Copper	1¼	1⅝

PORCUPINE STOCKS.

Apex	.12½	.13
Coronation	.02½	.03⅛
Nor. Exploration	2.75	3.15
Dobie	1.10	1.25
Dome Ex.	.74	.75
Foley-O'Brien	.68	.74
Rea	2.93	2.95
Hollinger	10.65	10.75
Monita	.12	.14
Pearl Lake	.45	.45½
Central	3.60	3.62
Imperial	.10¾	.11
Northern	.82	.83
Tisdale	.06¼	.07
Preston East Dome	.22¼	.22½
Standard	.12½	.13¼
Swastika	.31	.31½
United	.03⅝	.04
Porcupine Gold	.47	.47¼
West Dome	.95	.98
Crown Chartered	.45½	.45¾
Eldorado	.11	.13
Gold Reef	.14	.20
Porcupine Canada	.85	1.00

COBALT STOCKS.

Bailey	.02	.02⅛
Beaver	.45	.45½
Buffalo	1.55	1.90
Chambers-Ferland	.12½	.12⅝
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Cobalt Lake	.29	.30
Coniagas	6.00	6.50
Crown Reserve	2.82	2.85
Great Northern	.14	.14½
Green-Meehan	.01⅜	.01⅞
Hargraves	.05	.07
Kerr Lake	3.00	3.15
La Rose	3.85	3.90
Little Nipissing	.01¾	.02
McKinley-Darragh	1.85	1.86
Nipissing	7.50	7.55
Nova Scotia	off	.10
Peterson Lake	.06¾	.07
Right of Way	.06	.07¼
Rochester	.01¾	.02
Silver Leaf	.02½	.03
Temiskaming	.38	.38½
Trethewey	.57	bid
Wettlaufer	.83	.84

CANADIAN STEEL PRODUCTION.

1st Half 1911.

Steel rail production fell off about 8 per cent. during the six months, as compared with the corresponding period in 1910, being 161,635 tons.

The following table gives the production of pig iron, steel ingots and steel rails during the first half of 1911 and 1910, respectively:

	First 6 mos., 1911.	First 6 mos., 1910.
Pig iron (tons)	400,170	344,783
Steel Ingots (tons)	374,793	338,966
Steel rails (tons)	161,635	174,592
Grand total	936,598	860,341

The one unsatisfactory feature of the iron and steel situation in Canada is the demoralized condition of prices on account of the competition in the United States.

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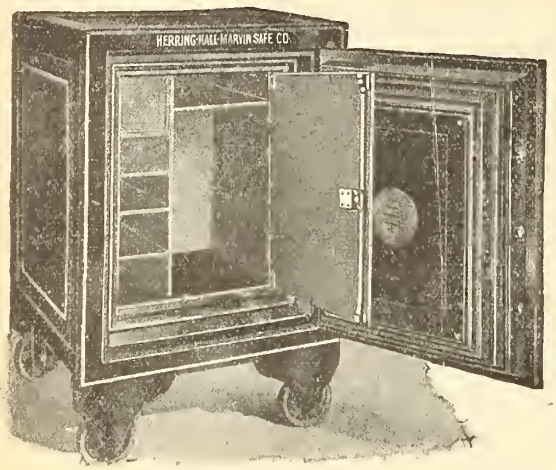

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Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

REPORTS RECENTLY ISSUED:

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1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map of Canada, by G. A. Young and R. W. Brock.
1170. Summary Report of the Geological Survey for 1910.

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1113. Memoir No. 16. The Clay and Shale Deposits of Nova Scotia and portions of New Brunswick, by H. Ries and J. Keele.

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1110. Memoir No. 4. Geological reconnaissance along the line of the National Transcontinental Railway in Western Quebec, by W. J. Wilson, accompanied by a map.
1064. Geology of an area adjoining the east side of Lake Timiskaming, by Morley E. Wilson.

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1091. Memoir No. 1, Geology of the Nipigon Basin, Ontario, by A. W. G. Wilson.
1137. Memoir No. 10 An instrumental survey of the shore-lines of the extinct lakes Algonquin and Nipissing in South-western Ontario, by J. W. Goldthwaite.

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1115. Memoir No. 8. The Edmonton Coal Field, Alberta, with maps, by D. B. Dowling.

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YUKON and NORTH WEST TERRITORIES

1080. Report on a part of the North West Territories drained by the Winisk and Attawapiskat Rivers, by Wm. McInnes.
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1042. Mineral Map of Canada. Scale 100 miles to 1 inch.
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1091. Map 8 A, Lake Nipigon, Thunder Bay District, Ontario. Scale 4 miles to 1 inch.

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1132. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.

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1135. Map 15A. Phoenix, British Columbia, topographical. Scale 400 ft. to 1 inch.
1148. Map 20A. Victoria sheet, Vancouver Island, B.C., topographical. Scale 1 mile to 1 inch.
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1164. Map 28 A, Sketch map of Portland Canal Mining District.

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1089. Map 9A. Explored Routes on Parts of the Albany, Severn and Winisk Rivers. Scale 8 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 10 cents is made for maps on linen.

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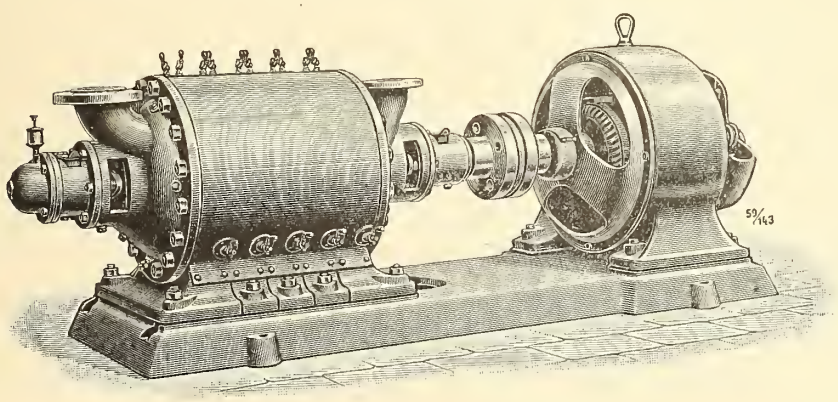

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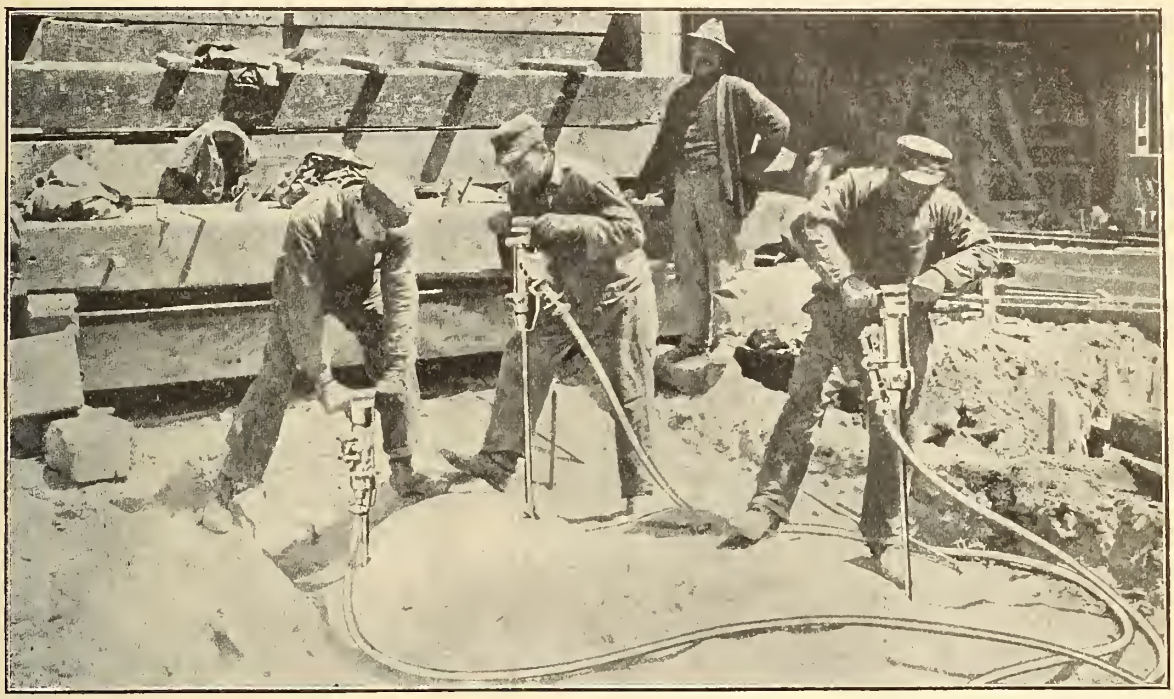

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Department of Colonization, Mines, and Fisheries.

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, Etc.

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is $10.00 and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFYER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year and a fee of $10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of $10 an acre for SUPERIOR METALS when more than 20 miles distant from a railway and $20 an acre when less than 20 miles.

For INFERIOR METALS the prices are $2.00 and $4.00 an acre respectively.

The attention of prospectors is specially called to the territory in the North-Western part of the province of Quebec, north of the height of land, where important mineralized belts are known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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Large deposits of iron also are known to exist at various places in the Province; and considerable mining has been done in connection with this mineral, the ore being used locally and shipped to foreign ports.

Among the most important minerals occurring in economic quantities may be mentioned, Coal, Gold, Silver, Manganese, Leadsilver, Copper, Barytes, Mineral Pigments, Gypsum and Tungsten.

Licenses are issued for prospecting for Gold and Silver for a term of twelve months. The licenses are for areas 150 by 250 feet, and can be obtained for 50c. an area.

Leases can be secured for $2. an area, for a term of forty years; subject to annual rental of 50c. an area.

Licenses to search over five square miles, for a period of eighteen months, for minerals other than gold and silver, cost $30.

Leases for three renewable terms of twenty years each can be obtained for $50., and are subject to a yearly rental of $30.

Royalties are as follows:—

Gold, two per cent on the gross value thereof; Copper, four cents a unit; Lead, two cents a unit; Iron, five cents a ton; Tin and Precious Stones, five per cent; Coal, ten cents on every long ton sold or removed from the mine.

Copies of the mining law can be had gratis, by applying to the Department of Public Works and Mines, Halifax, Nova Scotia, or to Mr. John Howard, Agent General for Nova Scotia, 57a Pall Mall, London, England.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. W. H. HEARST,
Minister of Lands, Forests and Mines,
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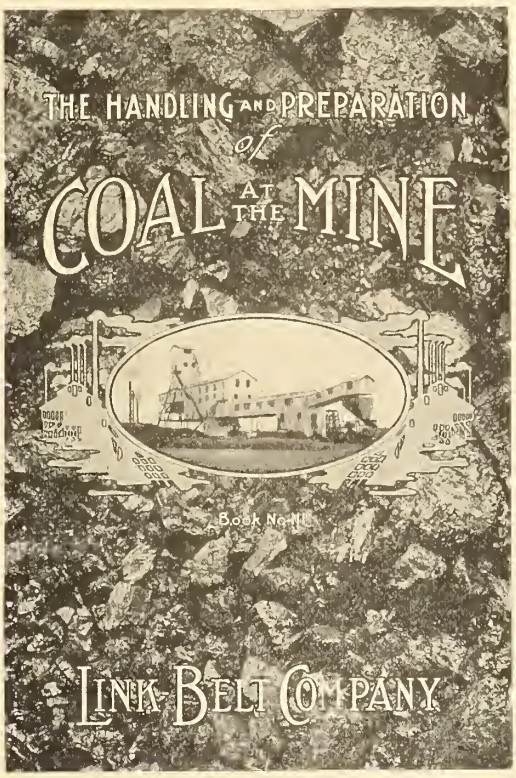

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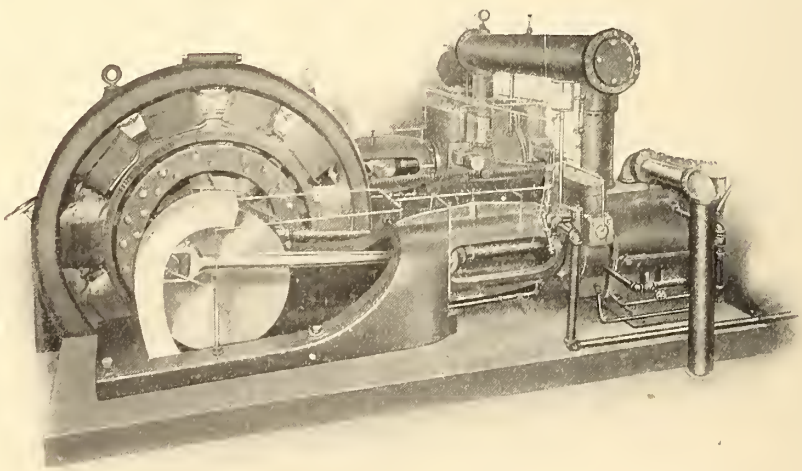

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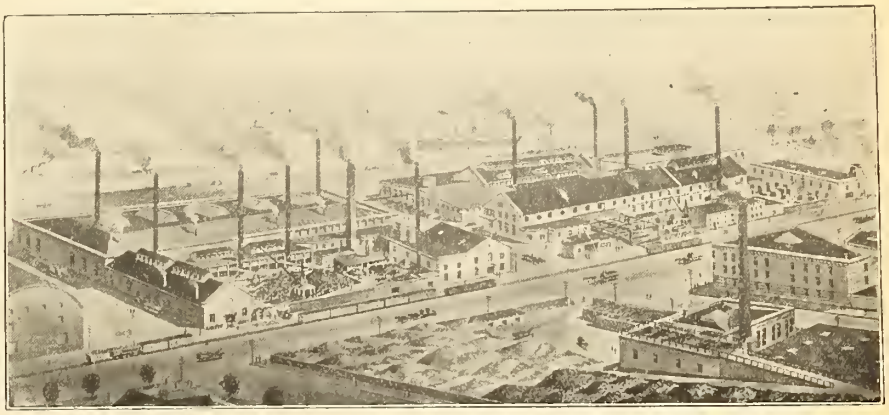

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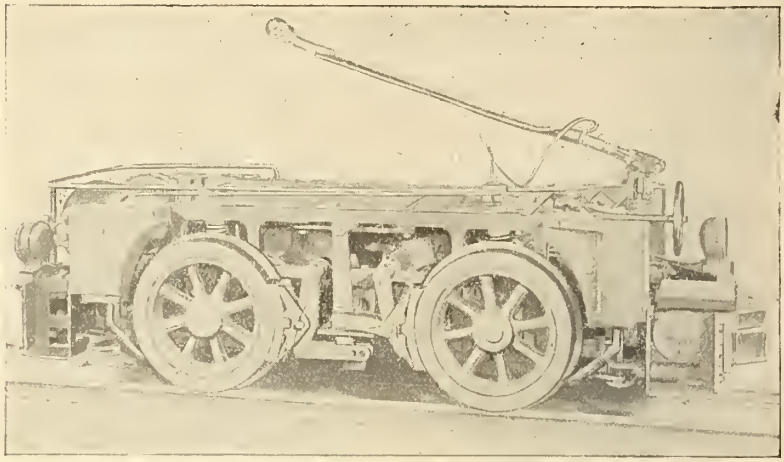

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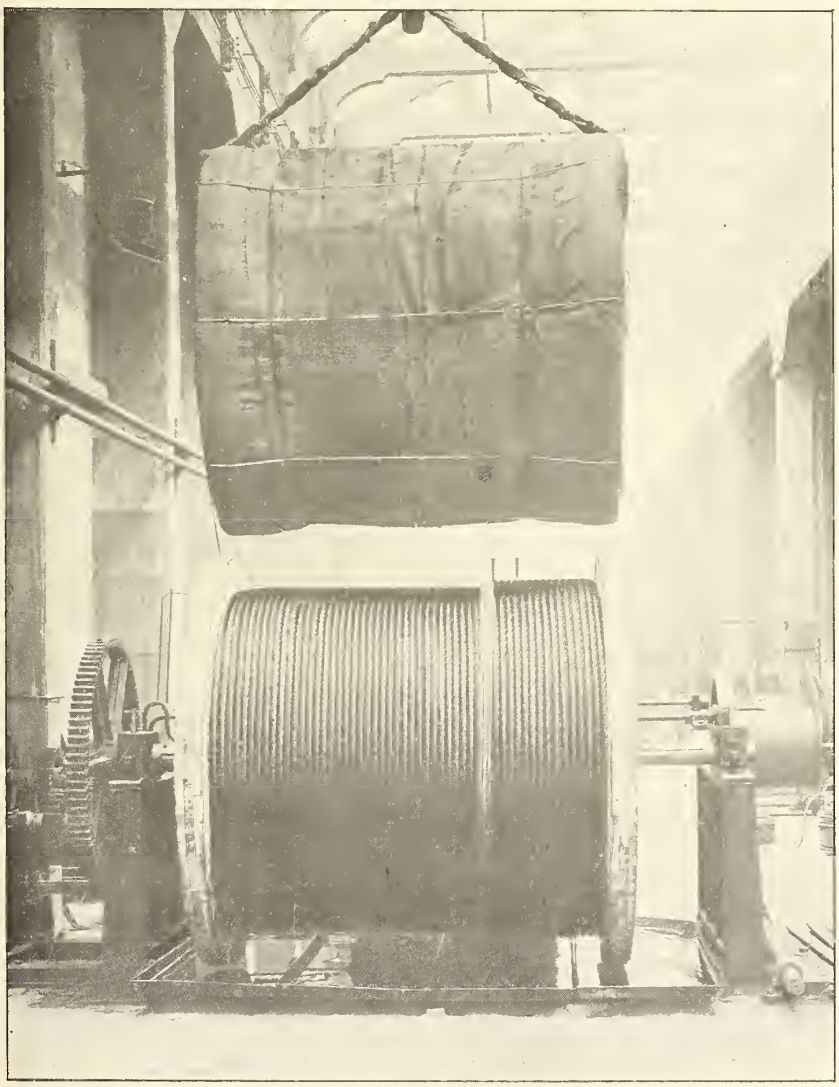

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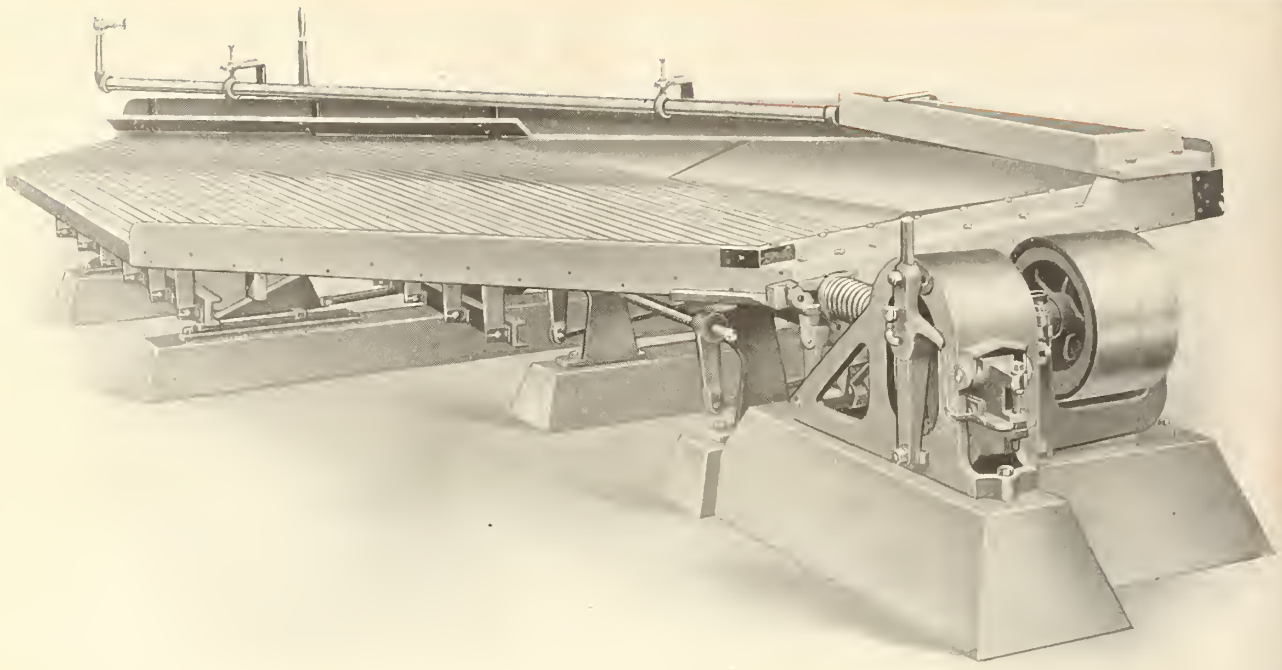

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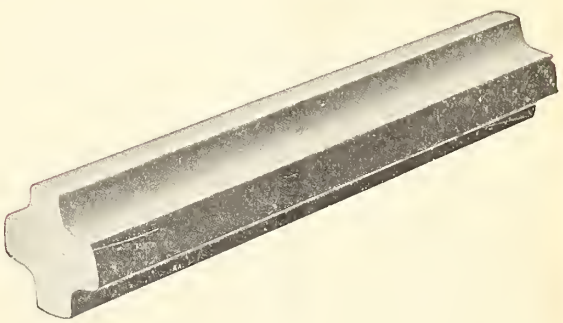

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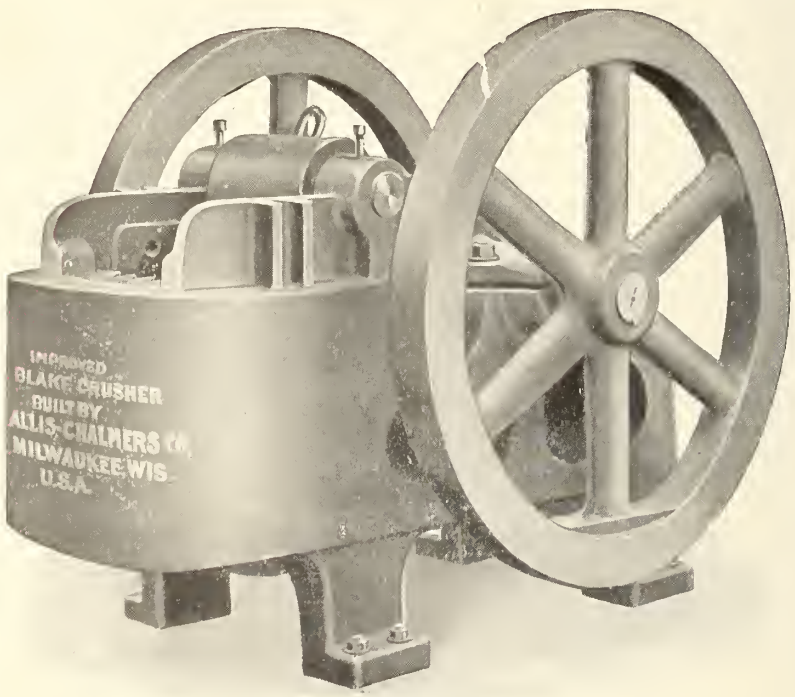

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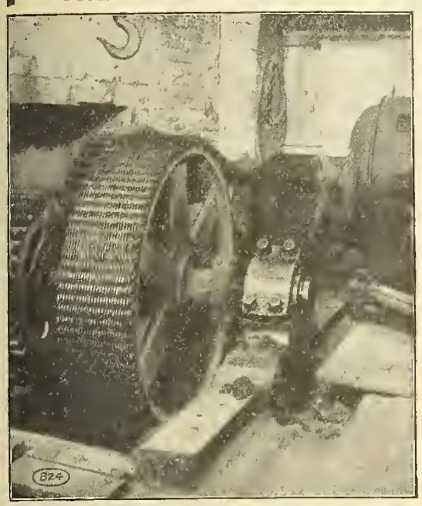

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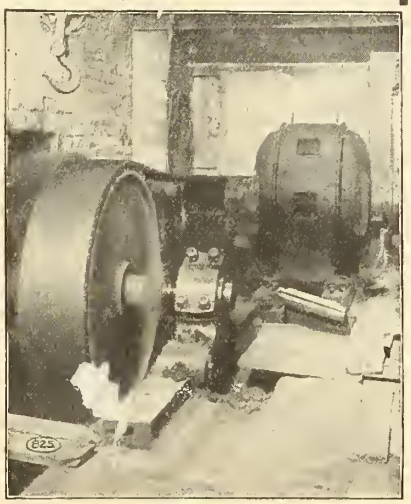

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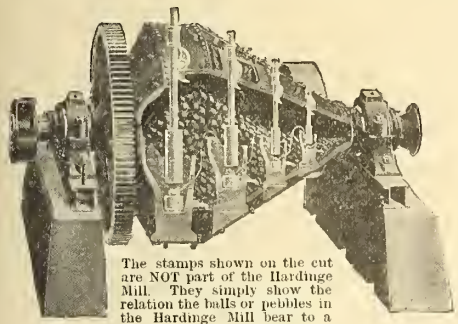

The stamps shown on the cut are NOT part of the Hardinge Mill. They simply show the relation the balls or pebbles in the Hardinge Mill bear to a number of stamps arranged for **Ideal Stage Crushing.**

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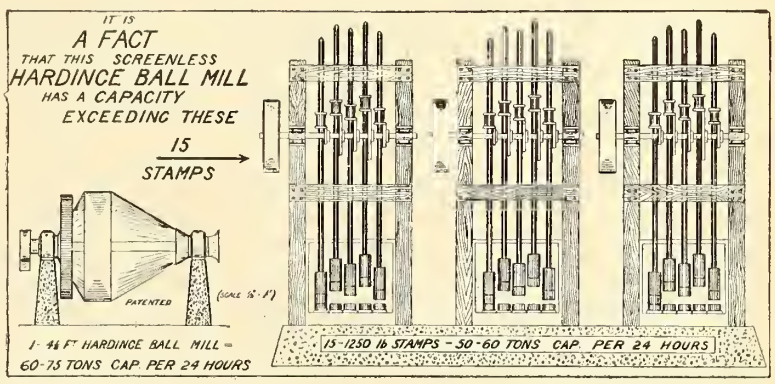

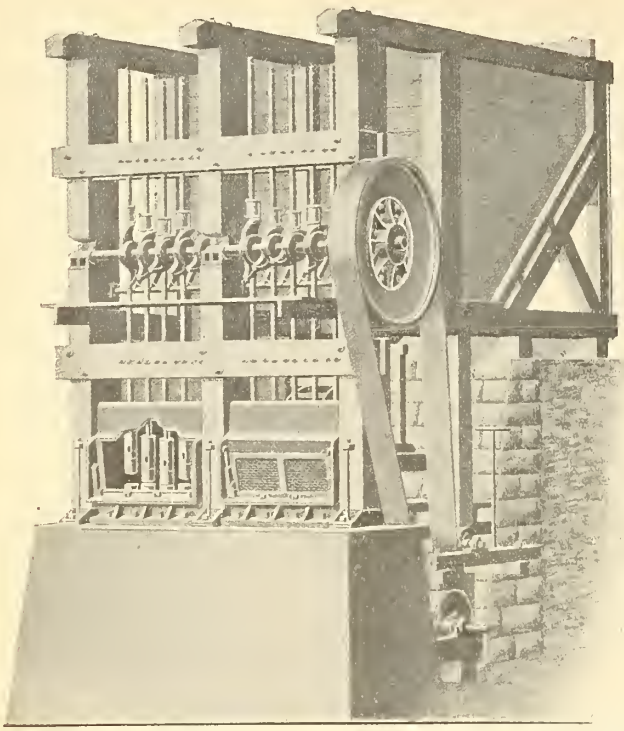

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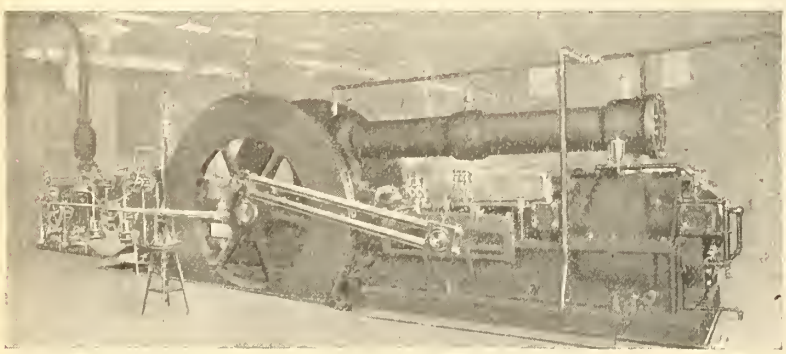

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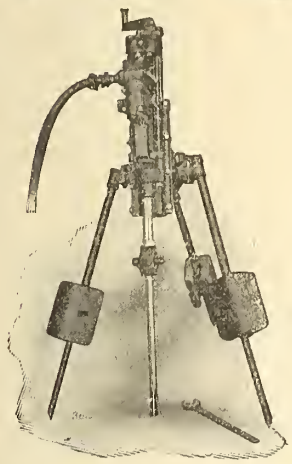
ROCK DRILLS



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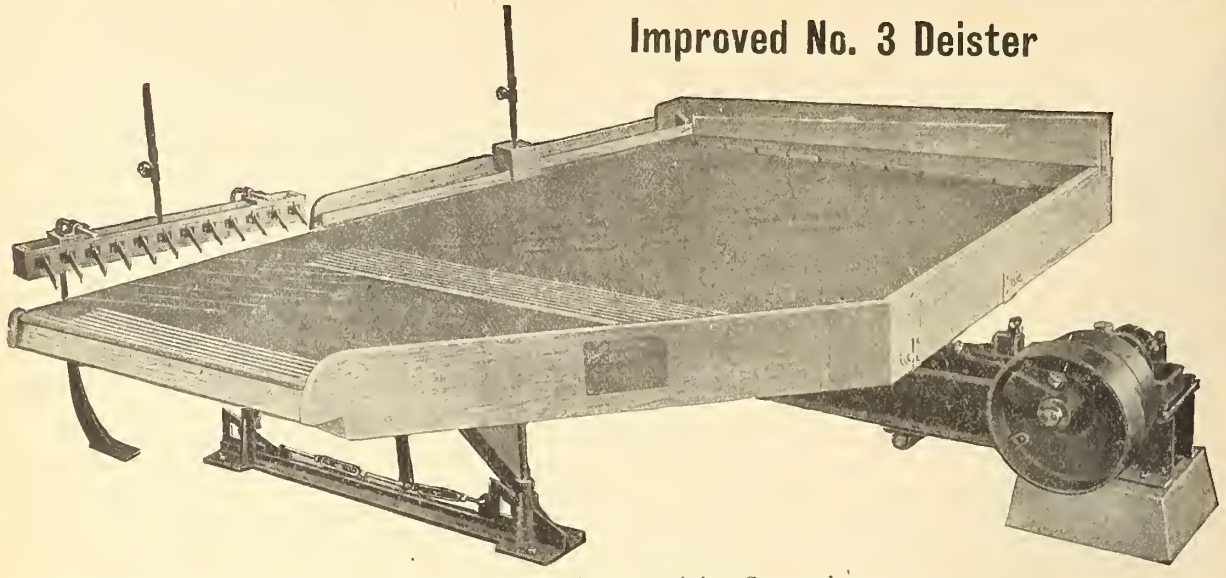

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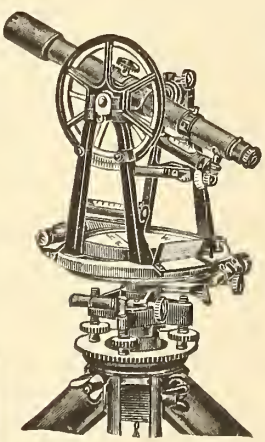

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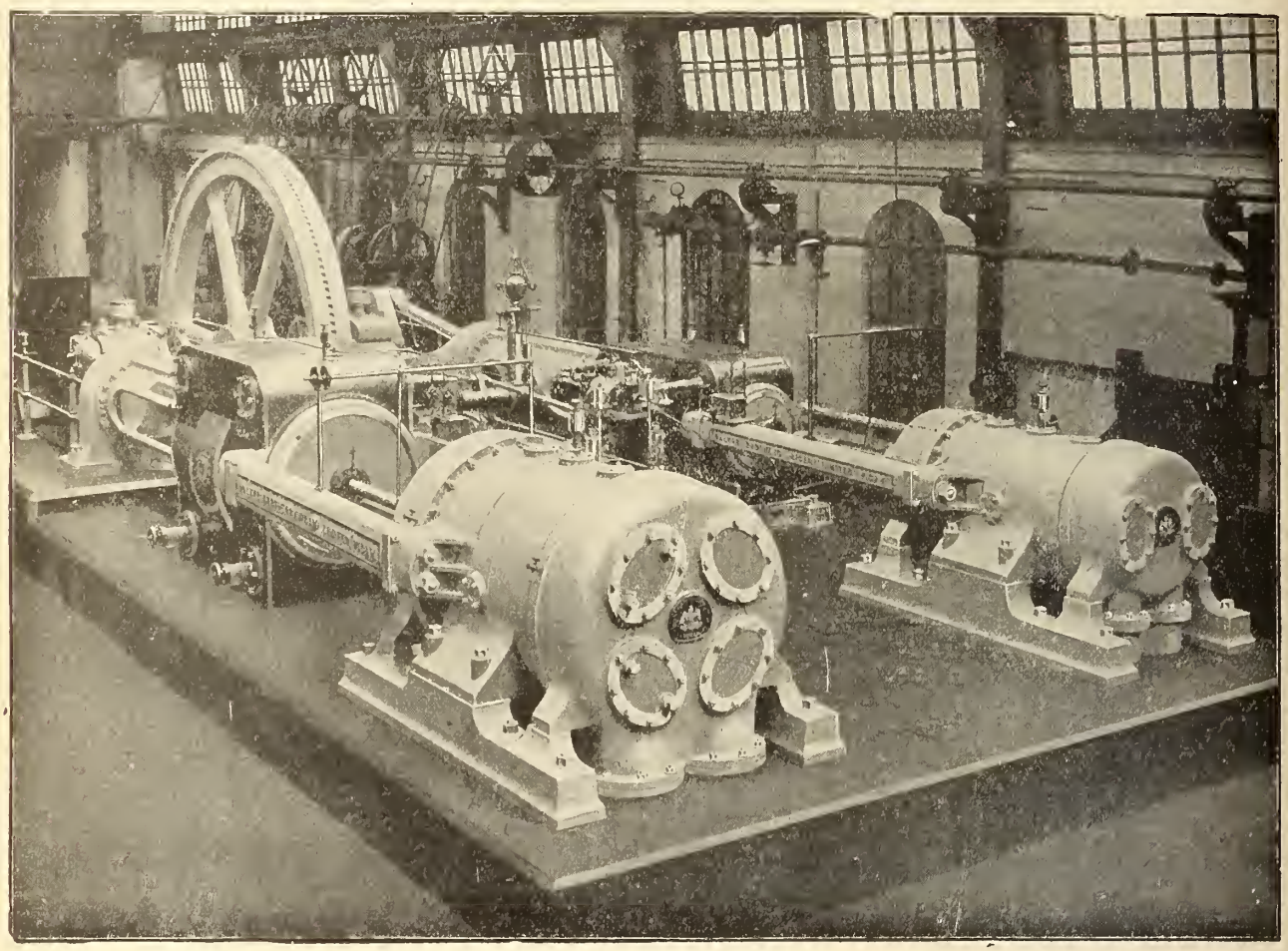

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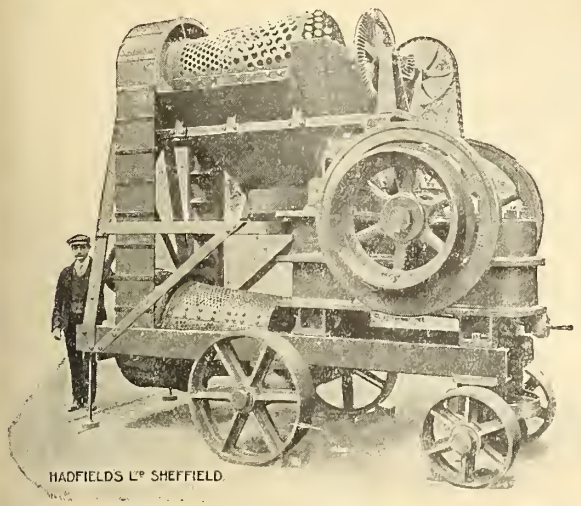

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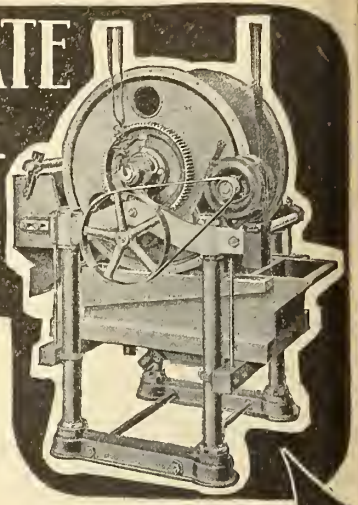

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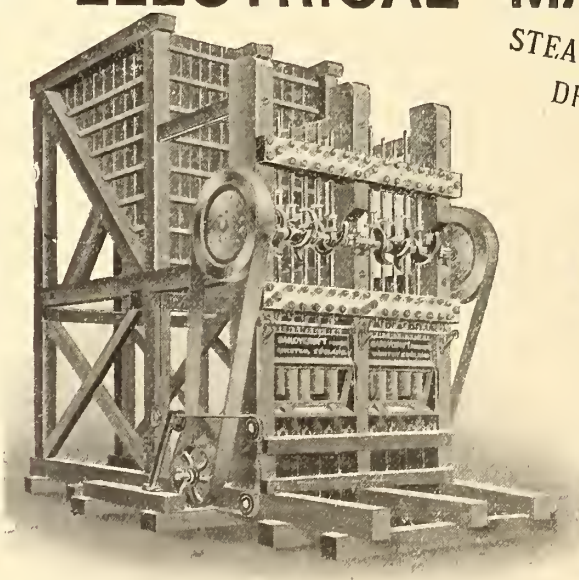

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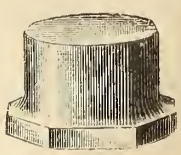

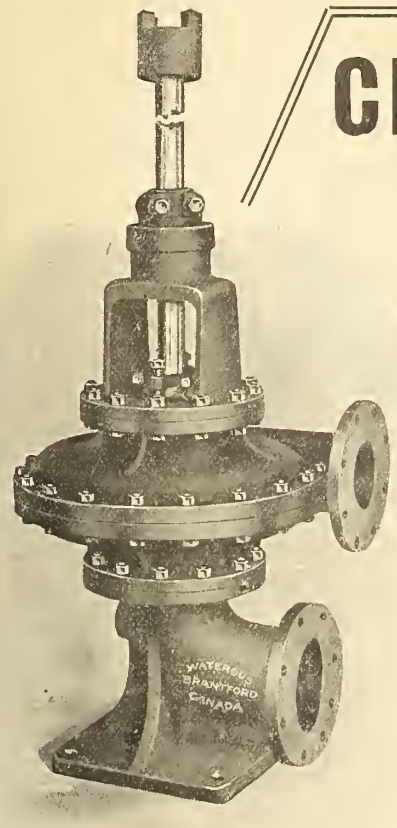

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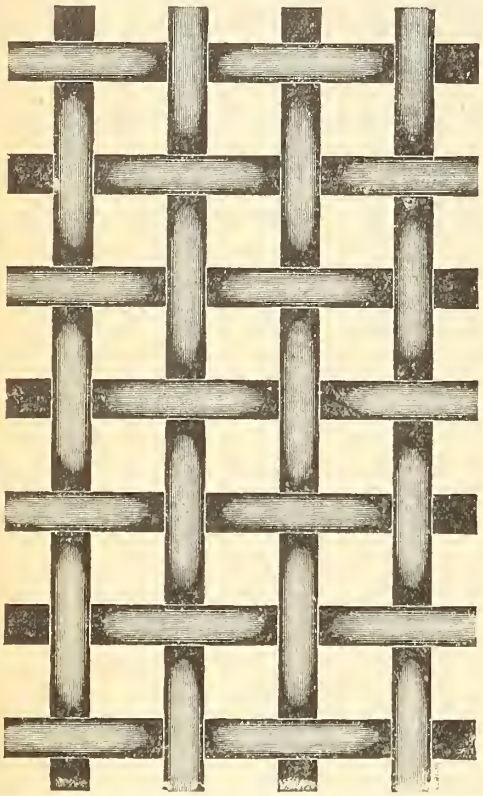

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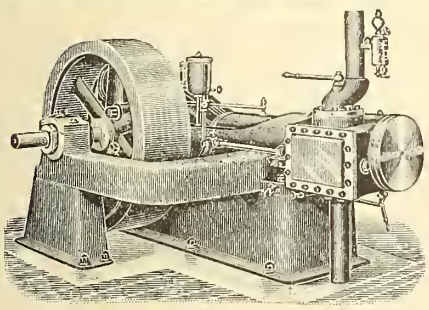

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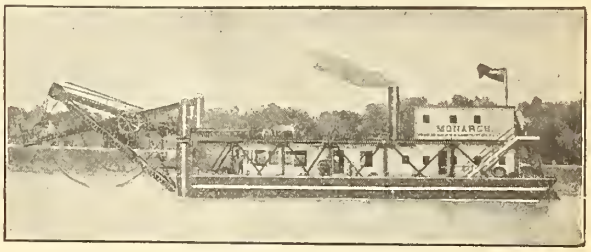

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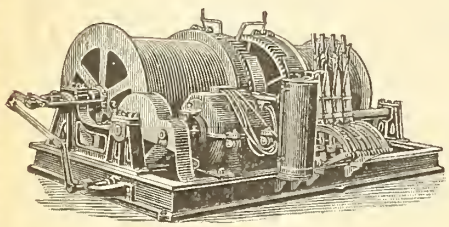

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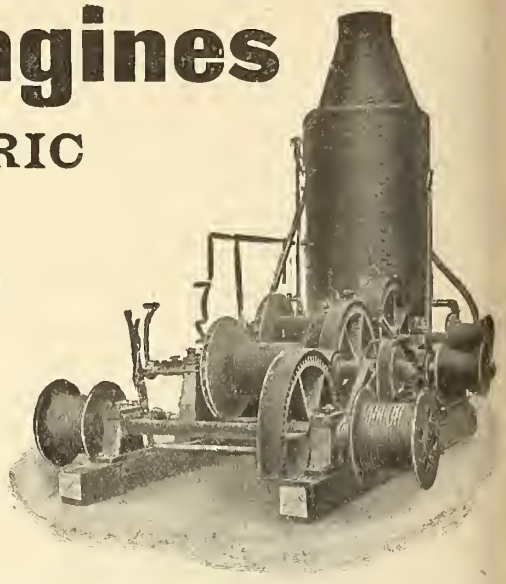

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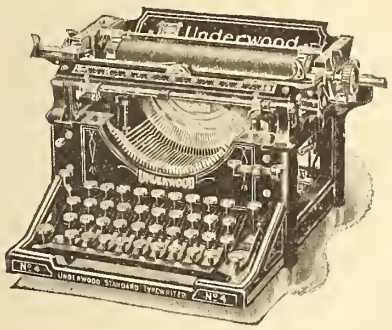

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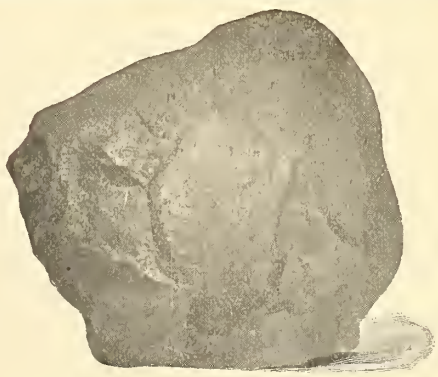

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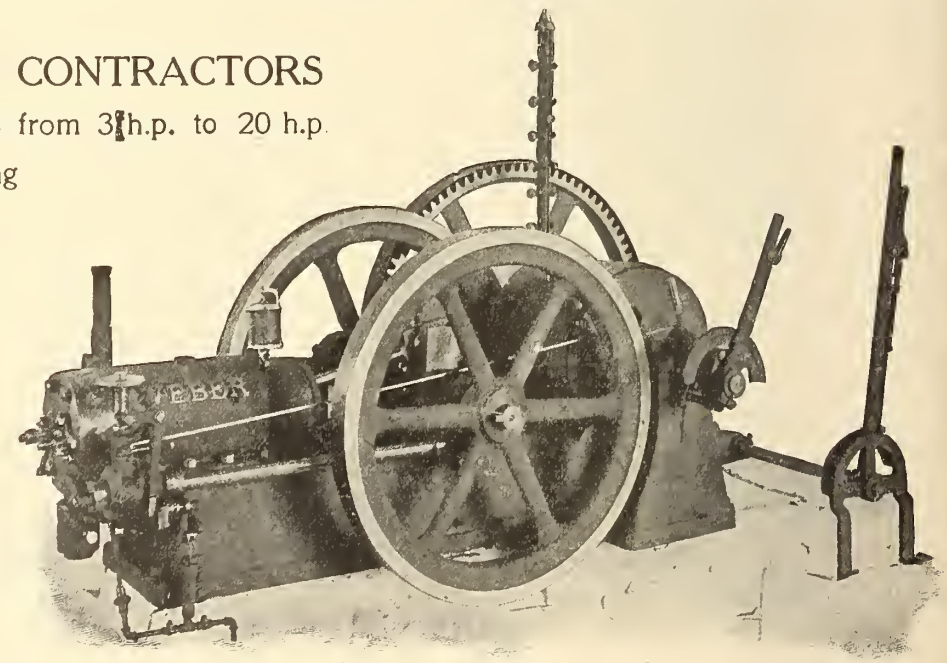

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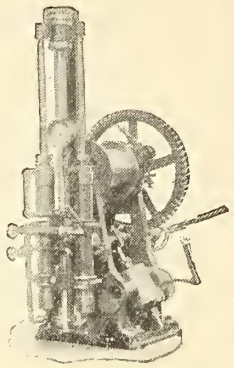

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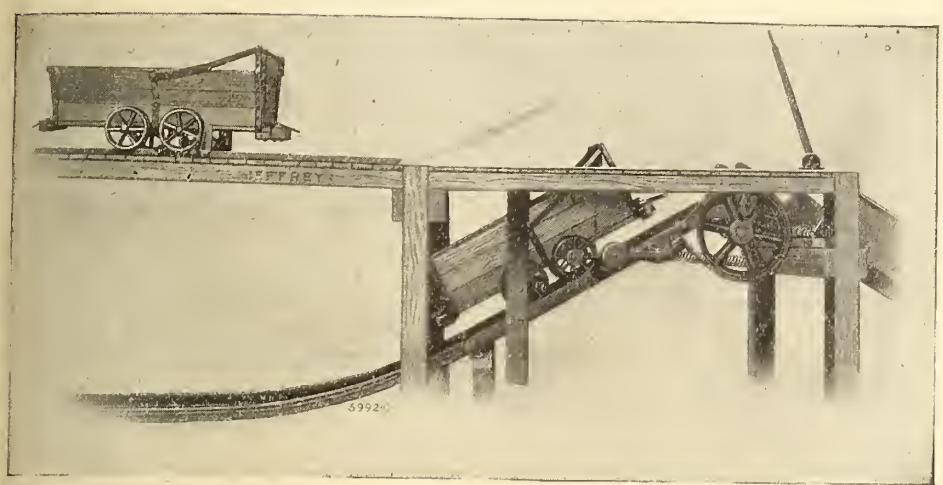

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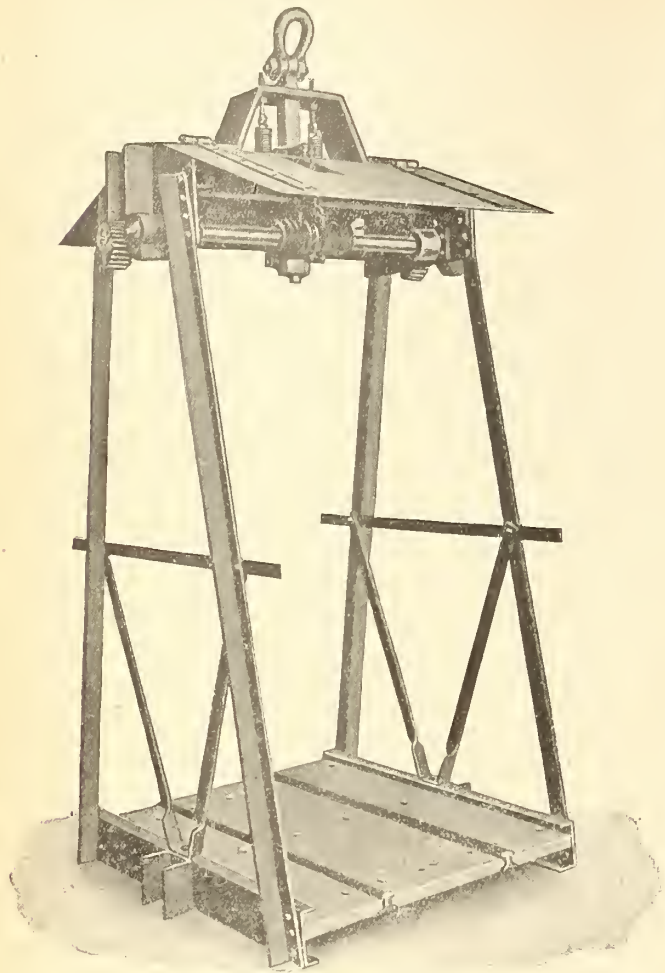

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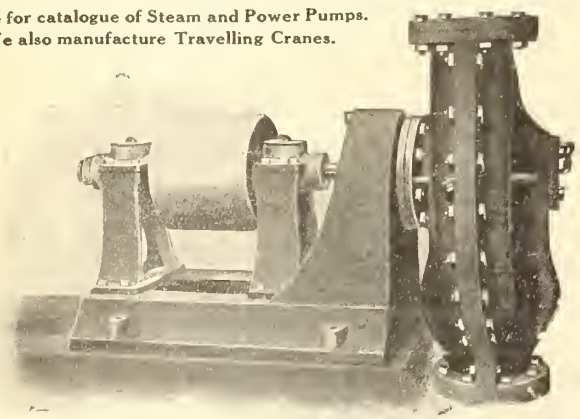

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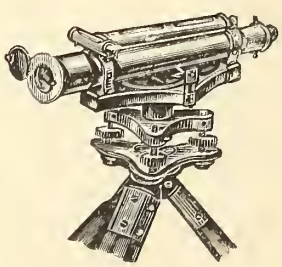

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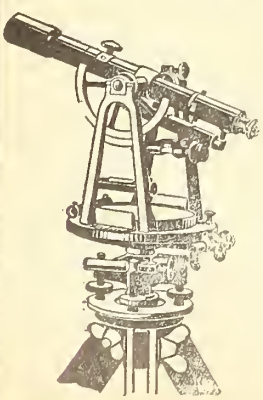

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THE CANADIAN MINING JOURNAL

VOL. XXXII. TORONTO, Dec. 1, 1911 No. 23

The Canadian Mining Journal

With which is incorporated the
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AN INDICTMENT OF CONSERVATION.

In the course of a characteristic address, delivered before the American Mining Congress, Mr. Horace J. Stevens gave an unvarnished opinion of the conservation movement in the United States.

After pointing out first the inevitable tendency in copper mining towards commercial consolidation, Mr. Stevens proceeds to handle the conservationist. Not only does he wear no gloves—he goes so far as to adopt brass knuckles. Here is a specimen of his denunciatory eloquence: "The greatest present menace "to the copper industry in the United States is a men-"ace that is common to all branches of mining. The "entire American industry is threatened by men oper-"ating under the names of progress and reform, . . ". . but who are political economists of the Stone "Age, and first cousins, in mental capacity, to the "Troglodytes."

Extravagant and intemperate as Mr. Stevens' invective may be, there is certainly a large degree of right on his side. For instance, the great Washoe smelter may be closed on account of the fact that the smelter fumes are damaging small tracts in the Federal forest reserves, timber that Mr. Stevens describes as being suitable possibly to furnish good lodge-poles for Indian tepees.

The most vital point, however, of Mr. Stevens' address refers to the Guggenheims. These much abused persons, at an expenditure variously estimated at from $13,000,000 to $25,000,000, built 195 miles of railway in Alaska to reach their Bonanza copper-gold mine. The gross value of both measured and probable ore reserves in this mine falls below $13,000,000, and, according to Mr. Stevens, the largest net profits to be hoped for from the operation of the mine will not exceed $5,000,000. Although the railway passes through regions that contain large and valuable deposits of bituminous coal, the Federal Government, acting on the advice of the conservationists, has prohibited the development and use of this coal. Hence the railway and the Alaskan settlers generally are compelled to use coal imported at high cost from British Columbia.

The Government's withdrawal of large tracts of oil, coal, and phosphate land is condemned with equal vigour. The next logical step, Mr. Stevens predicts, will be the withdrawal of iron, copper, lead, zinc, silver and gold lands—"a cleverly devised socialistic "propaganda."

To the argument that the iron ore resources of the United States are being too rapidly depleted Mr. Stevens opposes the assertion that in a single county of Michigan there is more iron ore than any "professional

conservationist'' has estimated to exist in the whole world.

The root of the whole evil is attributed to the fact that Congress has endowed the executive departments of the Government with power to promulgate rulings that have the force of law; the consequence being that the miner, although he may have complied with all known statutory requirements, may find himself arbitrarily deprived of his property by the officials of the forestry service. A Canadian analogy holds here in the case of the western coal lands that are administered by the Department of the Interior at Ottawa.

We have indicated enough to show the purport of Mr. Stevens' address. Whilst his language is far from being dispassionate and while his attitude does not remotely resemble the judicial, yet he voices a growing belief that many blunders and not a few political sins are being committed in the name of conservation.

THE ENGINEER.

In a scholarly, polished, and eloquent address before the members of the Toronto Engineers' Club, President Falconer, of the University of Toronto, traced the evolution and the meaning of the profession of engineering. With apt allusions he illustrated the successive historic phases of the engineer's function. He was listened to with rapt attention.

Admirable in tone and in content as was President Falconer's address, there was, unhappily, one strange gap. He touched illuminatingly upon architecture; he glanced over the field of civil engineering; he referred to the electrical engineer; he mentioned the mechanical engineer. But never a word did he say of the mining engineer, whose profession is the very plinth of the whole science of engineering.

Now this was a very serious sin of omission. We do not particularly blame President Falconer. But we cannot refrain from seizing on the occasion to relieve our editorial chest.

President Falconer's historical allusions were numerous and apposite. He drew on Biblical narrative, and on the history of Greece and Rome. We marvel that in reading Holy Writ he could have missed the mining man. Time does not permit us to be specific. But President Falconer will, no doubt, remember having read of Tubal Cain, who, by implication at least, was a mining and metallurgical engineer. Is there not, also, in the book of Job, specific reference to mining? Chapter 28 is a lordly picture of mining. What, moreover, of Hiram, King of Tyre?

In fact, although sacred and profane literature is dotted with innumerable references to mining and the mining engineer, there is a singular convention on the part of orators and publicists to ignore them. The mining engineer is treated as a negligible quantity.

All the high eulogies bestowed by President Falconer upon the civil engineer were, no doubt, deserved. But why overlook him who provides all engineers with his materials of construction? How would the railways, the canals, the buildings, the bridges, the ships, and every other product of human ingenuity be constructed had not the mining engineer, through centuries of laborious effort perfected the means of extracting ores from the mine and metals from the ore!

We suggest that President Falconer, as a salve to our wounded self-esteem, give us a stirring address on the mining engineer's relation to the world's history.

AMALGAMATED ASBESTOS.

The decision of the directors of the Amalgamated Asbestos Corporation to default payment of the interest on their consolidated bonds, came as no surprise to the public. The earnings of the Corporation could not possibly provide for a 5 per cent. payment on $8,000,000.

There is now no other recourse than financial reorganization. While the mines are in excellent condition, the market is certainly profoundly depressed. But even were the asbestos market active, there is little ground for thinking that reorganization of the Corporation's finances could be much longer postponed.

Those who followed the early history of Amalgamated Asbestos will be given ample confirmation of the belief that far too great a load was placed upon the Corporation by the promoters. But the blame rests not altogether upon the shoulders of the promoters; a large part of it belongs to those technical men who subscribed to the original overdone prospectuses.

There is little to be gained in recriminations. Nor is it either fair or proper for those newspapers that most avidly supported the promoters to assume a hostile attitude now. On the other hand, it is desirable that the directors of the Corporation be given every assistance in reducing its financial obligations to a rational level.

It may be mentioned here that the Canadian Mining Journal will take no notice of anonymous letters. Several such, in which abuse has been heaped upon the Corporation, have reached our office.

OFFICERS FOR THE INSTITUTE

Before January 1st, 1912, all nominations for offices in the governing body of the Canadian Mining Institute, must be in the hands of the secretary.

Circumstances make it more than ordinarily important that next year's President, who, it is assumed will hold office for two successive years, be a man of outstanding reputation. Not only must he have at heart the good of the Institute, but he must possess in large degree those qualities that spell popularity. As President he will have to undertake the onerous duties of chairman and of ex-officio member of numerous com

mittees. He will be called upon to act the part of host, entertainer, adviser, and peaee-maker.

In view of the faet that the summer of 1913 will be marked by the presence in Canada of a most formidable gathering of scientists, the selection of the presiding officer should be given much thought. The International Geological Congress will bring to Toronto some hundreds of geologists and mining men from many parts of the world. Practically all the leading spirits of the profession will gather here. In separate parties they will tour through all Canada.

In organizing and handling this large series of excursions, consummate eare, taet, and business acumen will be required. And the bulk of this responsibility must be assumed by the President.

There is also another serious eonsideration. The Institute has undertaken, through a strong committee, to revise and eodify the Dominion mining laws. This will be the largest feature of the coming year's work. If the President be not thoroughly eompetent to handle this complicated matter, if he be not conversant with the requirements of the case, then the battle for right legislation will be foredoomed to failure.

We urge upon the members of the Canadian Mining Institute the necessity of pondering long and well before casting their votes. Above all no nominations should be made nor should votes be cast for seetional or personal reasons. The Institute is striving to become a national body, and is, in some measure, succeeding. The good of the whole society must be considered first and solely.

THE SUMMARY REPORT OF THE MINES BRANCH FOR 1910.

From the Director's General Report, which preeedes the special staff reports, we gather an outline of the work aceomplished and begun during the calendar year, 1910.

Dr. Haanel asserts preliminarily that the labours of the Mines Branch are becoming more practical every year. As evidence of this he instances the large demand for the monographs published by the Branch.

Important amongst the new investigations begun during the year was the study of the building and ornamental stones of Canada. A summary of Dr. W. A. Parks' monograph on the building stone of Ontario is included in the present volume. But the strongest feature is the ineeption of systematic work on the character, handling, use, and storage of explosives.

Fuel testing, iron ore concentration, experiments in the reduction of refraetory zinc ores, and magnetometric surveying are other activities of the Branch.

The preliminary reports presented in this summary cover a wide range of subjects. Iron ores, molybdenum ores, eopper mining, miea deposits, peat bogs, etc., etc., are written up by members of the staff. In fact, the Branch appears to have taken stronger and deeper root and to have become imbued with a decidedly vigorous spirit.

The CANADIAN MINING JOURNAL strongly endorses Dr. Haanel's plea for an adequate central office wherein all the technical staff of the Branch can be properly aecommodated. It is to be hoped also that larger appropriations will be secured for the new Explosives Testing Station.

It is with some astonishment that we notice in the accountant's statement an item signifying that the sum of $25,361.91 was a balance "unexpended and lapsed." The Branch will do well to spend every cent it can secure, and, if possible, run itself into debt. Its total appropriation for 1910 was only $113,303.65. To carry out future plans on a becoming scale this should be multiplied by five. An unexpended balance in such a department is eontrary to all precedent.

ELEMENTARY ECONOMICS.

A prominent mining man, in the course of an interview with the CANADIAN MINING JOURNAL, stated that he had twice or thrice offered to pay the price asked for certain prospects in Porcupine, on condition that he first be permitted to spend a considerable amount of money in investigating. In each ease this offer was unqualifiedly rejected. The person in question was amply able to carry out any undertaking that appealed to him. He was not only ready and willing but anxious to be responsible for the preliminary development of any reasonably promising claim. But everywhere he found owners asking impossibly high prices and imposing impossibly rapid terms.

This is one general cause of the present decline of public interest in Porcupine. Another incidental cause is the suppression, or non-publication of Mr. Robbins' report on the Hollinger. Still another is the superfluous and glittering generalities that are being published about the Dome, ostensibly from headquarters.

On its own merits Porcupine must stand or fall. Assuredly it needs sane advertising. More assuredly it does suffer from indiscreet booming.

It is high time that the mine owners and operators of Porcupine get together and devise a practicable scheme of publicity.

THE MOLYBDENUM ORES OF CANADA.

Dr. T. L. Walker has added another monograph to his valuable contributions to the literature of Canadian ores. Under the auspices of the Mines Braneh he has investigated the molybdenum ores of the Dominion and has presented the results of his observation in the latest publication of the Branch.

Dr. Walker visited most of the best known Canadian deposits. Of these he gives a list of twelve that appeared to him to be most promising. Quebec, Ontario, and British Columbia are represented in this list.

Molybdenum is one of the least exploited metals. Its principal ore, molybdenite, presents peculiar difficulties in any attempt to concentrate it. Coneen-

trating tables do not give uniform results. Indeed, ordinary methods of milling have never, so far as we are aware, proved entirely satisfactory when applied to ores of molybdenum. The vacuum process appears to have given good results, but we doubt if the trials have been complete. Possibly dry concentration may prove effective. But there remains much for the investigator to do, and the field is inviting.

The world's production of molybdenum amounts only to a few hundred tons, and is subject to pronounced variation. Were the output larger and consistent there is no doubt that a steady and profitable market would be developed.

Of known Canadian molybdenite deposits, the most promising are in Quebec, Ontario, and British Columbia. The ores reported upon range in molybdenum content from 0.5 to more than 10 per cent. of molybdenum. The principal deposits occur in quartz veins, pegmatite dykes, and near the contact of limestone with intrusive granite or pegmatite. Prospecting for the mineral is not surrounded with the difficulties that characterize gold, silver, and other metals.

Dr. Walker concludes his monograph with the remark that development is often hindered by reason of the prohibitory prices asked by property owners. This is lamentably true.

A DEEP SHAFT IN WET GROUND.

A Montreal firm has been awarded the contract of sinking a 200-foot concrete shaft through sand, clay, and gravel at St. Albert, near Edmonton, Alberta. The details are interesting.

The coal lies at a depth of about 300 feet. It is overlaid by 100 feet of shale in which occur occasional seams of coal and sandstone. Over this is imposed a body of clay and very wet sand and gravel, 200 feet thick.

The attempt was made some time ago to sink an ordinary timber shaft. At a depth of 82 feet the work was abandoned. It was found impossible to hold the shaft and to take care of the water.

The proposed new shaft will be built of reinforced concrete from the surface to the shale. Here it will be completely sealed. Thus an absolutely fireproof and water tight shaft will be secured.

THE INSTITUTE IN PORCUPINE.

Every effort is being made to organize a strong branch of the Canadian Mining Institute in Porcupine. With this end in view a meeting is to be held at South Porcupine on December 16th. It is hoped that every mining man within reach of the place of meeting will attend this first gathering.

A few short papers are to be read on the evening of the 16th, after the regular business has been transacted. On the following day all who desire to do so may be shown over the camp.

Dr. Frank Adams, the President of the Institute, will be the guest of honour. Accommodation will be secured at the various mines for visitors who notify the secretary in time.

CHAS. A. STONEHAM & CO.

The exaggerated mining news items published by Chas. A. Stoneham & Co. have bred much mischief. One mining company has adopted the expedient of advertising in the daily papers the fact that it cannot be held responsible for any statements made by Chas. A. Stoneham & Co.

It would be a very wholesome thing if every mining company whose shares are listed on Canadian exchanges were to make a similar protest. Unclean parasites, and this describes the firm of Chas. A. Stoneham & Co., could thus be promptly choked to death.

A WARNING.

Several letters of enquiry regarding the Canadian Mining Record have reached our office. To set correct certain misapprehensions it is well that we state specifically that the Canadian Mining Record has no possible connection with the Canadian Mining Journal. If we are not mistaken, the Record, which was published in Toronto, has ceased to exist.

EDITORIAL NOTES.

The Government of Western Australia employs one chief inspector and a staff of 18 men to control the storage and use of explosives.

A new mineral has come to light. An Ottawa paper announces that Mrs. Ella Rawles Reader, a lady who is supposed to be mining zinc on Calumet Island, has struck a vein of "plumbuganite." If Mrs. Reader evolved that euphonious name she deserves more than a little credit.

The writing of prospectuses is an art that can be acquired only by long experience. It is rarely that one sees a properly balanced presentation of facts and opinions. The tendency is, of course, so to use the engineer's report as to give a highly favourable view of any enterprise. A result is that many engineers are falling into the habit of making their reports serve the purpose of the prospectus. This is a lamentable tendency, a tendency that should be guarded against most rigidly.

Canadian orders, totalling upward of 50,000 tons of pig iron, have been placed in the United States. Deliveries are spread over six months.

Mr. Hugh S. de Schmid, reporting on the mica deposits of Ontario and Quebec for the Mines Branch,

Ottawa, lays stress upon the fact that the average unit value of Indian mica imported into Great Britain shows a maximum variation in five years of only $119.44. On the other hand the corresponding maximum variation for Canadian mica is $691.97. This indicates the need of grading and standardizing the Canadian product.

CORRESPONDENCE

Editor Canadian Mining Journal:—

Toronto.

Sir,—Since the publication of Mr. Hedley's most appropriate views in reference to the legislature of mining enterprises, I have been looking forward to your journal carrying this to some issue, but since the 1st ult. I note that it has not been further commented upon.

May I therefore be permitted to pass a short criticism on the subject, as through your journal I feel that something tangible may result?

In a condensed form, the proposal is to eliminate, as far as possible, the discreditable floating of mining propositions, wherein the subscriber to such company's stock has not reasonable assurance of

1st—Commercial ore.
2nd—Capitalization on sound basis.
3rd—Good management.
4th—Promoters' remuneration under control.

Before entering into a discussion on the foregoing, it will surely be agreed that the capitalization, and promoters' remuneration of most mining enterprises, are not directly within the province of consulting or advising engineers, I will, therefore, first deal with what vitally concerns the mining engineer.

The divergence of even expert opinion on an already developed mine is well known, so to even a greater extent would be the difference of opinion in the case of a prospect, or unproved arrears, but what irritates, is the publishing of reports by promoters when one probably knows, from actual experience, or other authentic reports, that the statements on the part of the promoter are not only misleading to the outside investor, but that there is little hope of commercial ore, and in some instances, mineral is non-existent except in traces.

To me, the blame is not entirely with the promoter, and a little closer co-operation on the part of mining engineers would, I think, be conducive to a better condition under this heading, and my personal views for a remedy are as follows:

That the branch members of the Canadian Mining Institute formulate a "Mining Bureau," separate to their membership to the Institute, such members to be consultants who are in no way connected with any mining enterprise, except in a professional capacity.

That under the name of "Mining Bureau," or some such title, the members would be prepared to examine and report confidentially for the endorsement, or otherwise, of the report submitted to them.

Such "Bureau" could not, of course, be formulated by the Canadian Mining Institute, but should be more or less a private organization, may be made remunerative, and its usefulness extended to the quashing of "wild-cats," as may be illustrated by Stewart and Steamboat Mountain, both of which were left for the Dominion Government to snuff out, but not until the public had invested to a large extent in each case.

I estimate that the advantage offered by such an institution would be readily taken up, by not only those who are directly interested in mining, but also by the general outside investor.

There are naturally many points for discussion on such a proposal, but with judicious handling, there should be no insurmountable difficulties.

On the question of management, I think that your proposal to have provincial examinations for mine managers, would be a means whereby the investor may be assured that he has the opportunity of having a fully qualified man in charge, but what often occurs is the appointing of a person who has had no previous experience, but who is an ornament and friend of the promoters, but as promoters generally have the ruling power, a definite solution to prohibit this appears to be almost impossible, as by legislation, a company may be compelled to have a fully qualified engineer in charge, and yet such man may be subservient to the unqualified person appointed by the promoters.

As previously stated, it is hardly within the province of the consultant, or advising engineer, to attempt to dictate as to capitalization and promoters' remuneration, but with the innumerable legitimate and excellent opportunities for the investment of capital in mining, one naturally feels that we should endeavour to rectify the present evils, and thus add to the inducements, also to see that such investment should have reasonable assurance to become remunerative.

To many of the promoters there appears an incentive for the promoter to construct his company so that he may "usher the investor in on the ground floor" while he occupies the sub-basement, and while one cannot dictate to the investing public as to what floor they should occupy, they could at least be safeguarded by placing them in possession of the details of the structure, and to apply a remedy, I would suggest Dominion legislation somewhat upon the following lines:

That it should be unlawful for any company, syndicate, or trustee to issue privately or publicly, or use literature for the purpose of securing subscriptions for shares, which shall not have therein printed—

A. Capital of the company.
B. Title the company holds.
C. Amount of promotion appropriated, and whether in cash or shares, or both.
D. Amount of shares already issued and fully paid for.
E. Shares issued but not fully paid for.
F. Balance of shares in treasury.

Such figures and statements to be as entered in the books of the company at the time of publication, and the name of the secretary to be given with registered address of the company.

I do not see that any reputable company could object to comply with the above requirements, and as most public mining flotations for the development of a "prospect," or unproven ground, are more or less speculative, the public, with the facts and figures before them, would have more confidence in taking an interest.

In any event, it would prevent the sub-basement being occupied by the promoter, while the public are tenants of the ground floor, with no knowledge of any basement existing.

In conclusion, I consider that a great effort should be made to remedy the existing discrepancies, and through closer co-operation amongst those of the profession, also through the medium of your journal, I trust progress may be reported.

Yours faithfully,

"CONSULTANT," B.C.

BOOK REVIEWS.

GRAPHICAL SOLUTION OF FAULT PROBLEMS—By C. F. Tolman, Jr., 43 pages — illustrated — flexible binding — price, $1 — Published by Mining and Scientific Press, San Francisco, and The Mining Magazine, London—1911.

Few mining engineers have made a close and comprehensive study of ore deposits. To be of practical assistance to the engineer, Mr. Tolman has sketched the principles of the graphic representation and investigation of fault problems. No other phase of mining is so in need of definition.

Mr. Tolman introduces his subject as follows:—"A "common occurrence in mining is to have a drift on "the vein meet a polished wall, on the other side of "which no ore is discovered. The life of the mine "depends upon rediscovering the ore, but in many "cases the vein is never found again. . . Every "man engaged in mining should be interested in fault "problems."

To facilitate the study of faults, the author points out that a consistent record of all data pertaining to the ore body should be kept. The typical problems discussed in the book are selected from those given in the laboratory courses in structural geology at the School of Mines of the University of Arizona.

In Section II. the nomenclature of fault movement is outlined. Instead of "vertical," the term "normal" is used. In the measurements of fault movements, displacements, separations, throws, and heaves are illustrated diagrammatically. There follow sections on methods of projection, line and plane intersections, and several on fault movements.

The reader will find it necessary to furbish up his descriptive geometry before he can extract the meat from Mr. Tolman's work. This done, there is no question as to his deriving practical benefit.

PERSONAL AND GENERAL

Mr. F. M. Passow, assistant superintendent of the Eustis mine, Quebec, passed through Toronto on November 21st on his way to Gowganda and Porcupine.

Mr. G. W. Rayner has returned from Northern Quebec, where he spent the summer prospecting. Mr. Rayner covered the Keekeek country, and the districts tributary to the Bell and Harricanaw rivers. During his travels Mr. Rayner met only two or three prospectors.

Mr. Frank C. Greene, a well-known coal mining engineer, is now general manager for the Graham Island (B. C.) Coal and Timber Syndicate, Limited, which holds coal lands situated on Graham Island, of the Queen Charlotte group, British Columbia.

Mr. Frank E. Elmore, of London, England, has been spending several weeks in British Columbia in connection with the experimental application of the Elmore Vacuum Process of concentration to the recovery of metals from local ores. Experiments are in progress at one place on mill middlings from lead-zinc ore and in another on low-grade copper ore.

Mr. Robert H. Stewart, general manager of the Consolidated Mining and Smelting Company of Canada, Limited, returned to his headquarters at Trail, B.C., early last month, after having spent a month in Ontario and eastern Canada.

Mr. H. H. Claudet, formerly of Rossland, B.C., who has been supervising experiments with one unit of the Elmore Vacuum Process plant on ore from the Hewitt-Lorna Doone mines, near Silverton, Slocan Lake district, is now superintendent of the Wakefield concentrating mill at which the experiments have been made for the Silverton Mines, Ltd., of London, England.

Mr. Elias Rogers, of Toronto, gave evidence last month before the British Columbia Tax Commission, then sitting in Victoria, B.C. In the course of his evidence Mr. Rogers urged the removal of the existing provincial tax of 15 cents per ton on coke.

Mr. J. A. McPhee, a graduate in mining engineering from the University of Washington, Seattle, State of Washington, is now engineer and surveyor at the Rambler-Cariboo mine, in McGuigan Basin, Slocan, B.C.

Mr. W. S. Rugh, for years in charge of the Le Roi Mining Company's office in Rossland, B.C., was last month the recipient of a valedictory address and souvenir presentation on the occasion of his leaving that town to reside on the coast.

The New Minister of Mines for Ontario.

Hon. W. H. Hearst

The Hon. William Howard Hearst, K.C., who succeeds the Hon. Frank Cochrane as Minister of Mines for Ontario, is a barrister-at-law. He was born on February 15, 1864, in Township Arran, County Bruce, Ontario. His early education was received at public schools and the Collingwood Collegiate Institute.

In the year 1891, Mr. Hearst married Isabella Jane Dunkin. His family consists of two sons and two daughters.

For years Mr. Hearst has been a leading Conservative worker in Northern Ontario. On the formation of the Whitney Government he was appointed Government agent in connection with the Lake Superior Corporation loan. This position he filled until April, 1908, when he resigned to contest the Sault riding.

It is gratifying to know that the Hon. Mr. Hearst has paid especial attention to mining law and to the mining industry generally. His experience in mining litigation has been varied and extensive.

The new Minister has always been an ardent champion of Northern Ontario. He is well fitted to carry on a constructive campaign of development.

In religion the Hon. Mr. Hearst is a Methodist. He has always been identified with philanthropic movements in his community.

CALCITE VEINS.

Calcite veins, like quartz veins, have no essential connection with valuable ore deposits. Quartz and calcite are the commonest fillings of fissures, because these minerals are the ones most commonly deposited from circulating solutions. When these solutions contain valuable minerals as well, the resulting deposit is very large compared with the cases in which it contains workable ore deposits. In the Waitekauri mine in New Zealand there was a large calcite vein of good value, but when the calcite vein junctioned with the quartz both veins lost their gold values, and no payable vein was again found.

In gas producer practice the fuel bed should not be operated at a temperature higher than 1,300 degrees C. High temperatures induce clinkering and in other respects lower the efficiency of the producer.

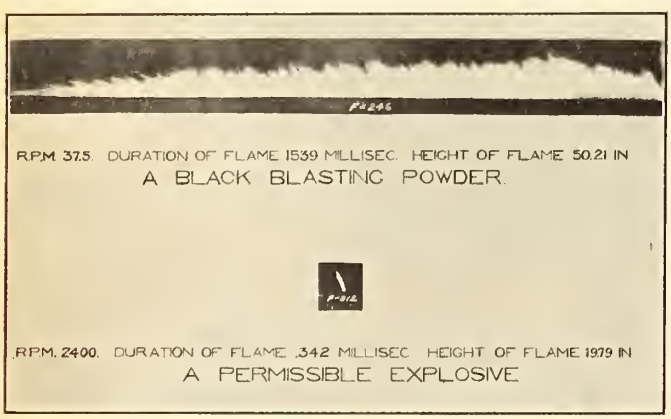
An Account of the National Mine Safety Demonstration, held in Pittsburg, October, 30th and 31st, 1911

(Editorial Correspondenee.)

At the invitation of the Director of the United States Bureau of Mines the Canadian Mining Journal sent a representative to witness the First National Safety Demonstration held in Pittsburg on October 30th and 31st.

The whole city was "en fete," not on account of the Demonstration, but because the last day of October had been chosen as the date on which to celebrate the centennial of steam-navigation on the Monongahela and Allegheny rivers. This, fortunately, made it possible for President Taft to honour both the Demonstration and the Centennial.

Proceedings began at 9 a.m., on Monday, at the Bureau of Mines buildings in the Arsenal grounds, 40th and Butler Streets. Addresses of welcome, brief and to the point, were delivered by the Hon. Walter L. Fisher, Secretary of the Interior, Dr. J. A. Holmes, Director of the Bureau; and Governor John K. Tener. The Hon. Mr. Fisher referred to the notable work of the Bureau and promised to see to it that new buildings and equipment be furnished. Governor Tener, a fine specimen of manhood, spoke for the State of Pennsylvania. Dr. Holmes proffered a general welcome.


R.P.M. 37.5. DURATION OF FLAME 1539 MILLISEC. HEIGHT OF FLAME 50.21 IN
A BLACK BLASTING POWDER.
R.P.M. 2400. DURATION OF FLAME .342 MILLISEC. HEIGHT OF FLAME 1979 IN
A PERMISSIBLE EXPLOSIVE

The morning audience, numbering perhaps 4,000, was made up of miners, operators, foremen, officials, and delegates from other States. Canada sent half-a-dozen or more representatives.

Continuous demonstrations were shown in the chemical and physieal laboratories, in the boiler room, the fuel laboratory, the petroleum laboratory, the gas laboratory, and the explosives laboratory. The experiments included the sampling of gas, the breaking of incandescent lamps in an explosive mixture of gas and air, the smokeless combustion of low-grade, high-volatile fuel using mechanical stokers, the exhibition of apparatus for testing explosives, the briquetting of various fuels, the ignition of coal dust, and many other incidental tests. The gallery explosion of coal dust, using first a permissible explosive and then black powder was the feature of the morning. The ballistic pendulum, a device adapted from an antiquated piece of ordnance, was spectacular. Several rescue and Red Cross cars were on a siding and were examined by the visitors. The crowd, separated into several continuous streams, moved continuously through each building and section. The marked courtesy and the unfailing patienee of Dr. Holmes and his staff made it possible for nearly all of us to get a complete view of the buildings and apparatus.

At 2 p.m. on Monday the whole concourse was taken out to the Experimental Mine at Bruceton, about 12 miles outside of Pittsburgh. Here the mine, whieh consists of two specially constructed converging tunnels, had been prepared for a large-scale explosion. One pound of coal dust per linear foot had been distributed on scantlings. Electric connections were laid, and after the crowd had walked through the mine, the lights were removed, and the first eharge of permissible was fired. No coal dust explosion followed. Owing to a defect in the connections, the second experiment, in which black powder was employed, was not brought off until 5.45 p.m. Rain was falling and daylight had failed. Most of the crowd had moved down to the railway traek about 400 yards from the entries. Even there the detonation that followed was almost overpowering. Vast tongues of flame issued from both portals. No more vivid and appalling illustration of what a mine explosion means could be imagined. Words cannot convey the magnitude, force, and magnifieence of the phenomenon—therefore more words shall not be employed. It suffices to say that all of us were impressed beyond possible expectations.

To give a clearer idea of the plan of the mine I append here a few notes from the official programme:—

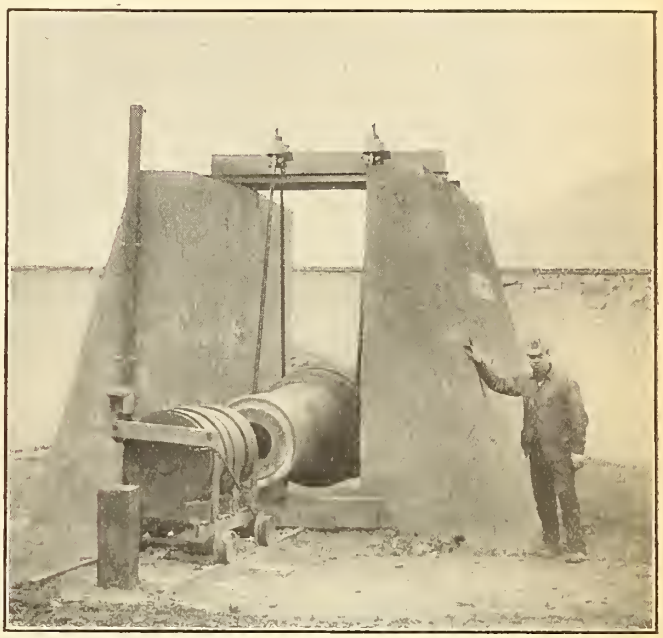
"The Experimental Mine of the Bureau of Mines is situated near Bruceton, Pa., on the Wheeling branch of the Baltimore & Ohio Railroad and is in the Pittsburgh seam, which at this point outcrops on the side of a hill about one hundred feet above the railroad.

"Object—The mine was opened primarily in order to study the phenomena of dust and gas explosions and to test various methods of preventing and checking explosions in progress under actual mine conditions, which requires repeated explosions under varied conditions.

"Plan.—The arrangement of the part of the mine which will be used for the explosion of Oetober 30th is indicated on the map shown on opposite page. An outside steel gallery is of one-half inch boiler plate, 102 feet long and 6 feet 4 inches in diameter, is connected by a 20-foot movable steel section and a 20-foot concrete explosion-door section to a slant entry. This entry intersects the east entry or aircourse 192 feet from the end of the explosion door section. The entire slant entry, 70 feet of the aircourse, and 169 feet of the main entry are lined with reinforced concrete. Heavily reinforced concrete portals are built at the mouths of the gallery slant and main entry.

"Explosion Data.—One surface and four underground instrument chambers have now been constructed. The wires from the instruments in these stations pass through pipes behind the concrete lining to recording instruments in the observatory. Pressure var-

Apparatus for photographing the length of flame of an explosive.



Ballistic Pendulum

iations at the stations and velocity readings are taken by these instruments in conjunction with those at the observatory. Gas samples are taken by special devices at the instrument station.

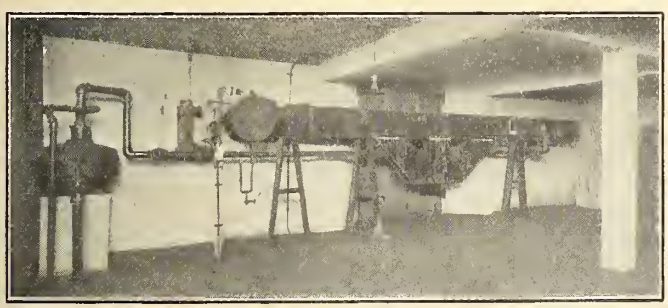
"Explosion Conditions.—The mine is prepared for the explosions by placing coal dust on the floor of the steel gallery and on wooden shelves along the sides of the entries, which is exploded by firing a charge of black blasting powder (representing a blown-out shot) into the steel gallery.

"Gas Samples.—Afterwards the entry doors are closed and men in oxygen helmets enter the mine through a slide door in the main entry door, to take gas samples, extinguish incipient fires and inspect the condition of the roof. Later, when conditions are safe, the fan is started and the mine cleared of afterdamp. Should it be necessary, timbermen then enter the mine to remove loose pieces of hanging rock and place temporary timbers. Afterwards records are made of the effects of the explosion.

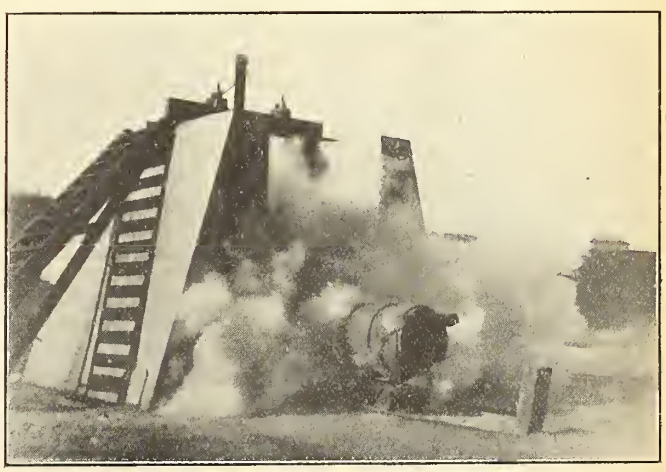
"Inspection.—On October 30th experienced mining men among the visitors will be permitted to inspect the mine before and after the explosion, when it has been put in good condition."

At sharp 9 o'clock on Tuesday morning a large crowd began to pour into Forbes Field, a baseball park opposite the Hotel Schenley. The capacious 3-storey steel grandstand was fairly filled. At the opposite side of the field was placed a large steel explosion gallery, from which battery wires were strung to the President's box in the stand. From 9 o'clock until 10.30 o'clock the time was occupied with exhibition and competitive tests between 40 First-aid squads of six men each. Ten "problems," covering burns, wounds, gas poisonoing, and electric shock were performed. Each team carried its own equipment. Coal companies from all over the United States were represented. The men were all miners, specially trained and chosen by local elimination trials.

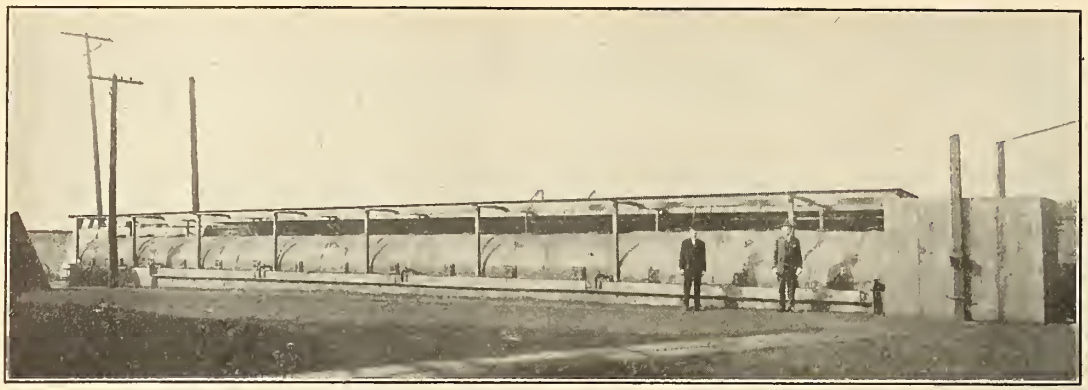
At 10.40 a.m., one-half pound of 40 per cent. nitroglycerine, tamped with one pound of dry fire clay, was fired into the steel gallery. Only a dull concussion was heard, and no explosion of dust resulted. Twenty minutes later, a corresponding charge of FFF black powder, tamped with dry fire clay, was fired. The 150 pounds of coal dust that had been distributed through the gallery exploded with deafening effect. A flame many feet in length shot from the gallery mouth.



Gallery for testing safety lamps in the presence of gas.



Ballistic Pendulum in action.



Steel Gallery in which Coal Dust experiments are made.

An explosion of coal dust in the steel gallery.

A few minutes later, while volumes of dense brown fumes were still billowing from the gallery, a rescue party, equipped with various types of breathing apparatus, entered the gallery and effected the rescue of two dummies. Several squads of reseuers then performed a series of evolutions before the President.

One interesting experiment was conducted earlier in the morning. Mr. G. A. Burrell, an officer of the Bureau, entered a glass box, the atmosphere of which contained 0.25 per cent. of carbon monoxide (white damp). He took with him three eanaries. While the gas had no effeet upon the experimenter, all three of the birds began at once to show signs of distress. After a few minutes they collapsed. Mr. Burrell stayed in the box for some minutes further. Later the birds were all revived by the application of oxygen.

At 11.30 a.m., President Taft presented the trophies. Speeches were made by Governor Tener, Hon. Mr. Fisher, and Miss Mabel Boardman. Miss Boardman represented the American Red Cross Soeiety.

To the visitor it was a slight shock to hear Governor Tener declare that all the anthracite coal in the world came from Pennsylvania. Similarly it was a souree of surprise when the Secretary of the Interior asserted that the United States led the world in mine safety work. This is so beside the mark as to need no comment.

* * * *

Too much praise eannot be bestowed on Direetor Holmes and his efficient lieutenants Messrs. Paul, Shields, Hall, Feehan, and Clement. The limited time at their disposal made it obligatory to crowd into one day and a half, events that could easily have been spread over a week. It was necessary, also, for the sake of impressing gatherings that numbered from two thousand to fifteen thousand, to make the demonstration spectacular. And it was speetacular. The whole effeet was impressive, educative, and inspiring.

The JOURNAL hopes that when our own Mines Branch Testing Station is eompleted some such public exhibition can be arranged.

First Aid to the injured—bandaging for injury to jaw.

Interior rescue room Bureau of Mines Station.

On the Mica Deposits of Ontario and Quebec.

Hugh S. de Schmid, M.E.*

The summer season of 1910 was devoted to an examination of the principal mica regions of Ontario and Quebec; with the object of gathering material for a revised edition of the monograph on mica, issued by the Mines Branch in 1905.

While the chief purpose of the tour was to examine and report upon the mica deposits at present being worked, time was also devoted to an examination of old mines, with the object of collecting geological data bearing on the origin of the mica, and of compiling as complete a map as possible of the localities in which the mineral has been found to exist in commercial quantities. While it was found impracticable to visit every small surface pit from which mica has, in the past, been taken, all available information regarding such was collected, and will be embodied in the full report.

Quebec.

Since the original monograph was published in 1905, new amber mica occurrences have been located and worked in Quebec, north of the districts covered by Mr. Cirkel's report, and it would appear that the mica-bearing region extends considerably north even of the area which had already been prospected.

In the Lievre River district, the most northerly workings are situated a few miles from Notre Dame de Laus, in the township of Bigelow, where Mr. W. Parker, of Buckingham, has carried on considerable surface work, and discovered extensive deposits of mica on range V, lot 52. The mica is a rather dark amber, and of only medium splitting quality.

In the Gatineau region the mineral has been mined as far north as range II, lot 28, of the township of Egan, where Mr. Joanis, of Maniwaki, has taken out several thousand dollars worth of fair amber mica.

Prospectors were met with in the vicinity of Pemichangau Lake, who reported favourable indications on ranges V. and VII. of the township of Blake.

The most westerly mica deposits which have as yet been worked in the area under consideration are situated in Litchfield and Huddersfield townships, where Messrs. Bowling Bros., of Thornby, and the Calumet Mica Co., of Bryson, have carried on some surface work.

It may be remarked that the mica bearing dykes (pyroxenites) are to be found cutting the Laurentian rocks throughout almost the entire district situated immediately north of Ottawa and the Ottawa River, and over an area of which the boundaries to the north, east, and west are as yet but poorly defined. The presence of these pyroxenite dykes, while indicative always of a possible occurrence of mica, does not necessarily imply the existence of a commercially valuable deposit. In some districts mica in quantity is to be found in pockets throughout the entire mass of such a dyke, while in others but scanty traces of the mineral are to be met with, though the rock, to all appearances, is identical in both places.

Owing to its occurrence in such sporadic fashion, mica is among the most uncertain, and, from a miner's point of view, one of the most disappointing of minerals to follow. Often when the indications of a continuance in depth of the deposit are most favourable, the fissures narrow down, and all traces of the mica are lost; on the other hand, seemingly barren rock will suddenly yield large quantities of high-grade crystals, which, however, may form only an isolated group, and be underlain by many feet of rock before mica is again met.

While it is not intended to assert that mica in quantity exists on every lot in the region between the Lievre and Gatineau rivers, the district is nevertheless so extensively traversed by pyroxenite dykes exhibiting traces of the mineral that the possible existence of deposits on almost any lot cannot be said to be precluded.

In addition to the localities mentioned, mica also occurs farther to the east, in Argenteuil county, Wentworth township, where several operators have mined on a small scale. The mica in the last-named district, as in the Saguenay region, Berthier County, still farther to the west, is chiefly of the muscovite variety.

Ontario.

The mica-mining region of Ontario has not been extended by any new discoveries of importance since the publication of the last report.

The chief centres of mining activity are Sydenham and Micaville, in the townships of Loughborough and North Burgess, respectively. In the former district, the General Electric Company's mine — the old Smith and Lacey — still remains the chief producer, and employs an average staff of 35 men. The output and reserves of this mine play an important role in fixing the market price of the mineral, and the General Electric Company, which carries on its mining operations under the name of the Loughborough Mining Company, can be said to practically control the market.

The above company also owns various other mines in different parts of the country, chief among which are the Cantin mine, on lot 1, range IV., of South Burgess township; the Hanlon mine, on lot 11, range VI., of North Burgess; and the Chaibec mine, on lot 7, range A, of the township of Wright (Quebec). None of the latter mines were working when visited.

The occurrence of a yellowish, and rather brittle mica, whose composition and exact species have not yet been determined, in a highly metamorphosed rock in the Sydenham district, may be mentioned here as constituting a type of mica deposit in many respects dissimilar to the majority of occurrences visited. The deposit in question is at present being worked by Mr. J. Richardson, of Kingston, with an average staff of half a dozen men, and is situated on lot 1, range X., of the township of Loughborough.

The intrusive rock to which the mica probably owes its origin had not, at the time of my visit, been met with—the depth reached by the workings not exceeding 60 feet. The mica appears to have been deposited by pneumatolytic emanations from the igneous intrusion of some basic rock which did not reach the surface, but which will probably be met with at an inconsiderable depth.

Three beds, from 1 to 2 feet thick, of a reddish quartzite, are met with in the workings. These layers

*Abstract from Summary Report of the Mines Branch, Ottawa.

contain no mica, and the rock in their immediate proximity is also practically devoid of the mineral.

The source of the mica is, in all probability, a basic laccolite.

A similar mica is also found on lot 5, range II., of Bedford township, this occurrence being almost identical with the foregoing. In this case, however, the country rock is limestone, belonging to the Archæan formation, and is of the normal white, coarsely crystalline type.

The association with the mica of secondary minerals such as vesuvianite, actinolite, garnet, etc., at both the above-mentioned mines, is interesting, and will be further described in the full report.

Qualities of Mica.

With the exception of some half dozen, all the mines and prospects visited, numbering over 200, were concerned with phlogopite, or amber mica deposits. The colour of the mica was found to range from almost black, in which case the resemblance to biotite was very close, to almost colourless; the very dark and the very light-coloured varieties being, as a rule, the poorest splitters.

The suitability of mica for electrical purposes depends essentially on two factors: (1) its degree of cleavage, and (2) its non-conducting properties. Consumers of the mineral seem to vary in their opinions, some preferring a relatively dark mica of medium splitting quality, while others refuse to take any but the light-coloured variety — on account of its apparent freedom from iron — though its cleavage may be much inferior to that of the dark-coloured.

Brittleness also is an important consideration with consumers, this being a fault which affects both the dark and the light micas.

With the advent, however, of mica-board manufacturing, brittleness has ceased to prove such a detrimental factor, since even the most brittle mica is sufficiently flexible in very thin layers (½ to 1 mil.) to be used in the building up of mica plate.

Some manufacturers use both dark and light amber mica, and mix in a certain proportion of Indian white mica (muscovite) the resulting plate possessing, it is claimed, all the qualities necessary to the manufacture of electrical appliances.

Status of the Mica Industry.

The condition of the mica market, though inclined to show a slightly better tendency, towards the latter part of 1910, has not conduced to any great activity on the part of operators during the past few years. Some few of the larger owners are continuing to work, but practically all the smaller mines are idle.

A peculiar feature is, that while in the Quebec mica districts mining was declared to be unprofitable under present mining conditions, operators in Ontario, while admitting that prices were low, yet contrived to find a satisfactory enough market to enable them to continue working their properties, and even to consider the reopening of mines which have been idle for some years. The cause of this divergence of opinion is difficult to arrive at, since wages and general mining expenses are, if anything, lower in Quebec than in Ontario.

Owing to this inactivity amongst mica-miners, fully 80 per cent. of the mines visited were found to be idle, and the pits more or less full of water, and consequently inaccessible.

Although in the past, Canadian producers have, for the most part, seemed to be content with the market provided by the United States, shipments are now being made in increasing quantity to English consumers, and inquiries were often made during the past season as to names and addresses of buyers in the United Kingdom.

While appreciating the superiority of Canadian amber mica for electrical purposes, English and Continental manufacturers nevertheless still procure the greater part of the mica they require from India.

Subjoined are tables showing the amount of mica imported into the United Kingdom during the past five years from Canada and India respectively, and also the imports of Canadian mica into the United States for the same period.

TABLE 1.

Exports of Mica from Canada to Great Britain.*

Calendar Year.	Tons.	Value.	Average Value per ton.
1905	179	$25,717	$143.07
1906	167	58,735	351.71
1907	80	43,913	548.91
1908	156	81,050	519.55
1909	30	24,316	810.53

*Compiled from Mines Branch statistics.

TABLE 2.

Imports of Mica into Great Britain from Canada.*

Calendar Year.	Tons.	Value.	Average Value per ton.
1905	130	$24,349	$187.30
1906	209	51,618	246.98
1907	88	51,497	585.19
1908	122	74,362	609.52
1909	34	30,749	904.38

*Compiled from British Board of Trade Returns, 1910.

TABLE 3.

Imports of Mica into the United Kingdom from India.*

Calendar Year.	Tons.	Value.	Average Value per ton.
1905	901	$369,506	$384.50
1906	1,845	782,397	423.15
1907	1,778	672,532	378.25
1908	1,369	415,773	303.71
1909	1,302	480,042	368.69

*Compiled from British Board of Trade Returns, 1910.

TABLE 4.

Imports of Mica into the United States from Canada.*

Calendar Year.	Tons.	Value.	Average Value per Ton.
1905	253	$121,560	$480.47
1906	539	328,991	610.35
1907	767	596,321	777.47
1908	172	140,166	814.92
1909	107	132,941	796.05

*The Foreign Commerce and Navigation of the United States.

It will be seen that in 1905—the year in which the greatest quantity of mica during the quinquennial period in question was shipped from Canada to English consumers—this quantity was exceeded by the Indian shipments by more than five times; while in 1909,

the Canadian mica imports were only one forty-third of the Indian.

A comparison of Tables 2 and 4, showing the average value per ton of the mica shipped to the United States and of that sent to English buyers, discloses a rather remarkable difference of price; in one case (1905) the latter would appear to have paid $336.80 per ton more for their mica than the Americans, while in 1909 the reverse is the case, the prices being in favour of the English consumers by $14.48 per ton.

The accurate average price is not, however, claimed to be shown in the above tables; in fact, the figures given in the British Board of Trade returns, show discrepshown in the above tables; in fact the figures given ments published by Canadian shippers amounting in one year (1906) to as much as $104.73; the average price per ton, calculated from the British Board of Trade returns, being $246.98; while the figure arrived at from the statements furnished to the Mines Branch statistical department was $351.71.

A comparison of the figures given in Tables 1 and 2 will show how greatly these two sources of information vary in their statements both as regards tonnage and value.

The cause of the wide difference in value of the English and American shipments, given in the two tables —differences which render any sort of comparison futile—is probably to be found in the various grades of mica shipped to the different countries.

Shippers, being bound by no compulsory system of classification or grading other than may be agreed upon between themselves and the buyers, may, in one instance, forward a consignment of more or less roughly trimmed mica of comparatively low unit value, while to another purchaser only high-grade sheets are sent, the difference in value of equal weight shipments being accordingly very great, while both consignments would be similarly classed in the Trade Returns as "mica," without distinction as to quality.

It is worthy of remark that, while the yearly average unit value of the Indian mica imported into the United Kingdom in the five years shows a maximum variation of $119.44, that of the Canadian mica similarly imported reaches the high figure of $691.97 (mean value calculated from Tables 1 and 2).

The comparatively small difference in the case of the Indian mica is doubtless due to the standard quality of the mineral, which varies little in colour and general character (elasticity, brittleness, etc.) whereas the amber mica possesses all these attributes in greatly varying degree—its price varying accordingly.

It is due to the fact that the Indian mica can always be depended upon to be of the same standard quality, that buyers in the United Kingdom have generally preferred this variety to the amber, which can seldom be relied upon, even in a single shipment, to be of uniform grade and colour.

Canadian producers, while realizing this, yet appear reluctant to fall in with the wishes of the English market, and cannot agree to the request of prospective purchasers in the United Kingdom to furnish shipments which are uniform in quality with samples submitted by them.

There can be no doubt that, could a satisfactory system of sorting be devised and agreed upon amongst mica dealers, the market relations and conditions between Canada and Great Britain would be materially improved.

For the purpose of further emphasizing the discrepancy between tables calculated from returns furnished by shippers on the one hand and by Foreign Trade returns on the other, an additional table (5), of exports of Canadian mica to the United States, is given: the figures here given are taken from "Trade and Navigation."

TABLE 5.

Exports of Mica from Canada to the United States.*

Calendar Year.	Tons.	Value	Average Value per Ton.
1905	351	$150,767	$429.62
1906	735	519,479	706.77
1907	468	372,798	796.58
1908	132	115,005	871.25
1909	325	229,689	706.74

*Trade and Navigation.

The following table (6) gives the total annual production of mica in Canada for the same period:—

TABLE 6.

Total Annual Production of Mica in Canada.*

Calendar Year.	Tons.	Value.
1905	...	$178,235
1906	574	303,913
1907	774	312,599
1908	436	139,871
1909	369	147,782

*Mines Branch returns.

The fact that, in some cases, the total annual production falls short of the combined exports to Great Britain and to the United States for the year, is due to the practice made by some producers of accumulating large stocks of mica: these reserves, in many cases, remain on the mine, and so do not figure in the production returns.

*At the present time, large quantities of mica are being held in reserve, which owners are not disposed to ship at current prices.

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*Editorial Note:—Since this report was written the market has become much stronger. It is now decidedly active.

TREATMENT OF ELECTROLYTIC MUD.

The mud is washed free from sulphate of copper, slowly dried in steel trays and then heated to a dull red to get rid of the tallow and alter the mechanical conditions of the graphite with which the starting sheets were originally coated. Before the practice of heating the mud was adopted in electrolytic refining in Australia, says Mr. G. H. Blackmore, it was found impossible to get the copper out of the mud except after days of boiling with sulphuric acid, and even then as much as 40 per cent. of it remained in the residue.

QUARTZ IN TUBE MILLS.

Quartz from the mine is now largely used in tube mills. It is an effective grinder, but does not make a good lining. In feeding a mixture of quartz and pebbles, the pebbles make up the lining, whilst the quartz stays in the charge, so that the advantages of both materials are gained.

An Address on the Past, Present and Future of Copper

Delivered before the American Mining Congress, Chicago, on Wednesday, Oct. 25, 1911, by Horace J. Stevens

The Past.

The great copper industry of the present day is a thing of small beginnings. One century ago, in the year 1811, the world's production of copper was a trifle under 10,000 long tons, an amount smaller than was secured last year by any one of more than twenty different mines. During the present year the great Anaconda mine, of Butte, has produced, during nearly every month, as much copper as was supplied by all the mines of the world, in the entire year of 1811.

Fifty years ago, in 1861, the world's output of copper was but a trifle more than 100,000,000 pounds, a production that was exceeded, in 1910, by the Anaconda, American Smelters Securities Co., and Phelps, Dodge & Co. The production of the year 1900, the last of the nineteenth century, was just fifty times as great as that of the year 1800. Should the same ratio of increase be maintained during the twentieth century, the output of the year A. D. 2000 would be 24,318,150 long tons of copper, twenty-five times as much as the present production, and even a fifty-fold increase for the twentieth century would allow an average increase of less than four per cent., while the average annual increase, for the decade beginning 1900 and ending 1910, was almost exactly seven per cent., compounded yearly. Those who foresee a complete collapse in the copper industry would do well to give consideration to the actual figures of increase during the past. The copper industry does not move forward at even an approximately steady rate from year to year, but is given to advancing by great leaps, almost inevitably followed by periods of quiescence, or even of actual retrogression. High prices for the metal stimulate production, while curtailing consumption, and, as a direct consequence, output is increased, which decreases prices, which in turn brings about decreased production, due to the inability of small and weak producers to stand the strain of low prices. Decreased production again brings about high prices, and the cycle is begun anew. Much the same conditions existed in the American iron and steel industry for 50 years, until the formation of the United States Steel Corporation, which, while unable to prevent periods of depression, as its sponsors fondly hoped, has proven a wonderfully steadying factor in the iron and steel market, serving the purpose of a gigantic balance-wheel.

Growth.

The growth of the copper industry is best shown by the following figures of the world's production, by decades, in long tons: 91,000 tons in the decade ending 1810; 96,000 tons in 1820; 135,000 tons in 1830; 218,000 tons in 1840; 291,000 tons in 1850; 507,000 tons in 1860; 900,000 tons in 1870; 1,189,000 tons in 1880; 2,373,000 tons in 1890; 3,708,000 tons in 1900; 7,390,000 tons in 1910. The influence of the electrical industry upon the consumption of copper is plainly shown by the figures since 1880. The production of the seventh decade of the nineteenth century was only 900,000 long tons, or a trifle less than ten times the output of the first decade of the century, while the production of the last decade of the century, ending 1900, was more than forty times the output of the first decade, and was more than four times as great as that of the decade ending in 1870, only thirty years before. The output of the decade ending 1910 was more than six times as great as the output of the decade ending in 1880, and was almost exactly double the production of the previous decade ending in 1900. The production of copper by the world, amounting to approximately 7,390,000 long tons, for the decade ending 1910, amounted to more than three-fourths of the total world's production of copper for the entire preceding century.

Figures of production and consumption of any given commodity in universal use may differ from year to year, according to whether a surplus is accumulated, or a preceding surplus is drawn upon, but over long-term periods, production and consumption necessarily are the same, and, figured by decades, it is safe to say that the figures of production are practically the figures of consumption. At present there is a copper surplus, of which much is heard, but to show how comparatively unimportant the present surplus is, when compared with the figures of output for the preceding decade, it may be stated that the world's surplus of copper at the present time is slightly less than 300,000,000 pounds of finished metal, or a trifle under 135,000 long tons, an amount less than 5½ per cent. of the total production of the decade, and equivalent to only about eight weeks' supply of copper, at the present time measuring the supply either by productive capacity or by consumptive demand.

Very exact figures are available regarding production, dividends, costs and metal prices of the mines of the Lake Superior district since the first production was secured, in the year 1845, the total output for that year having been only 24,880 pounds of finished copper. The total production of fine copper by Lake Superior mines from 1845 to 1910, inclusive, a period of sixty-six years, or two-thirds of a century, was 5,122,478,402 pounds, having a gross value of $726,849,840, from which were paid dividends of $182,824,770, the ratio of dividends to gross values for this entire period amounting to 25.1 per cent., and dividends, divided by copper production, show average dividend payments of 3.56 cents per pound. The average price received from all Lake Superior copper for this period of sixty-six years was 14.19 cents per pound, which, after deduction of dividends, leaves an estimated cost of 10.63 cents per pound for all years. By adding the figures of expenditures on unproductive mines, amounting to about $60,000,000, the cost of Lake Superior copper would be made almost 11½ cents per pound, and by adding a further $15,000,000 for assessments on mines that have since repaid in dividends the original assessments, the cost of copper would be made about 11.85 cents per pound, leaving a net margin of profit for the entire production of almost exactly two

cents per pound, plus the present aggregate value of the various active mines.

Omitting the production of mines that have not proven profitable, the average cost of Lake Superior copper, yielded by dividend-paying mines, has averaged about 9.5 cents per pound for all years, and the present cost of making copper by all of the producing Lake Superior mines probably is slightly above nine cents per pound. The actual cost of making copper in the leading producing fields probably is between nine and ten cents per pound at the present time. Some of the newer fields, which are skimming their cream, show lower costs, but it is difficult to see where the world will be able to produce its copper in years to come at an average cost materially under ten cents per pound, this figure excluding the limited production of badly planned and badly managed mines, which yield only a small fraction of the total copper output, but secure their metal at an average cost very much higher than the average cost of all mines.

For the immediate future, the supply of copper in sight is fully adequate, and no unduly high prices need be anticipated, but the figures clearly foreshadow another boom period, within the next two to four years, at which time the alarmists will be as badly scared, for fear that the copper supply is petering out, as they now are for fear that the production is so much greater than consumption that nothing but permanent disaster is in sight. Allowing an average increase of consumption of 7 per cent. yearly, the figure that has ruled during the first nine years of the present century, the world's requirements of copper will amount to approximately 1,650,000 long tons in 1920; 2,975,000 long tons in 1930, and 5,350,000 long tons in 1940—the latter named year, now only 29 years ahead, calling for a copper output almost six times that of the present rate. Twenty-nine years ago, or in the year 1882, the world's production of copper was 181,622 tons, or about one-fifth of the present output. Allowing for even a five-fold expansion during the next three decades to correspond with the five-fold expansion in the three decades past, the world's copper requirements in 1840 will be more than 4,500,000 long tons. Should the ratio of increased production and consumption remain at an average of seven per cent. for the balance of this century, the world would yield and consume in the year A. D. 2000, about 175,000,000 long tons of copper, a quantity of the red metal more than double the tonnage of the world's present production of iron and steel.

THE FIRST DECADE OF THE TWENTIETH CENTURY.

A survey of the progress made by the copper industry during the first decade of the twentieth century, now lacking only a few weeks of completion, shows no revolutionary changes, but does show steady and in some cases phenomenal progress, in nearly every division of the industry. In the matter of mines, the old districts of Butte and Lake Superior remain the largest producers, but Arizona, with a half-dozen important copper fields, passed Montana in output in 1908, though again taking second place in 1909. In copper mining, the most important development of the decade has been the making of the so-called porphyry mines, in which disseminated copper sulphides are mined from schistose or porphyritic country rocks. The development of such important new producers as the Utah Copper, Nevada Consolidated, Miami and others of this class, has alarmed many people, who jump to the conclusion that the so-called porphyry mines must close down the older mines, developed on veins in Butte and other camps, and on the stratified trap beds of Lake Superior. There is no real occasion for this alarm, as the porphyry mines, while highly important, are not apt to be developed in large numbers. In fact, the entire western part of the United States has been scoured, by the keenest and strongest aggregations of capital in the copper business, for promising country-rock deposits, with a net result to date rather insignificant in the number of properties developed, though highly important in output secured already, and even more important in promise for future production. When the Mesaba iron range was opened, eighteen years ago, a similar wave of pessimism swept over the mine-owners of the older iron ranges in Michigan and Wisconsin, but time has proven that the high-grade ores of the Mesaba, capable of being mined by steam-shovel, at wonderfully low costs, are absolutely necessary in furnishing an adequate supply of ore to the iron and steel works of this country, and similarly it will be found, as time passes, that the production of the porphyry mines is absolutely essential in supplying the copper needed by the world at anything like a fair figure to the consumer. Processes of actual ore extraction have been modified and improved in many fields, with a resultant increase in safety to miners and decrease in cost of ore extraction. The steam-shovel has come to stay in copper mining.

Strange to say, copper mines, which are vitally interested in extending the use of copper, were somewhat slow in adopting electric power, but rapid progress has been made in this direction during the past decade, and all of the mines of Butte are now electrified, while there has been a great increase in the use of electric energy in the Lake Superior district. The constantly increasing use of hydro-electric power is now restrained, and further restraints are threatened by the conservationists. The newly adopted system at the Anaconda mine, in Butte, which combines the utilization of hydraulic, electric and pneumatic power, offers great possibilities of pliancy and economy, and the lead of the Anaconda is likely to be followed by many other important mines.

In ore reduction, material progress has been made in concentration, the very general adoption of Wilfley tables and similar devices permitting the saving of fines previously wasted. Hydraulic classifiers, settling tanks and a variety of ingenious devices for the saving of the uttermost mineral values, have aided in this work, and are now found in most important mills. Slimes, previously wasted, are now carefully collected in slum-ponds and reworked; with an aggregate yearly extraction of many millions of pounds of copper formerly wasted.

Perhaps the most striking progress made during the past decade, in any division of the copper industry has been in smelting. No new principles have been adopted in either reverberatory or blast-furnace work, but reverberatories of a gigantic size hitherto unknown have been adopted at many plants, while even more striking progress has been made in the capacity of blast-furnaces. Ten years ago, a 300-ton blast-furnaee was considered exceptionally large, and near the possible maximum size, but the Washoe works of the Anaconda Copper Mining Co., again blazing the way, now have two furnaces, each 56 inches by 51 feet in size, with a maximum daily smelting capacity of 1,800 tons each, and a third furnace that is 56 inches wide and 87 feet long at the

tuyeres, this mammoth furnace actually having smelted 3,100 tons within 24 hours. It has been my privilege to see this great blast-furnace with smelting in progress at the western end, while the eastern end was frozen, and repairs in progress within the bosh.

The past decade has been a further extension of the electrolytic process of refining, and the great bulk of the world's copper now is refined by elcetrolysis. In fact, very little finished copper, other than electrolytic, reaches the market, except from the Lake Superior mines, the product of which commands a premium by reason of its extra toughness and superior adaptibility to drawing and stamping. With depth, many of the Lake Superior mines have shown a marked increase in arsenic, and for this reason a considerable part of the Lake Superior copper now is refined electrolytically, and sold as electrolytic and not as Lake copper.

Combines and Mergers.

At various times in the past efforts have been made at copper corners, but these have proven uniformly unsuccessful. The first copper corner was by the Associated Smelters, of Swansea, and might be termed the original copper trust. The Associated Smelters, which flourished from 1840 to 1860, were arbitrary in their operations, buying cheaply, selling dearly, and zealously guarding their smelting processes. As a result of the very short-sighted policy of screwing prices of ore and matte to the lowest possible figures, while selling the finished product at the highest possible prices, with the ore producers aggravated by arbitrary charges for draftage and moisture, and the further grievance of unfair assay methods, the mine-owners were led to build independent smelters at and near the mines, in most of the principal copper-producing districts, these effectually destroying the power of the Associated Smelters of Swansea as the arbiter of the copper industry.

The second attempt at a copper corner was made by the Société des Metaux, of Paris, under the leadership of M. Secretan, the Société des Metaux becoming, in February, 1887, one of the sixteen underwriters that organized the Syndicat Secretan, with a nominal capitalization of $13,587,000. This syndicate contracted with the leading copper producers for their output, and speedily advanced the price of the metal to 17¾ cents, effecting an increase of more than 50 per cent. in price within one month. Consumption immediately declined to a low figure, and the Secretan Syndicate borrowed enormous sums to carry its rapidly accumulating copper from French, German, and English banking houses, the Comptoir d'Escompte of Paris alone lending the enormous sum of $33,368,000 to the Syndicat Secretan. This corner broke early in 1889, after about eighteen months' existence, and in a single day, in the spring of 1889, the price of copper dropped from £70 down to £35 per long ton. About four years were required to clean up the wreckage remaining from this ill-advised corner, and put the copper industry soundly on its feet again.

The third attempt at a copper corner was made in February, 1889, by the organization of the Amalgamated Copper Co., which corporation maintained the price of copper, arbitrarily, at 17 cents per pound, until October, 1901, when an accumulation of 200,000,000 pounds of metal compelled a break that took the price of copper down to about 12 cents per pound, and about three years were required by the industry to recover from the effects of this corner.

The price of 26¼ cents per pound, reached in March, 1907, by Lake copper, was not the result of any corner, but came about through an ill-advised scramble by consumers, who feared that they could not secure the metal. As a result of the high price, consumption was curtailed sharply, in all directions, as happens inevitably under such unsatisfactory price conditions, and the copper industry of the world still suffers from the existence of a surplus of slightly under 300,000,000 pounds of metal, remaining from a surplus that, including both visible and invisible supplies, reached about 450,000,000 pounds at the end of 1909, since which time there has been a small but steady decrease in surplus from month to month.

The tendency in copper mining, as in all other branches of industry, is toward combination in ever-larger units. This tendency is based upon and governed by purely economic laws, and the laws of political economy are so much stronger than any law ever devised by a parliament, or any ukase ever promulgated by a deposit, that it requires no spirit of propheey to foreeast the ultimate outeome of the present clash between the laws of political economy and the laws of congress.

In the copper industry the great bulk of production now is furnished by about a dozen different interests. The Amalgamated Copper Co. has a productive capacity of about 300,000,000 pounds yearly, with an actual output last year of 223,808,546 pounds. The American Smelting & Refining Co., or Guggenheim interests, have a productive capacity only slightly inferior to the Amalgamated, with an actual output of 174,150,000 pounds in 1910, which figure will be exceeded materially this year. The production of Phelps, Dodge & Co. was 116,888,070 pounds in 1910, while smelter production, including custom ores treated, was 138,805,562 pounds, and the sales agency of this firm handled 194,138,696 pounds of copper last year. The Calumet & Hcela, with its subsidiaries, has a productive capacity of nearly or quite 150,000,000 pounds yearly. The Rothschild interests, controlling the Rio-Tinto of Spain, and the Boléo of Mexico, have a eopper output of more than 100,000,000 pounds yearly.

The leading copper producers of the world are now operating under check, a 10 per cent. reduction in output having been put into effect in August of last year. Under the Sherman Anti-Trust law, this checking of production would be considered criminal, if it could be proven, yet the reduction of output was absolutely necessary in order to save the eopper industry from a prolonged period of utter demoralization, during which scores of millions of dollars would have been lost by investors, and a quarter-million or more of working men would have suffered severely, many of them losing their jobs, and the remainder suffering severe cuts in wages. We have the authority of eminent statesmen, totally devoid of business experience, that the Sherman Act is a panacea for all ills of the body politic, yet no sensible business man would do otherwise, if he had the power than to reduce production, at a time when a surplus product threatened not only the small remaining profits but the very foundations of the copper industry. The issue thus is drawn very plainly between our present politico-criminal law, and all the laws of business and of political eeonomy.

Business and Politics.

I have no connection, direct or indircet, with any copper mining company or eopper producer, except that, in

a general way, I have small business dealings with a great majority of the actual copper producers of this and foreign countries, hence I speak without personal prejudice, and not as the mouthpiece of any individual copper interest.

The greatest present menace to the copper industry in the United States is a menace that is common to all branches of mining. The entire American industry of mining is threatened by men operating under the names of progress and reform, whose slogan is conservation, but who are political economists of the Stone Age, and first cousins, in mental capacity, to the Troglodytes. The conservation experts of the forest service are systematically hampering legitimate mining operations throughout the Western States, and both law and justice are disregarded by these conservationists, while the federal departments affected are governed more by rulings than by law. Congress has made the very grave and dangerous mistake of endowing the executive departments of our Government with the power to promulgate rulings that have the force of law, and in some of the departments rulings have been put into effect that not only are arbitrary and unjust, but that also are absolutely illegal, yet the poor miner, who has complied with all the requirements of the law, is liable to see his property, to which he is clearly entitled, both by law and justice, taken from him by the officials of the forestry service, under the slightest pretext, and is denied access to or recourse by the courts. The most odious forms of despotism can show nothing worse, in this particular, than the hideous imposition under which honest miners are suffering in the Western States of our country.

ANACONDA AND THE GUGGENHEIMS.

The conservationists, many of whom might, with greater truth, be termed conversationists, would close the Washoe Works of Montana, the greater reduction plant in the world, with a monthly output valued at millions of dollars, employing thousands of men, and indirectly giving employment to tens of thousands of men, under the childish plea that the smelter fumes are injuring timber on the federal forest reserves—timber that, in a pinch, might furnish fairly good lodge-poles for Indian tepees.

The Guggenheims are the bogey-men with which the conservationists most frequently alarm the public. We have had it dinned into our ears, by innumerable patriots seeking office, and repeatedly set before our eyes, in every yellow newspaper and muckraking magazine, that "the Guggenheims are stealing Alaska." As a matter of fact, the Guggenheims control a copper mine in the interior of Alaska, that is a wonder in its way, yet which cannot be rated at more than a third-class property. The mine, the Bonanza, is a sort of copper-plated gold-brick, in that an interior core of limestone is surrounded by phenomenally high-grade bornite and copper glance. No competent mining man who has visited this property ever has estimated the amount of ore in sight, and safely to be inferred, as capable of yielding more than 100,000,000 pounds of finished copper, a total production equivalent to only one year's maximum output by any one of the six leading copper mines of the world. In order to get this ore out of a wilderness, the Guggenheim interests have built the Copper River & Northwestern Railway, a line of 195 miles length, variously estimated to have cost from $13,000,000 to $25,000,000. The gross value of all the copper contained in the Bonanza mine, taking the outside estimate of tonnage, is considerably less than the lowest estimate of cost of this railway, and the net profits derivable from the Bonanza mine, cannot, by the most liberal figuring, be estimated at more than $4,000,000 to $5,000,000. Instead of being commended for their enterprise and courage in building this railway through an Arctic wilderness, the Guggenheims are held up to public scorn as thieves and robbers. This railway cuts through workable beds of coal, but is prohibited, by the federal authorities, from developing or using this coal, and is compelled to import inferior coal from British Columbia at a cost more than double that of domestic coal if its mining were permitted. Not only does the railway suffer from this arbitrary action by the Federal Government, but the 50,000 unfortunate American citizens who live in Alaska are compelled to pay double or triple the price they should pay for fuel, through the efforts of the conservationists, backed by the Federal Government, to "save" the coal for some future use, at an indefinite date. It scarcely seems strange, in the light of this situation, that mourning was donned in Alaska when the High Priest of conservation reached that land, which the conservationists seem to consider a sort of penal colony. The conservation of our mineral, timber and power resources should be effected along legal and business lines, and not under the guidance of spiritualistic visions.

The reformers, as these gentlemen term themselves, are advocating the Government building and operation of railways in Alaska, and the Government ownership and operation of coal mines, which is state socialism pure and simple, and any man seriously advocating such a policy is a socialist, no matter what he may choose to call himself. It is further advocated, by the junior senator from Wisconsin, and his official and unofficial organs, that the Government also should buy the Copper River and Northwestern Railway from the Guggenheims. Doubtless the Guggenheims will be very glad indeed to sell their railway, which is threatened by tidal floods and glacial floods, with its principal bridge across the Copper River threatened by a glacier itself, but it is difficult to see where the long-suffering taxpayer will benefit by such a purchase.

The Federal Government already has withdrawn immense tracts of oil, coal and phosphate lands, and the next step in this cleverly devised socialistic propaganda will be to withdraw from entry, or inhibit mineral entries upon iron, copper, lead, zinc, silver and gold lands.

The pretext for past withdrawals is that our mineral resources are being depleted so rapidly that there is danger of their extinction, in the near future, unless administered by an all-wise and all-powerful central government, which can make no mistake, and can do no wrong. The figures regarding our natural resources, put forth apparently in earnest, by some of the leading conservationists, are so utterly ridiculous that it is impossible to regard them seriously. There is more iron ore existing in a single county, in my own State of Michigan, than any professional conservationist ever has estimated to exist in the entire world. This is made as a plain statement of fact, and those who think to the contrary are challenged to impeach the assertion.

The lawless actions of the forestry bureau, which is perhaps the most odious of our bureaucratic iniquities, have been of a sort to arouse the alarm of all thinking men who believe in self-government. Apparently it is the cunningly devised scheme of the leaders of the so-called conservation movement, to expropriate the public

lands, now held by the Federal Government in trust for the benefit of any and all citizens who will develop them, and hold these public lands for the sole benefit of the bureaucrats, who will enjoy the usufruct, through a carefully-planned system of leases, by which the water-power, forests, mines and arable lands will be leased, to corporations that are amenable to the benevolent control of the doctrinaires, and to individuals who can be terrorized to conform to the exactions of the bureaucracy. The opportunities for graft that are contained in such a system are almost inconceivably great, and comparing their claims with their actions, the conclusion is irresistible that the conservation movement, as now managed, is not a genuine effort to improve the condition of the American people, but a cleverly devised scheme to deprive the people of their landed heritage, and fix upon their necks the iron collars of serfdom, to the end that a more gorgeous and richly endowed bureaucracy may flourish upon the soil of what once was a free country.

It is said, and apparently with reason, that the spy system of the United States is now the finest and most extensive in the world, excelling even those of Russia and Turkey, heretofore the most progressive nations, in the matter of thoroughly organized espionage. We also have the benevolent activities of an attorney-general who is now vigorously prosecuting the kindling-wood trust. It is obvious that the shaving-paper combine and the office-towel monopoly had better watch out, for their turn may come next. Why does not the attorney-general prosecute the labour unions, which are trusts in the meaning of the Interstate Commerce law, existing in open defiance of the beneficent provisions of the Sherman Act? The answer seems obvious. The present activities of the United States Department of Justice, as it is termed, officially, afford a spectacle for gods and men.

Business throughout the United States is suffering from uncertainty—which has been accentuated, rather than decreased, by the recent decisions of the Supreme Court, which read into the Sherman Act a provision that only "unreasonable" restraint of trade should be punishable, under the terms of this Act. As Richard Olney justly remarked, this leaves the Sherman law about as clear as if Congress were to pass a law stating that only a "reasonable" tariff should be imposed, and leave the adjustment of all duties to the Supreme Court of the United States.

This nation has been made great and prosperous by the initiative and enterprise of the individual, yet the theorists bid us throw aside the habits and course of conduct of centuries, and depend solely upon the initiative—God save the mark—of the bureaucrats. Why not speak out boldly, what all sensible and patriotic citizens are thinking, throughout this country? We are suffering from a most odious form of bureaucracy, fortified by an extensive system of paid spies, an organized claque, a clever press bureau, and the systematic support of that section of the press noted mainly for its dubious motives and devious politics. Some citizens with defective hearing take the clamor of this portion of the press, desirous of cheaper wood pulp, for the real voice of the nation. It is time that the yellow newspapers, muckraking magazines and purely political conservationists were told to stand aside, and permit the Federal Government to be run, once more, in accordance with law and common-sense. Some of the gentlemen who are preaching progress and conservation, have combined moral platitudes with business turpitude, and label their product as reform. In the name of progress they bid us turn our faces to the rear; in the name of conservation of our natural resources, for generations yet unborn, they forbid us to utilize the mineral, power and timber resources required for the needs of the present generation. Their plan of state ownership of mines and water-powers is state socialism, very thinly disguised. These men are enemies of the republic, who, under the specious cloak of declamatory patriotism, would rob us of our right to self-government.

Our worthy President takes the stand that because the Sherman Act is law it must be enforced rigidly, regardless of consequences. If this be the case, it necessarily follows that all federal laws must be rigidly enforced, regardless of consequences, and it would be interesting to learn why our Federal Government does not enforce, or even attempt to enforce, the fifteenth amendment to the Constitution of the United States, which reads as follows: "The right of citizens of the United States to vote shall not be denied or abridged by the United States, or by any State, on account of race, colour or previous condition of servitude." Is it possible that the Sherman Act takes precedence of the Constitution?

The Slocan District of British Columbia

The condition of the mining industry of the Slocan district of British Columbia may be stated to be more promising now than for ten or more years past. This situation is not due to the prevailing prices of silver, lead, and zinc, which are the chief metals produced in the district, for yearly average market prices have been low for several years. Rather is the prospective early return to prosperity in several of the mining camps of the district due largely to results of deep-level development, these having shown that ore occurs at such depth as to assure the permanent and profitable working of some of its mines for a number of years, thereby encouraging the expenditure of much money in doing development work on a scale not previously carried out.

The notes that follow, while by no means fully descriptive of progress made and results being achieved, will serve to in some measure convey an idea of the advance made during recent years, and to indicate grounds for the confidence felt for the future of the silver-lead-zinc mining industry of the Slocan. The various mines are dealt with generally in the succession in which they occur, going easterly from Slocan Lake.

STANDARD SILVER-LEAD COMPANY.

This company continues to make good progress with the development and equipment of its Standard mine, situated in Four-mile camp, near Slocan Lake. The water supply system has been completed, the compressor

installed, and started supplying air for machine drills in the mine, the concentrating mill completed and connection made with the water line for power purposes, and the aerial tramway given its preliminary run, conveying ore from mine to mill.

In the mine, the chief work of late has been the further development of No. 6 tunnel, which is 190 feet, vertical depth, below No. 5. In this adit zinc ore was encountered at about 1,800 feet from the portal; this continued for nearly 100 feet, when lead ore was met with. The tunnel was driven another 200 feet ahead, when it cut 8 feet of zinc ore, which was drifted on both ways for a short distance. Driving beyond this vein is still in progress.

From the 1,900-ft. point in the tunnel a turn was made to the left, following the lead ore. At 200 feet from the main tunnel the vein is about 12 feet wide, the first-class ore varying from 3 to 8 feet in width, the remainder being concentrating ore. The question of whether or not this shoot of ore is the downward continuation of the ore body occurring in No. 5 has not yet been determined. Later a raise from No. 6 to No. 5 will prove whether it is or not.

Work in the mine is now being done with machine drills instead of hand, as heretofore, consequently much greater progress is being made in doing development work.

SILVERTON MINES, LTD.

The development of No. 7 level of the Hewitt-Lorna Doone group is being continued. As far as it has been driven it has passed through three ore shoots. This adit is now in about 900 feet, and it has developed much ore, nearly all high-grade, and some of it very rich. Raises are being driven between Nos. 6 and 5 and Nos. 5 and 4. The distance between levels is 110 feet, vertical height, so that these raises will give 220 feet of connection between Nos. 4 and 6. A raise has already been made between Nos. 7 and 6, and another is being made between an intermediate (above No. 7) and No. 6. When the raises above No. 6 shall have been completed they will be used for passing ore down to that level, at the portal of which is situated the upper terminal of the aerial tramway from the mine to the Wakefield mill, and this will admit of doing away with the "baby" tramway from No. 4 down to No. 6.

No ore is being stoped at this mine, for the ore bins at both mine and mill are quite full, awaiting the completion of some repairs and renewals at the mill, prior to having another mill run. There is on hand more than 1,000 tons of clean picked milling ore—that is, with the high-grade ore sorted out for shipment to the smelter, and the waste picked out so as to leave the mill feed of a suitable grade for milling purposes.

Experimental runs have been made with the unit of the Elmore Vacuum plant recently put in at the mill, and it is understood that results have been encouraging. Some necessary adjustments of mill machinery have lately been made, preliminary to giving the Elmore process a further trial. The probabilities seem to be that the process will be found effective for the recovery of the zinc content of ore of the character usually treated at this mill.

VAN-ROI MINING COMPANY.

This company's concentrating mill is treating 125 to 130 tons of ore a day, and is producing two kinds of concentrates, namely, silver-lead and silver-zinc. The tonnage of ore milled this year to date is nearly 25,000 tons. The mill is new, having been completed only last March, since the middle of which month it has been steadily operated.

Orebodies are being developed on three levels of the mine—those of both the main vein and the Beryl vein, which had opened later. It is expected that ore production will be well maintained from both veins, and that the year's output of ore and metals will be satisfactory.

MINES NEAR NEW DENVER.

The several mines already mentioned, while nearer to Silverton, are also within easy reach of New Denver. There are others in the near vicinity of the latter town, among them the Mollie Hughes and Apex, which are still being worked, and the Sweetgrass, California, and others that were operated earlier in the year, though at present inactive.

Mollie Hughes.—Negotiations were carried on by Vancouver men for some time with a view to acquirement of this mine, the quartz veins in which contain gold and silver. So far as information was received, though, no definite arrangements have yet been made to carry out this proposed transfer of the property. Meanwhile it has been worked on a small scale, and some ore has been extracted and shipped to the smelter at Trail.

Apex.—The Apex is situated on Silver Mountain, about a mile and a half from New Denver, opposite New Denver Canyon. Six men are taking out and sacking ore for shipment, and they have one carload ready. The vein has been stripped for 257 feet, and it shows ore stated to be of shipping grade, about 18 inches in width, along that length. The ore is what is known as "dry" ore, with fair-sized bunches of silver-lead ore intermixed. As yet the vein has not been proved deeper than 30 feet. An ore-house and blacksmith shop have been built, and men are now employed in erecting a house for the accommodation of miners and their helpers, of whom 10 to 12 in all will be working here through the winter. The Apex is owned by a company that some time since acquired this property with the Sunset above Cody, and other mining interests of the late George Hughes, one of the pioneers of the Slocan district.

Other Mines.—It is probable several other mines in the neighbourhood of New Denver were worked during the year, but no information was obtained concerning them during the brief time at disposal in that locality.

IDAHO-ALAMO GROUP.

About four miles up Carpenter Creek from New Denver, and rather more than a mile below Three Forks, the Alamo concentrator is to be seen, situated close alongside the Nakusp and Slocan Railway, from Nakusp on Arrow Lake, around by Rosebery, on the upper part of Slocan Lake, and thence by New Denver Canyon and Three Forks to Sandon. The disused concentrating plant and the ruins of an aerial tramway are standing monuments of the profitless expenditure of a large amount of money obtained from Great Britain and spent by a well-known English mining engineer, of whose management local miners have not a very high opinion.

It is stated that $80,000 worth of ore was taken from one part of the Idaho mine, and that without reaching a depth of more than 40 feet. The statement was not verified, but is here given simply for what it is worth. However, this much is fact—that the property is now

under lease and bond to Thomas Avison, of New Denver, who is taking out ore on a small scale, and is confident he has a mine that will again come into prominence among the shipping mines of the district.

SLOCAN STAR MINES.

A commencement has been made to drive the long, deep-level tunnel at the Slocan Star mine, as recommended by Mr. A. G. Larson, M.E., of Vancouver, B.C. The organization and incorporation of the new company, formed for the purpose of acquiring the Slocan Star and Rabbit Paw groups of claims, situated near Sandon, was effected in October, and work under the new auspices commenced about the beginning of November. Mr. Oscar V. White, who has long been superintendent for the Byron N. White Company, hitherto operating the Slocan Star group, remains in charge of operations on the consolidated property.

Beside commencing to drive the long tunnel, the work of retimbering the old workings, fixing up the stopes ready for the extraction of ore, etc. (in the ground, concerning which there was litigation that extended over years), has been taken in hand. Later an ore pocket will be put in below the new tunnel, and picking tables placed between that bin and the concentrating mill. It is expected that ore stoping in the older parts of the mines will be commenced early in the New Year, and that thereafter production will be resumed of both picked crude ore, for shipment to the smeltery, and of mill feed, for concentrating.

SEVERAL MORE SANDON MINES.

Beside the Slocan Star-Rabbit Paw group, there are the Ruth-Hope, Byron N. White, Richmond-Eureka, and Payne groups of claims, all in the vicinity of Sandon, though the last named is more than a mile away from that town, which is already benefitting, and will continue to do so in increasing degree, from the resumption of work on the Slocan Star and Payne mines after years of idleness on both.

Hope.—No recent particulars have yet been obtained concerning the Hope, but it is known development work is being continuously done in this mine, and sufficient ore is being extracted and shipped to provide for the payment of about 15 men employed.

Richmond-Eureka.—The Byron N. White property, formerly a part of the Slocan Star group, has not been worked lately, operations having been suspended last spring. But the Richmond-Eureka, which has been developing some of the same veins as occur in the Byron N. White group, has steadily continued both development and mining silver-lead ore for shipment to the smeltery at Trail. Latterly production has been on a smaller scale than some time ago, but the Consolidated M. and S. Co., owning this property, is continuing exploration for other shoots of ore, which it is expected will be opened when development shall have been sufficiently advanced.

Payne.—The deep-level development work to be done on the Payne is regarded as of great importance to the district, for if successful it will prove one more addition to the accumulating evidence that the ore shoots in the Slocan district live down to much greater depth than had previously been believed. Further, the fact that this important work is to be under the direction of Mr. W. E. Zwicky, of Kaslo, manager of the Rambler-Cariboo, on which property he did the pioneer deep-level exploratory work in the district (undertaken on his strong recommendation), induces confidence that if the Payne ore bodies continue to greater depth than has yet been explored in this mine, they will probably be found by Mr. Zwicky. It is intended to drive a cross-cut tunnel about 3,300 feet, starting from the Sandon side of the Payne Mountain, and cutting the vein at about 675 feet below the old No. 8 level of the Payne mine. Mr. George Clark is foreman, with 8 or 9 men under him. Camp buildings are being erected preliminary to commencing tunnel-driving.

RECO MINE, CODY.

Prospects are bright once again for the Reco mine, situated above Cody, Slocan. About 18 months ago driving No. 11 tunnel was commenced, thus to explore virgin ground. Only a small working was engaged, and these men have driven 630 feet, the last 180 feet having been in ore. Air being bad, they went back about 130 feet and commenced raising, to make connection through to No. 9, which they had already extended about 200 feet, to get beyond the orcshoot opened in No. 11.. The raise will be 89 feet, vertical height, and about 110 feet on the incline. At 30 feet up there was between 18 and 24 inches of solid silver-lead ore. When this raise shall have been put through the extraction of ore will be undertaken, and thereafter there should be a good output made, with a prospect of its being maintained over a comparatively long period.

OTHER CODY MINES.

Other mines in the vicinity of Cody that are being worked are the Twilight, Noble Five group, Sunset, and Surprise.

Twilight.—The Twilight is owned by Harris and Kelly, of Sandon. The lower extension of the Reco-Goodenough vein occurs on this property. Last winter two leasers commenced to drive No. 2 adit on an adjoining claim, known as No. 1. At about 175 feet in from the portal the vein was cut, on Twilight ground, and it was drifted on 300 feet, when it was decided to raise to No. 1 adit, the portal of which is on the Slocan Sovereign claim. The vein is well-defined, and for 180 feet has been about 4 feet in width, but so far the good ore in it has been but a small paystreak, ranging generally from 2 to 4 inches, though once it widened to 18 inches. There have been three different parties of leasers working here, and several small shipments of ore have been made. A site has been surveyed for opening No. 3 adit at a vertical depth of about 100 feet below No. 2. Quartz. indicating the presence of the vein, has already been found in a creek. It is proposed to commence work on this new adit next spring.

Sunset.—On the Sunset, which has been opened on both the Cody and McGuigan basin sides of the mountain, No. 8 tunnel is now in about 1,300 feet. Ventilation being insufficient for the miners to continue driving a raise is being made in the vein to the surface, a distance of 100 feet, for air. This raise was started at 40 feet back from the face of the adit. It is intended to continue working here throughout the winter; supplies to last until spring will be taken up to the mine before the snow shall become too deep for the pack train to reach the camp. No pay ore has yet been found on this level, only iron and zinc oxides. It will require the adit to be driven 300 feet farther to get under the long ore shoot already mined in levels higher up the

mountain. That shoot was 300 feet in length, and confidence is felt that it will also be found in No. 8, and of similar length.

Surprise.—The work of making the long raise from the 1,100-ft. level of the Surprise through to the bottom of the old workings, a distance of about 830 feet, approaches completion. It is expected connection will be made about the end of the year, after which work will probably be suspended until next spring, conditions being unfavourable for getting in supplies in the depth of winter. This raise is the longest in the Slocan district, and the work of making it has been tedious and extended over a lengthy period. However, Mr. Alex. Smith, who has persisted, notwithstanding that he has had many discouraging experiences in carrying on the work, has the satisfaction of knowing that the raise has passed through the best shoot of ore yet opened in this mine, and one that promises to give him and his partner good returns after the requisite provision for ventilation shall have been made. The deep level from which the raise has been made is an extension of one of the Last Chance tunnels, which was driven first in Last Chance ground, then through part of the Noble Five group property, and finally into the Surprise.

Noble Five Group.—An intended visit to the Noble Five was not made, owing to a heavy snowfall having taken place on the day the walk from Sandon was to have been undertaken. However, this much was ascertained two months ago, namely, that development work on the Deadman claim of the Noble Five group had resulted in the discovery of a shoot of silver-lead ore of excellent grade, not previously opened, and of a body of clean zinc ore of a percentage high enough to allow of this ore being shipped crude to the smeltery. It would appear, therefore, that in common with other mines in Cody camp, the Noble Five may be expected to again become a producer on a comparatively important scale.

THE RAMBLER-CARIBOO GROUP.

There have been between 40 and 50 men working all the summer and autumn on the property of the Rambler-Cariboo Mines, Ltd., situated in McGuigan Basin, which used to have its outlet at a point on the Kaslo & Slocan Railway, about equidistant between Whitewater and Sandon. Developments in the Rambler-Cariboo mine in recent years have done much to restore confidence in the mining industry of the Slocan district and to encourage mine-owners to undertake deep-level exploration. Since the big adit—it is nearly seven-eighths of a mile in length—was driven five or six years ago, and the old workings thereby drained, much development work has been done below the 800-ft. level, which was the lowest in the mine prior to driving the 1,400-ft. level. Gradually the downward continuation of the ore shoots has been demonstrated, until now it has been proved that the highest-grade ore yet found in quantity in the mine occurs on the 1,200-ft. level. Three ore shoots have been opened in the vein on this level, which has been driven 450 feet south from the main raise. The shipping ore in the first of these does not occur to as large a width as that in the second. The vein is big, in places up to 10 feet between the walls, but the ore in the first shoot is not nearly so wide as in the second, in the former ranging from 8 inches to 2 feet, while in the latter it runs from 1 foot to 5 feet of clean ore, with 2 to 3 feet of milling ore as well. No stoping has yet been done on either the 900 or 1,200-ft. level, but about 10 feet of ore has been stoped on the 1,000-ft. level. Shipment of ore to the smeltery has been delayed by the state of the wagon road to Three Forks, the upper part having latterly been a snow road and the lower only suitable for hauling on wheels. Now that snow has fallen low down the valley ore-hauling to the railway will be undertaken. If the weather proves favourable for teaming, some 150 to 200 tons of first-class ore will, it is expected, be shipped to Trail during the latter half of November and in December. When the mine was visited on November 11, there was 50 to 60 tons of ore in the ore-house waiting for the snow to fall to allow of shipment. The erection of an aerial tramway down to the railway, and the building of a new concentrating mill alongside the track will be undertaken next spring. The machinery and equipment of the old mill will be used in the new building, for which purpose it will be taken from the old mill building, situated high up the mountain, to the new mill site, on Seaton Creek, at a distance of about 6,700 feet down the mountain side from the portal of the 1,400-ft. adit level.

Extension Group.—The Rambler-Cariboo Extension property consists of a small group of claims situated in the vicinity of the Rambler-Cariboo group. These were formerly known as the Adams claims. They are being developed from the main adit of the Rambler-Cariboo, from which a drift has been run on a vein cut by that level. Work was commenced by the Extension Company on October 1. It is intended to drift right through the property. The drift at this level will give a depth of about 550 feet.

Rio.—The Rio is at the head of the McGuigan Basin, about a mile from the old Rambler-Cariboo mill. The vein was cut by a cross-cut tunnel at 480 feet from its portal. Two shoots of ore have been found in the drift, but this level will have to be extended about 100 feet before it will be under the big showing occurring 150 feet above. Work is to be continued throughout the winter, for which purpose the necessary machinery has been taken up to the mine.

The Washington, situated on the Payne Mountain side of the basin, was worked by a few men during the first half of the year, but not latterly.

LUCKY JIM ZINC MINES.

No. 6 level of the Lucky Jim mine, near Bear Lake, Slocan, has been driven 1,134 feet. At 1,009 feet from the portal the lime dike was entered, but no zinc has yet been cut on this level in the lime, although the tunnel was advanced 125 feet in this rock. Drifting on the footwall of the lime dike is now being proceeded with, the expectation being that the ore will be found along this side of the dike. Two shifts of men are at work, and about 4 feet per day is being driven.

There is much ore available for stoping above No. 5 level, but none will be extracted until after the provision of railway transportation facilities, now in hand by the construction by the C. P. R. of a spur from the Nakusp and Slocan Railway, leaving this line at a point about one mile above Three Forks. Much of the grading has already been done, and Camp No. 3, within a mile of the Lucky Jim mine, is being established.

IN WHITEWATER CAMP.

Notwithstanding that in the summer of 1910 forest fire destroyed the concentrating mill at the Whitewater mine, and much else of the surface plant and buildings, Mr. John L. Retallack and his associates in this mining

enterprise, have prosecuted development work with renewed energy, chiefly in the deep of the mines, and, in small measure, in the upper part of the property.

Formerly there were two companies engaged in operating this group of mines, namely, the Whitewater and Whitewater Deep, respectively. Then a syndicate leased the Whitewater and part of the Whitewater Deep property. Still later Mr. Retallack organized a company styled The Deep Mine, Limited, and this last-mentioned organization undertook important deep-level development and drove the main level, or No. 14, of the deep of the mines a distance of 2,000 feet. Afterwards raising to No. 10, of the Whitewater Deep, was commenced, with 540 feet on the incline required to be driven to connect these two levels. This raise was up about 100 feet when the last fire disaster, already referred to, compelled a suspension of work for the time being, for not only had the upper part of the mines lost practically all its surface buildings and plant, but the compressor plant of The Deep was badly damaged, the camp destroyed, and all other facilities for continuing work swept away. The crowning loss was that of transportation facilities, for the railway for several miles from Whitewater towards Kaslo was rendered quite useless, bridges and trestles having been burned and the track badly damaged. Eventually, though, communication by wagon road was provided, and materials and mining supplies were sent in, new buildings erected for The Deep Mine, Ltd., the compressor made fit for service, and underground development was resumed. Since then the main rise has been put through from No. 14 to No. 10, connecting with the latter at about 1,500 feet from its portal, and levels Nos. 13, 12, and 11, respectively, have been opened from the raise. These levels have been driven, together with various cross-cuts off them, in search of ore shoots, and this exploratory work is being continued, the object being to have the mine open and in a position to produce ore whenever railway transportation facilities shall again be provided. Meanwhile, ore stoping is being done in the upper mine by the John L. Retallack Co., so that two or three cars of ore may be sent out before deep snow shall make hauling impracticable at the high elevation at which the property is situated. This ore is to be hauled in sleighs to Sproules, and be sent by the Kaslo & Slocan Railway to Kaslo, for shipment thence to the smeltery. Telephone communication between the mine and Kaslo, over a distance of nearly 20 miles, is being established, so this means of communication will be available shortly.

CONCLUDING OBSERVATIONS.

The Slocan district is so extensive and the mining properties scattered over it so numerous that much more space than has been taken by the foregoing notes would be required to cover it exhaustively. There are many mines not now being worked that may be expected to again have attention and their ore deposits be opened. However, ample has been written to show that the district is steadily growing in favour with mining men, possessed of capital for the development work requisite to make accessible the large and valuable mineral resources of the district. Not only are there many mines within the area dealt with, somewhat briefly as regards details of individual properties, in the foregoing survey of the present situation, but there are as well numerous properties in both Ainsworth division, in eastern Slocan, and Slocan City division, in the western part of the district, that are not here noticed.

There is little room for doubt that the district is making satisfactory progress toward a period of productiveness and prosperity in connection with its mining industry altogether beyond what a few years ago would have been regarded as possible. Its progress, if not spectacular, has been substantial, and fortunately thus far almost free from the malign influences of unprincipled promoters desirous only of "mining the public." It is to be hoped that mining on paper only will be sternly discouraged, and the best interests of the district and its mining industry be thereby protected.

THE NOVA SCOTIA MANGANESE COMPANY.

Through the courtesy of Mr. E. A. Saunders, secretary of the Mining Society of Nova Scotia, we are able to publish the accompanying photo. It represents the concentrating mill that has just been completed on the property of the Nova Scotia Manganese Company, Ltd.

The mine is situated in Lunenburg County, about 10 miles from tidewater, and 13 miles from the town of Windsor.

The manganese veins were discovered by Ernest Turner, of Mill Road, Lunenburg County. Associated with him at first were Dr. Henry Kane, Mr. E. N. Dimoek, and others. A joint stock company was recently formed, and the work at present is being conducted in its name.

The main shaft is down 165 feet. To the west a drift has been run for 115 feet. High grade manganese ore averaging 18 inches in width, shows continuously through the drift. Shipments of ore are being made to Trenton, near New Glasgow, where a glass-making establishment is situated.

CANADIAN MINING INSTITUTE.

Porcupine Meeting.

The following notice has been distributed to mining men throughout Cobalt, Porcupine, and Toronto:—

Dear Sir,—Under the direction of the undersigned committee, a branch of the Canadian Mining Institute for Porcupine is being organized, and a general meeting is called for the 16th December, at 8 o'clock p.m. at South Porcupine.

It is proposed at this meeting to elect officers for the year, and to organize the branch in as effective manner as possible. It is proposed to have a standing committee to obtain papers from the members, to arrange for monthly meetings, and to keep up the inter-

st in all ways possible. Rooms will be rented and urnished with magazines, books, maps, writing ma-erial and specimen cabinet.

After the business of the meeting is completed short ddresses will be given by visiting members, and three r four short papers, dealing with sampling and other ubjects of interest in this the initial stage of the de-elopment of the gold camp, will be read.

The meeting will close with a short musical program nd refreshments.

On the day following, the guests and other members who desire, will be shown over the camp. Unique op-portunities will be afforded of seeing the various show-ngs of gold, and an opportunity seldom afforded of comparing the various finds in Porcupine.

We have been fortunate enough to secure the presence of a number of prominent members of the Institute, including Dr. Frank Adams, the president.

We trust that you will find it convenient to be present. Members advising this committee before the 1st of December will be afforded accommodation at the various mines.

Committee:—
C. E. WATSON.
H. C. MEEK.
C. G. CAMPBELL.

Address the Secretary, Box 514, South Porcupine, Ontario.

Stock Value and Mine Value

By DR. A. C. LANE.*

(Continued from last issue).

Class B.—Explorations or failures. Average fluctuation factor 4, rarely under 2.5.—On the other hand, if we take the remaining mines which sold below $10 in 1901, we find that their fluctuation factor is rarely less than 2.5 and averages nearly 4, and that of the seventeen, seven were worth nothing if we compute their value in 1901 from the dividends and assessments since and their selling price at the end of 1910. Of the remainder, in only two was their value (similarly figured) more than the lowest price of the year.

Comparison of prices with worth.—Now what does this difference in range of fluctuation mean? And is this factor 2.5 anything but arbitrary? In order to determine this I have computed as best I might the actual worth of the mines at the date 1901, by discounting at 7 per cent. coming dividends, and their low selling price in December, 1910. This latter was pretty nearly the ratio of price at which those of them that were to go into the Calumet and Hecla merger were to be taken in. I then debited the assessments that have been called in the meantime, and when the amount of the assessments was greater than the positive amount derived above, I have simply written the word "minus" and assumed that the holder refused to pay indefinite assessments. I have given this for the year 1901 rather than 1899, but the deductions I shall draw will be equally applicable to 1899, and the worth will not materially vary except that all the cheaper Class B mines would have been worth at least 14 per cent. less on account of interest, and in some cases about $24 less on account of assessments that were called in 1899 and 1901. But as some of the mines were organized in 1899 it seemed better to compare with a year when they were fairly organized, like 1901.

The lowest prices for 1899 were very much the same as the worths, and this is true for 1901 for the Class A mines. These were seasons of great prosperity and inflated prices. On the other hand, in 1903 and 1904 the worths are still within the range of the prices of the year; rather nearer the top in 1903, but just about half way down in 1904. In other words, the stocks of the first class (A) vary about a 7 per cent. valuation—in boom times yielding a 7 per cent. average only if one buys at the very best prices of the year, and at the higher prices of the year yielding barely 4 per cent. It will be remembered that Lawson, in the days of "Frenzied Finance," used to say that copper stocks were coming to a 4 per cent. basis. On the other hand, in relatively dull times, as in 1903 and 1904, which were after all but "semi-panic years," one could easily obtain the stock on a 7 per cent. basis. If the very best prices of the year could be obtained the yield would be nearer 10 per cent., and at the higher prices of the year the yield would be considerably below 7 per cent.

Meaning og 2.5 fluctuation factor, range from 10 per cent. to 4 per cent. yield. Limitations of activity.—We can now see a possible meaning for value 2.5 as a limit to the fluctuation factor of this Class A. It may mean this, that in Class A the yield is approximately ascertainable in dividends, and when they are forced to such a value that there is only a 4 per cent. yield on them, or anything like it, there are very few who buy an uncertainty yielding no more than a certainty; and that, on the other hand, when they drop to a point where they yield 10 per cent., a lot of people who have private opportunities to invest at 10 per cent. in non-marketable securities, find it now worth while to invest in these stocks which have the added advantage of marketability and yield.

It may then be that this fluctuation factor, 2.5, represents the ratio between the 10 per cent. yield which will draw in the man who has the best opportunity for investment, and the 4 per cent. yield, which even savings banks will give.

Reason for greater speculative value in Class B.—The mines grouped under Class B, selling sometime in the year for less than $10, are usually the explorations and failures. Most of the Michigan mines shares, while the par value is $25, are put on the market marked initially $8 to $10 paid in, representing the land and the cash needed for development up to the point where it is seen whether a mill and heavy equip-

*Professor of Geology, Tufts College.

ment is needed, in which case assessments are called. Consequently these mines will generally represent properties that have not in exploration found anything up to date, or old mines that are worked out or proved failures. If we go back to 1880 we find the same thing true. Very often a mine ultimately successful goes below the initial price at which it is put on, but the majority of those going below $10 have never paid a cent in dividend. Taking the list in June, 1881, the total of the lowest selling prices of Class B was from $37 to $41. The value, judging from their dividends and selling price in 1910, was only something like $12.45. On the other hand, the cost of a share of each of the stocks selling over $10 would be $384 or more, but would be worth discounting on a 7 per cent. basis their future dividends, $581.50. In other words, the yield is more than 7 per cent., and very nearly the 10 per cent. which we have said might be expeeted from unlisted copper stock. This is due to the fact that the Calumet and Hecla are selling on a 7 per eent. basis referred to its current dividend without allowance for the increase which began in 1896. In 1901, though the Class B mines make a better showing (owing solely to the presenee of Trimountain among them, where it did not belong that year, although it went below $10 in 1899), their lowest prices sum up to $67, but their dividend worth was $74.16, of which $19.75 must be assigned to Trimountain. I thought it right to include Trimountain to represent the fact that among these cheaper mines there is an oceasional fair one. It is pretty clear, however, whatever figures one takes, that it is the lowest annual value of these cheaper stocks that is nearest the value measured by yield, and is sometimes a little less than that value, or sometimes greater. That value is given by two or three out of the fifteen or sixteen which will ultimately prove sueeessful.

Clearly then, the increase in the fluctuation factor is very largely due to an increase in range upward, not an increase in range downward. It is an added value given by organized speculation. It is not an added value due to marketability. The higher priced copper stocks have that already. In figuring the worth of the Class B stocks on a 7 per cent. basis I have already allowed for that, if my previous contention that 7 per cent. is a fair yield for a listed copper stock is correct. If we could say that the average value is exactly the mean between the highest and the lowest priees (which it is not) we could say that the fluctuation factor made the stock worth two and one-half times as much as before.

It must be remembered, too, that these stocks are of relatively little worth per share, and the case is something like the difference between a celluloid and an ivory poker chip. The celluloid poker chip would be as useful as the ivory poker chip. The value as chips is not an addition in a given ratio to the value of the raw material of which the chips are made. Therefore, it might not be fair to discuss the "poker chip" or fluctuation value as though it were an addition in a certain ratio to the value of a stock. Indeed, the more expensive stock with less fluctuation costs more to carry to get a given profit by fluctuation. It might be fairer to consider it as the addition of a certain amount to the value of a stock regardless of its value otherwise. An average difference in price from high to low in these smaller stocks would be something like $10 in 1899 to 1901, which were speculative years, whereas, in 1903 and 1904, the amount would be only $4. It might be fairer, then, to say that the value of activity was an addition on the average of $2 to $5 a share to the stock rather than to estimate it as a percentage of the whole cost of a share.

Loss of fluctuation value in consolidation. — This gives us the reason for the considerable protest made by smaller speculative mines like the La Salle, in going into the Calumet and Hecla on the terms proposed. Each share of the cheaper mines was assigned a part of a higher priced share. The prices at the time of merger were thought to be low, though they have been much lower since. Still they were values that were near the lowest for the year 1910. Assuming the ratio was fair enough if based on probable definite returns, but that the consolidation values were close to the low prices for the year, the smaller mines would have been reasonably sure to sell for two and one-half times more, and on the average for four times more, than their consolidation value; while the rise they might obtain in their high-priced share would not be nearly so much. As a matter of fact, however, the prices did not rise during the year 1911 (up to date).

Effect of Struggle for Control on Value in General Slight.

For the effect of the fifth factor, that is struggle for control, I have not been able to derive any average figures. Up to this point, I have been able to analyze fairly satisfactorily (at least to myself) the kind of effect and, to some extent, the amount of effect of various factors and the influence of organized speculation thereon. This last factor I ean not at present isolate.

Buying for control is of two kinds. There is the slow, quiet, unostentatious accumulation when the real purchasers are so far as possible unknown. The effect of this, in as much as the people who are buying for control are generally well informed, might be expected to raise the lower prices rather than to increase higher prices. It is eoneeivable, however, that manipulation of one kind or another might depress prices while buying for control is going on.

The seeond type of buying is seen when a fight is on and a few shares are enough to give control one way or another. The Union Pacific panic price is the standard illustration of this. So far as I can judge in the Miehigan field the highest and lowest prices seem much more closely correlated with other factors than with the struggle for control. It may be that the activity and wide range of prices in Osceola in 1907 was due to the strnggle for control, though the high price for that year is, after all, only capitalizing the dividends of that year at 7 per cent. By this I do not mean to imply that the struggle for control does not have an effect upon priees. It simply implies that the kind of men who struggle for control are ordinarily so well posted in shrewd buying that their struggles hardly affect the annual range of the price. This is where a personal element may enter in the stock market and might not apply in other fields. The management of the Calumet and Hecla have a reputation which leads one to think that they would not put out false rumours to depress a stock that they wished to buy. On the whole, the effect of especial desire should appear in the average price.

Conclusion.

The net result of our essay is this, that organized speculation adds marketability and thus about 50 per cent. to the value of stock; and, in the cheaper

stocks especially, it increases the range of fluctuation and incidentally the average price paid for them, leaving the lowest prices of the year not far from the worth that would be computed for them (from their ultimate return either in depreciation or dividends, on the 7 per cent. basis which holds on the average for listed copper stocks), but raising the highest values so that they are about four times as great as the low and consequently increasing the average value very materially.

Application in Taxation.

There seems to be a curious application of our conclusions to the question of tax assessments, leading to a possible confirmation of them. If, in assessing a mine, it should be deemed fair that various mines should be assessed for taxation upon their yield, present or prospective, without regard to whether their stock was listed or not, or whether the stocks were in small units or large, as being matters which pertained to the stock rather than to the mine; then the value of a mine stock should be discounted by a factor representing the increase of value of the stock due to marketability or fluctuation. I do not say that this is so, but it is at least a curious coincidence that I find in the newspapers the following item: "The Board of Supervisors of Houghton County are said to grade the properties for taxation as follows: For undeveloped properties, 40 per cent. of the stock market value; for properties developed but not yet producing, 50 per cent. thereof; for regular producing and dividend paying mines, 60 per cent. thereof."

Now this 60 per cent. valuation for regular producing and dividend paying mines is about what (quite independently) has been found to be the ratio of a listed and a non-listed security of equal uncertainty. That the stock market value is very much more inflated for the undeveloped properties than the developed, is shown by the lower ratio at which their assessed valuation is taken. In fact, if we assume that the average value of the Class A mines (the average fluctuation factor being 1.6) would be found by multiplying the lowest price by 1.34, and that this will practically be the value on a 7 per cent. basis, of all the copper stocks, of which they make up over 90 per cent in value; and in the same way take the average value of the undeveloped properties as 2.4 times their low values, the ratio would be of the same order as the ratio 60 to 40. This ratio, 60 per cent. to 40 per cent., is merely a shrewd business man's general estimate of the relative value of such properties as compared with the stock market values from a mining man's point of view. But as the Board of Supervisors of Houghton County is to a very large degree composed of the agents and superintendents of the various companies, their estimate is well worthy of consideration.

It will be noticed that J. R. Finlay recently placed the Michigan mines for the State Tax Commission at $69,815,000, although their average earnings, he says, were $8,240,000. This, it will be noticed, is a return of about 11.6 per cent., and as the mines themselves have sold in the stock market in the year 1910, taking the average of the highest and lowest selling price, at $130,365,047, the ratio thus found by the comparison of Finlay's value for taxation with the average selling value is about 54 per cent. Thus his estimate is only 10 per cent. to 20 per cent. less than our conclusions might lead to.

While such discounts from the selling value by assessors have often been considered dishonest (and have unquestionably led to dishonesty) yet so long as the basis of taxation is that of "cash value" (as in Michigan and elsewhere) some such adjustments are inevitable, for, as has been shown, the worth of a mine is often much less than the worth of a share multiplied by the number of shares just as the worth of a number if city lots is very much less than the price per lot multiplied by the number of lots. But it would carry me too far from the theme of this essay to follow this longer. The point to be emphasized is that there inheres in the stock a value created by organized speculation which does not inhere in the mine upon which the stock is based. As to whether all of this should be considered value, depends upon just how value should be defined. Upon this point economists differ, nor do I propose to thresh the question over. Whether the poker chip can be considered to have value in Ruskin's eyes is one question. That it is valuable as an article of commerce is beyond question, and ready marketability at least is a factor which can easily be seen to be of social value. The question of the reality of fluctuation value and of its use to the community as a whole is a more complex one. If such range of fluctuation is necessary in order to get the money with which to develop mining enterprises, which are particularly essential to modern progress, if it is necessary that in grouping together the shares in eight enterprises (of which only one shall be successful), the range of fluctuation must be such that the chances of return are one-quarter of what they should be on the chances of yield alone, such a fluctuation may be socially desirable; but organized speculation is hardly expected to be perfect, and the prospects of "paper" profits in "organizing" and "listing" companies seem excessive compared with those which may be acquired in developing the resources of the lands which serve as a basis for those companies. In fact, I was surprised to find how heavy the chances were against the cheaper copper stocks, and how relatively good a showing the more expensive stocks made. This conclusion is not to be confined to Michigan copper stocks, for it depends on general principles. Try it yourself in some other field. If the average yield of the cheaper stocks could be made to bear the proportion to their mean prices that obtains in the better stocks, so that in purchasing a number one might expect a 7 per cent. yield, although one's chance of success in any one stock might still be very low, it would seem that the money for new enterprises might be more easily gained and fairly rewarded. Greater care in listing may tend to this goal. It is possible that something of this sort is now being done in the tendency of the larger companies to continue as "going concerns," expending a certain amount of their capital in exploration here and there.

CONSOLIDATED GOLD FIELDS OF SOUTH AFRICA.

The directors of the Consolidated Gold Fields of South Africa, Ltd., announce that the realized net profit on the year's operations, which is largely derived from dividends received on investments, after deducting debenture interest and all outgoings, shows a balance to credit of £792,883, from which the dividend on the first preference shares, accrued dividend

on second preference shares, an interim dividend of 2s. per share on the ordinary shares and French Government taxes, have been provided, leaving £487,003, which, added to £79,485 brought forward, leaves £566,488. From this the directors have made provision to the extent of £100,000 for the further writing down of the prices at which investments in the shares of crushing mines stand in the books of the company, leaving £466,488 available for dividend. In addition to the foregoing realized profit, the company's share investments (apart from any appreciation in value on properties and ventures) show, on current market prices, a further large unrealized profit. Investments stand in the books at average cost or under, and all shares are taken into account at prices below those current at the date when the accounts were made up. Certain changes in investments were necessitated by the formation of the Rhodesian and American Development Companies and realizations have taken place in Russian and other assets; otherwise the changes that have taken place in the company's holdings during the past year have not materially affected the general position or the nature of the investments. The directors recommend that a final cash dividend of 15 per cent. and a bonus of 5 per cent., both free of income-tax, be paid on the 2,000,000 ordinary shares, amounting to £400,000, and making, with the interim dividend, 6s. per share for the year, leaving £66,488 to be carried forward.

MODDER'S CIRCULAR SHAFT.

At the meeting of the New Modderfontein Gold Mining Company, held at Johannesburg in September, the chairman made the following remarks regarding the new circular shaft: "The sinking of a new circular shaft, which is another important part of the expansion programme, is proceeding very satisfactorily. The whole of the sinking equipment has been completed, and the shaft has so far been sunk to a depth of 588 feet, at a cost which compares very favourably indeed with the cost of rectangular shafts sunk on these fields. This shaft is being put down at a steady rate and with economy, but we are not attempting to break any records in sinking or to hurry the work unduly. We expect that it should intersect the reef towards the end of next year, which will fit in admirably with our programme. I might add here that your consulting engineer, Mr. Stuart Martin, in recommending the sinking of a circular shaft, had in mind several important points that, in his opinion, make for its advantage over a rectangular shaft. There is first the cost of sinking, which should show a considerable decrease. Then the cost of maintenance should be appreciably lower, as the circular shaft is walled, and there should be, therefore, none of the many troubles with the timbering which we meet with so frequently in rectangular shafts. Further, there are the questions of rapid hauling and ventilation, both of which, it is considered, are facilitated."

Federal Commission to Investigate Mining

Following is an abstract of an article that appeared in the Nelson (B.C.) Daily News on November 22nd:

At one of the largest and most representative mining conventions ever held in British Columbia resolutions were passed here yesterday asking the federal government to appoint a commission to investigate thoroughly the various questions affecting the silver-lead-zinc industry and to create a separate portfolio of mines to be held by a minister who will devote his entire time to the work.

The meeting suggested to the government that the enquiry by the proposed commission might include the questions of a tariff on lead and zinc and the by-products of the two metals; of continuing the lead bounty at the expiration of the grant at present partly disposed of; of the granting of a bounty on zinc and of the offering of some reward to the person or persons inventing a process for the treatment on a commercial scale of the complex low grade ores of the Kootenays. Each of these suggestions found strong advocates at the convention, which was unanimously in favor of some form of protection for the industry.

A committee was appointed to investigate the carious questions affecting the industry in British Columbia. The chairman of this committee is W. E. Zwicky, who will be glad to receive suggestions in writing affecting the industry from all interested in the subject Such communications should be addressed to Kaslo.

Copies of the resolutions passed will be forwarded for an endorsation to the Conservative convention at New Westminster on Friday. As subjects for discussion he suggested the question of the continuance of the lead bounty; the present low duties on lead and zinc; the high United States tariff on the same metals further experiments toward the solution of the zinc problem, and the appointment of a federal commission to enquire into the various questions affecting the industry. He suggested the selection of delegates to present any resolutions which might be passed by the convention.

James Johnstone said that he thought the question of expense should not be considered by the government in carrying on further experiments toward the solution of the zinc problem. If it cost $300,000 or $400,000 it would be a profitable investment. He offered the following resolution:

"In view of the partial success which has attended the work done by Dr. Haanel in Ottawa and Montreal during the past year toward the solution of this most important problem and in view of the fact that the money set aside by the late government for this purpose was insufficient to bring the work to a successful conclusion, this meeting does hereby urge the Dominion government to set aside a sum of not less than $50,000 to be used for this purpose.

"And we do further recommend that an award of $25,000 be offered any individual or company who shall perfect any process on a working commercial basis for the separation of zinc ores as found in the mines of the Slocan and Nelson districts of British Columbia."

E. W. Widdowson seconded the resolution. He thought the prize of $25,000 should be awarded to any person solving the question, whether by a perfected old invention or a new.

Wants Tariff.

C. F. Caldwell thought that the greatest aid to the solution of the zinc problem would be adequate tariff

protection for the industry. By protection only could the permananency of the silver-lead-zinc industry be assured. Under present conditions the Canadian mine owner could not eompete with the American competitor. He expressed an abounding faith in the mines of British Columbia. The lead industry affected every person in the Dominion, he declared. Mr. Caldwell said that he pleaded not for the operating properties, but for the prospects and mines which were idle. He described the present conditions as unhealthy and tending to make the high grade properties pay for the low grade properties, which, he said, could only be operated at a profit by a big smelting company.

"It takes bulldog tenacity and unfaltering courage to make a success of mining. The man who knows how to quit is no good in mining," declared Mr. Caldwell, who sat down amidst applause after urging an enquiry into the question by a commission.

The idea of the late government in making the grant of $50,000, said L. B. Reynolds, was to obtain a knowledge of the research made into the metallurgy of zinc by private companies and inventors, but not made public.

Experiments Should Be Here.

J. P. Farrell said that the conditions of the mines of this district were peculiar to the Kootenays and that any experiments should be earried on in Nelson. Even in the Kootenays there were hundreds of different complications in the ores whieh varied to a remarkable degree frequently in different workings on the same vein. He advocated an adequate tariff on ores from the United States.

Urges Bounty on Zinc.

A. Gordon French told of what had been done in Australia toward the solution of the complex ore question. The problem was one of the most intricate and difficult problems in metallurgy. It was no problem for a student or for an entirely theoretical man. While in Ottawa, said Mr. French, he had been told that both Dr. Haanel and Dr. Ingalls had abandoned the problem.

Efforts to treat sulphide zinc ores with or without lead, by an electric heating process was a physical impossibility, declared Mr. French, who explained in technical terms his reasons for the statement.

With regard to the Nelson zinc plant, which was erected under his supervision, Mr. French said that the zinc was coming off every day. He would not, in any event, leave this country until he had completely solved the question on a eommercial scale.

He advoeated not only a bounty on lead but also a bounty on zinc. He thought there was a good market in Great Britain for all the zinc Canada could produce. Mr. French was not in favor of the offering of a prize by the government for the solution of the problem. If the bounty on zine was given it should be seen that the bounty was proportionately divided between the prospectors and the smelters, who stood at the two ends of the industry. For the next 50 years the market for zinc and zinc pigment in Canada would be a growing one, said Mr. French. Zinc white eould be produced very cheaply in this country. Another industry of importance which would grow out of the zinc industry was the manufaeture of galvanized iron, he said.

The cheapness of electric power for the electrolytic process of zinc treatment was a great advantage offered by Nelson to the prospective builder of zinc plants, Mr. French said.

Oscar V. White spoke of the low price realized under present conditions for zinc.

In reply to a question Mr. French explained that from the silver-lead-zinc ores by his process he obtained the zinc and forwarded the silver-lead residue to a lead smelter. Another product of the process was black manganese di-oxide, an extremely valuable commercial product.

Would Protect Canadian Industry.

I. W. Bingay, explained that some lead products, such as tea paper, red lead, both manufactured products which might be made in Canada, were imported into the Dominion every year. He thought the Canadian manufacturer should be protected. The proportion of a duty on pig lead involved the whole schedule, as the manufacturer who used the raw material must be protected. Whether a tariff would be better than a bounty was a very deep question which should be thoroughly investigated. He advocated the appointment of a strong committee to prepare a case for the proposed federal tariff commission. It was not true that the lead bounty had not proved of benefit to the industry.

T. G. Proctor thought that one of the most important matters to be brought before the federal government was the formation of a department of mines with a minister with a portfolio.

Bonus for Zinc Smelter.

A. J. Becker, as an amendment to Mr. Johnstone's motion, suggested that the government pay a bonus to a local smelter of $10 per ton of spelter produced up to 20,000 tons, or $200,000. The motion was seconded by J. J. Fingland. It was explained that the object of such a grant of $200,000 was to induce efforts to solve the problem. If there were several competitive smelters each was to receive the bonus as each ton of spelter was produced.

Should Sell Lead in Canada.

W. E. Zwicky thought that a protective tariff should be placed on lead and that a bounty be placed on zinc. This bounty, he said, should be divided between the producer and the smelter. Another point was that the Canadian producer should sell in Canada and not in free trade England. He urged that the government be asked to appoint a commission to go into the various questions affecting the industry.

M. Giegerich advocated a bounty on zinc and a tariff on lead.

Mr. Caldwell supported a duty on zinc, in order to build up a Canadian market, instead of a bounty.

C. A. Mackay was in favour of protection for lead and lead by-products. He thought a case should be prepared on general lines and presented to the government asking the appointment of a commission to investigate the questions of bonuses on land and zinc, the tariff and a bonus to encourage efforts toward the solution of the zinc problem.

Suggestions for Government.

I. G. Proctor, who took the chair during the temporary absence of Mr. Starkey, appointed, on the suggestion of H. Giergerich, R. H. Stewart, C. A. Mackay, and A. J. Becker a eommittee to draw up a resolution on general lines on the question. This committee brought down the following resolution, which passed:

"Whereas, there is at present no market available which will allow of the profitable mining and treat-

ment of zinc ores of Canada; therefore, be it resolved that:

"This convention of those interested in the mining of lead-zinc ores in southern British Columbia does strongly urge upon the government of the Dominion of Canada the neeessity for

(1) "The provision of adequate proteetion on zinc and zinc produets which shall lead to the establishment of zinc smelting or refining industries in the Dominion of Canada and enable the producers of zinc ores to market their ores profitably, whether by bounty on the spelter produced or by an adequate duty on zinc and zinc products imported into Canada, or by both;

(2) "That this convention urges that the Dominion government appoint a commission to enquire into the methods best suited to eneourage and proteet the said industry;

(3) "That the committee so appointed should consider the question of bonus or other reward to any individuals or companies who may devise and earry to commereial sueeess works for the reduetion and refining of the low grade zinc-lead ores of this eountry whieh are not at present amendable to the ordinary methods of zinc reduetion;

(4) "That the eommission should eonsider whether it is advisable to assist finaneially any person engaged in the working out of sueh process, provided such an experimental work shall show promise of being successful;

(5) "That eopies of this resolution be forwarded to the Conservative eonvention to be held in New Westminster on November 24; to the honouroable the Minister of Mines at Ottawa, and to Mr. A. S. Goodeve, member for Kootenay."

Investigation Committee.

The following resolutions were also passed:

"Whereas, the present lead bounty has been of very considerable benefit to the lead mining industry; and

"Whereas, said bounty will expire on June 30, 1913; and

"Whereas, the Dominion government has stated its intention to appoint a permanent tariff commission; and

"Whereas, we, the assembled representatives of the mining industry, eonsider it advisable to petition for protection on lead and zinc, either in the shape of duty or bounty;

"Resolved, that this meeting elect a committee of six to investigate the situation, and to bring it to the attenion of this commission; and also o ask the endorsation of the above by the British Columbia Conservative Association whieh meets at New Westminster on 24th November, 1911." This was moved by O V. White, and seconded by James Anderson.

The committee appointed is W. E. Zwieky, O. V. White, A. J. Becker, F. A. Starkey, T. W. Bingay, and R. F. Green.

To Create Portfolio of Mines.

It was moved by W. B. Farris and seeonded by James Johnstone, that the federal government be asked to create a portfolio of mines, the minister to devote his attention entirely to the industry.

A resolution urging the Dominion Government to appoint a eommission to investigate in Kootenay the questions relating to the industry at the earliest possible date was moved by H. Giegerich, and seconded by James Anderson, and carried.

T. G. Proctor moved that the government be requested to inform the public what has been the result of the past year's zinc experiments. The resolution was seconded by W. E. Zwieky, and carried.

Votes of thanks were passed to Mr. Starkey for calling the convention, and to Mr. Beeston for acting as seeretary.

In the month of September last there were 10,341 stamps and 241 tube mills in commission in the Transvaal. The total output of gold was 700,023 ounees, valued at £2,973,511.

At the Robinson Deep mine, on the Rand, the cost of ore broken during the month of August last was 6s. 0.3d. per ton where machines were used, and 6s. 11.5d. per ton with "hammer boys." The stopes ranged from 51.1 inches (handwork), to 59.9 inches (large maehines).

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay: Dominion Coal Outputs, 1911 Season.

The shipping season of 1911 has been a very successful one, and a comparison with previous seasons will show the advance in output capacity which the Coal Company's mines have made. The production for the period between the 1st of May and the 30th of November has been as follows, from 1906 onwards:

May-November, 1906	2,281,884	tons.
May-November, 1907	2,262,850	tons.
May-November, 1908	2,129,944	tons.
May-November, 1909	1,567,043	tons.
May-November, 1910	2,363,970	tons.
May-November, 1911	2,480,000	tons.

The 1911 season shows an average monthly output of 354,000 tons, a figure which is 18,000 tons greater than any previous average obtained during the shipping season.

The shipments to St. Lawrence ports were also larger than ever before, as may be seen from the figures following:

Shipments to Montreal and St. Lawrence ports.

Season 1906	1,126,387	tons.
Season 1907	1,038,500	tons.
Season 1908	1,311,490	tons.
Season 1909	828,446	tons.
Season 1910	1,146,300	tons.
Season 1911	1,420,000	tons.

It will be seen that the St. Lawrence shipments are 110,000 tons greater than 1908, a year which broke all previous records.

ıs the Coal Company's profits depend very largely on the quanity of coal which can be mined and shipped in the season f open navigation, the operations of the season just closing hould have a favourable effect on earnings.

Mr. Richard Kirkby, who has for the last three years filled he position of mining engineer to the Dominion Coal Company, has resigned and returned to his home in Scotland. Previous to Mr. Kirkby's departure the members of the South ape Breton Mining Society tendered him a complimentary ddress, and presented him with a gold watch. It is generally egretted that Mr. Kirkby should have found it necessary, or purely personal reasons, to leave Cape Breton, where he ad proved himself a capable mining engineer and a tactful fficial.

The Baum Wash Plant, which has been under construction t Sydney since the spring, is now well advanced, and all the utside and concrete work is finished. The machinery is on ıe ground, and it is confidently anticipated that the Wash lant will be in full working operation by next June.

The railway branch to the Birch Grove Collieries is completed as far as the site of No. 21 Colliery, and the work of ecting the bankhead is commenced. The electric power transission line is also completed from No. 2 Power House to No. 1 Colliery. Contracts have been let for the building of a umber of miners' and officials' dwellings at Birch Grove, hich it is hoped to complete before the spring.

Over 300 dwellings have been completed this summer at ıe Lingan Collieries, and contracts have been let for additional houses to be ready by the spring. A large hotel is also eing erected by the company, for the accommodation of single en.

pringhill Mines.

Mr. J. R. Sharpe, who was the manager of the Cumberland oal & Railway Company's mines at the time they were abrbed by the Dominion Coal Company, and has since been cting as district superintendent, has resigned his position. Mr. D. Maxwell has been appointed resident superintendent, the ppointment being effective on the 15th November. Mr. Maxell has been manager of several of the Coal Company's ines, and has recently acted as assistant to the mining engier. It is understood that Mr. Sharpe has taken a position the States.

ort au Port, Newfoundland.

A large amount of work is now being done by the Dominion on & Steel Company at their new limestone property in ort au Port Bay, Newfoundland. It is expected to have a lly equipped and producing quarry at Port An Port for next eason's limestone requirements. The Steel Company's conmption of limestone is very rapidly growing.

ational Safety Field Day at Pittsburg.

The National Safety Field Day at Pittsburg on the 30th of ctober, appears to have been an unqualified success. The perintendent of the Dominion Coal Company's Rescue Staon was present, and reports that representatives from all over e North American continent were gathered from points as stant as Seattle and the Canadian West, Alabama, and the olated coalfield of Cape Breton. Every courtesy appears to ve been shown by the officials of the U. S. Bureau of Mines the Canadian visitors, and no restrictions were placed on e information available. The explosion of the experimental ine at Bruceton by black powder fired into coal dust was out as convincing a demonstration of the possibilities of a st explosion as one could wish to see, and if it struck a holesome terror into those persons who deny the possibility dust explosions without the presence of gas, it will have served a useful purpose. It is said the mine before the explosion was so humid as to be almost at the saturation point, but nevertheless the explosion took place. The Mines Bureau, it is understood, are going to issue an account of the experiments conducted in the form of a Miners' Circular, which will be well worth reading. The publications of the U. S. Bureau of Mines now form a valuable series of reports and monographs, which, thanks to the courtesy of the U. S. Government, can be obtained by any Canadian who desires to use them.

Dr. Shields, the genial and energetic head of the Red Cross work in the U. S. mining districts, was also very ready to devote his time to giving information to the Canadian delegates. In this matter of first aid and ambulance training, the mining men of the States, although possibly tardy in recognizing the usefulness of such instruction, have taken hold in a manner typical of the American, and the greatest enthusiasm is being displayed at the present time. The progress of the work has in the past been greatly hindered by strike troubles, as was the case in the mining towns around Glace Bay, and it has taken some time to gain the ground which was lost. It is to be hoped that the threatened labour troubles for next spring in the Pennsylvania mines will not once again undo the work that has taken so long to do.

ONTARIO.

Cobalt and Gowganda.

After lengthy trials, the Nipissing Mining Company has decided to build a concentrator. It will have a capacity of 200 tons and is to cost $250,000. The various shafts of the big mine will be connected by an aerial tramway, which will pass over the lake. The cyanide process will be used. The mill will be built on Nipissing Hill and work on the excavations has already begun.

Since the meeting of the La Rose directors three important developments have occurred at the Lawson, the Fisher Eplett, and the Princess. At the Fisher Eplett a foot wide vein of quartz and calcite has been uncovered in which can be seen at various points patches of high grade ore. As the productive veins on the Beaver and the Temiskaming, adjoining mines, showed no ore of value at the surface, sinking operations will commence at once and will be pushed with vigour all winter. At the Lawson in an intermediate level an extension of the rich No. 8 vein has been encountered. It is now providing some of the richest ore ever found at the mine, and for 30 feet has averaged six inches wide. At the Princess a two-inch but very rich vein has been cut up in the stope from the 135-foot level, and also on the 135-foot level itself.

This month the Cobalt Provincial mine has shipped a car of 1,200 ounce ore taken from the stope at the 100-foot level. In the winze below the 200-foot level the ore has come into the vein again unexpectedly, and this new development in part counteracts the disappointment of not finding values in the Savage veins when they were cut.

Operating profits at the La Rose mine for the month of September amounted to $94,779. During the month there were produced 313,501 ounces, having a gross value of $164,000. The production for the first nine months of the year shows that 2,751,946 ounces have been mined, while total expenses amounted to $536,868, leaving a profit of $916,765.

Porcupine, Swastika, and Other Gold Areas.

It has been officially announced that the stamps in the Dome mill will commence to drop on January 15th, unless unusually severe weather is encountered and other unexpected and abnormal difficulties. It is generally believed in camp that even with the Dome's superb organization it will tax its

powers to the utmost to carry out the undertaking in so short a time. The most spectacular streak in the Golden Stairways will be lifted out and sent down to the Parliament Buildings at Toronto as an exhibit. A shaft is now being sunk to crosscut this vein at 100-foot levels. It has already been ascertained by means of the diamond drill that the ore body does go down several hundred feet, and the shaft will be put down to the 400-foot level before any systematic attempt is made to block out ore. Owing to the very resolute manner in which the reconstruction of the mill has been pushed, it is probable that for the first two or three months the mill will be ahead of the mine. During the first month only $6 ore will be run over the plates, so that in the event of any adjustments as little loss will be incurred as possible.

It is stated that diamond drilling operations have been attended with the greatest success; what was hoped before has now been proven. In all, eighteen holes have been put down and average 800 feet to the hole, and an area of almost a thousand feet has been covered.

The staff has at length been enabled to move into the new camp buildings out of the tents which have been occupied ever since the fire.

The Temiskaming Mining Company, of Cobalt, has acquired a controlling interest in the North Dome mine from C. S. Beardsley, of Cleveland; P. Kirkegaard, and the North Dome Company. Bert Wolfram will succeed Chris Nelson as mine captain in the Temiskaming mine interests, and it is expected that a very vigorous campaign of development will be undertaken this winter. On the surface the veins appear as small and rich, but when the conglomerate capping is removed they open out to considerable ore bodies rich in sulphides and showing here and there free gold. So far little work has been done underground since the fire. A compressor adequate for the development of the mine is on the ground, but has not as yet been set up.

So satisfactory has been the development of the Deloro claims of the Dobie Mining Company that two shafts will be sunk at once on the vein to discover what there is below. The ore on the surface is quite spectacular.

A prospector named W. Milton Yorke, states that there are good showings in quartz veins on the Hurricanaw River about 75 miles to the north of the Transcontinental Railway. The Transcontinental Railroad is left at a point 150 miles east of Cochrane. Until the river freezes over solidly the trail is impracticable.

Twenty-one dividends have now been paid by the Crown Reserve, making a total of $3,626,061 to date, or 215 per cent. on capitalization. A dividend of $88,440 is paid monthly.

The new Pullman service to Porcupine will come into effect in the first or second week of December. The terminus for the present will be South Porcupine, but as the steel is laid, the rock cut finished round Pearl Lake, and the new bridge over Pearl Lake built, it will be moved south to the Timmins townsite. For the present two switches will be laid for the convenience of those mines wanting to get in machinery at once. There will be an enormous rush of supplies to this point directly they are laid.

At the 100-foot level and about 50 feet from the shaft, the Davidson vein has been cut by the Crown Chartered, who now has the property. So far the hanging wall of the vein has not been reached, though 30 feet of quartz and schist have been run through. It is probable that in a few weeks Consulting Engineer R. B. Lamb will make a report, and this will be eagerly awaited.

The new ten stamp mill at the McIntyre has been ordered. Until further tests have been made as to the nature of the ore it is not proposed to instal the cyanide treatment. The Vipond mill has also been ordered and will be installed without delay. Crosscuts are now being run on the Vipond to cut the No. 2 vein at the 200-foot level, and also to catch it at two points on the 100-foot level. Until the big compressor is installed only one drill is available, and progress is necessarily slow.

The American Eagle Mining Company in Munro township has just shipped two 50-ounce bricks of gold to New York. Earlier in the year the Gold Pyramid shipped 70 ounces, so that the record for Munro township for this year is already 170 ounces. Both these mines have small mills and have been working some time.

At the 300-foot level the Rea Consolidated mines have forty feet of almost solid quartz in their vein. At the 200-foot level it averaged between four and six feet wide. Some time ago above the 200-foot level ore blocked out on four sides was reckoned at $280,000. Since then the 300-foot level has been reached and the vein found to be much wider than at any other point in the mine. Also, on the surface another lead has been found to outcrop for several hundred feet, showing free gold at various points.

On the Lucky Cross property at Swastika the new compressor has been started and work at the new shaft will now be pushed forward at a much more rapid pace than formerly, when only hand steel work was possible.

This week the 20 stamps at the Dr. Reddick mill commenced to drop again. The only other property to resume work on any scale in the Larder Lake field is the Goldfields, which now has the Harris Maxwell, the Proprietary, and the old Indian. There is stated to be a quantity of $10 ore above the 80 foot level at the Dr. Reddick which will be milled right away. The Harris Maxwell is at present confined to putting in an electrical power plant to develop the various properties.

The Dixie syndicate, holding the Newman Mancha Johnston claims in Deloro has sold its interest to a Toronto and Boston syndicate, who will float a three million dollar company and start to develop forthwith.

BRITISH COLUMBIA.

About the middle of November announcement was made to the effect that the negotiations between representatives of the Western Coal Operators' Association and District No. 18, United Mine Workers of America, respectively, had been completed and that the proposed agreement between the parties would shortly be submitted to the coal miners and other employees in the several districts concerned for their ratification, this referendum to be carried through with as little delay as possible. It was stated that an agreement had been reached upon most of the matters regarding which there had been differences of opinion, an exception having been that of the minimum wage to be paid to workers, which question is to be arbitrated later. It is hoped, therefore, that work will be resumed in the larger mines before the end of November. There is little probability, though, of there being any considerable quantity of coal produced during the few remaining weeks of the current year.

East Kootenay.—The Sullivan mine, situated near Marysville, is now the largest producer of lead ore in British Columbia. Its output for the expired eleven months of the year has reached a total of between 16,000 and 17,000 tons, which quantity has been shipped to the Consolidated M. and S. Company's smeltery at Trail. There is available in this mine a very large tonnage of ore, but much of it has a zinc content, as well as lead, which makes it unsuitable for reduction under similar conditions to those admitting of the profitable utiliza-

tion of ore in which lead is the chief constituent. Whenever it shall be found practicable to treat the zinc ore at a profit, there will be developed here one of the largest zinc-lead mines in Canada.

Ainsworth—The Consolidated M. and S. Company has arranged for the acquirement of the No. 1 mine, situated in Ainsworth camp. This mine has for some years been worked on a small scale by Mr. H. Giegerich and associates, and though its output of marketable ore has not been large, it has generally paid working expenses. There appears to be a prospect of work being resumed at the Blue Bell mine, across Kootenay Lake from the town of Ainsworth. A proposal to again operate the mine and concentrating mill has lately been having the consideration of the directors of the company, the headquarters of which is in Europe, but at the time of writing no advice has been received of their decision, if yet arrived at. In another part of Ainsworth mining division, some 12 to 15 miles from Kaslo, up the line of the old Kaslo & Slocan Railway, is situated the Utica, a property stated to promise a large tonnage of ore, whenever arrangements shall have been made for working it continuously and milling facilities shall have been provided for concentrating that part of the ore not of sufficiently high grade for shipment to the smeltery in its crude state. Mr. Chas. F. Caldwell is endeavouring to obtain the amount of money requisite for placing the Utica on a permanent milling and shipping basis.

Nelson Division.—In Nelson mining division, the Granite-Poorman gold mines, five miles west of the city of Nelson; the Molly Gibson silver-lead mine, at the head of Kokanee Creek, about 20 miles in the opposite direction; the Emerald lead mine, in the vicinity of Salmo, and the Queen gold mine, in Sheep Creek camp, are the chief producers of ore as the year draws to its close. Several other properties, in different parts of this division, are also being worked, but in some cases with only a small output being maintained or with development work being carried out and no ore being mined. On the whole the year's production of metals has been less than was expected it would be, yet since substantial progress has been made in the direction of providing for an increased output in the future, the situation is not unsatisfactory.

Rossland.—The Consolidated Mining and Smelting Company's Centre Star group is keeping up its output, which will probably be for the calendar year 1911 about as much as for the company's fiscal year to June 30, last, namely, 193,000 tons. Litle publicity is being given to information indicating the conditions prevailing at these mines, but it is understood in the camp that the War Eagle mine, especially, is looking well, much ore containing a comparatively high gold value having been found, while other mines of the group, including the Le Roi, which has been added, are contributing materially to the generally good results that are being obtained from these mines as a whole. The Le Roi No. 2, Limited, is also making gratifying progress, recent deep-level developments having proved the existence in the lower levels of the Josie mine of considerable quantities of ore of good grade. The general average value of the ore extracted from the mines of the Le Roi No. 2, Ltd., continues to keep up well, being closer to that of earlier years. The year's production will show a total of about 45,000 tons of ore, of which about three-fifths will have been shipped to Trail as crude ore and the remainder put through the company's concentrating plant at the mine with results that add appreciably to the profit-earning capacity of the mine.

Slocan City.—While there is not nearly so much activity in the several camps in mining in Slocan City mining division as in some other parts of the Slocan district, mining is being carried on in several camps. On Ten-mile Creek, both the Enterprise and the Ellis Silver Mining Company's Eastmont mine are being worked. In the former the ore developed during recent months is not of so high a grade as it was expected would be found in the lower levels opened latterly, but it is hoped there will be an improvement in this respect before long. No information has been obtained of late as to progress at the Eastmont, but it is known work is still being carried on, and preparations were being made early in November to haul ore to the landing on Slocan Lake, for shipment thence to Trail. Other properties on which work was being done are the Lily B. and Meteor, both situated in the vicinity of Springer Creek. Shaft-sinking constitutes the development work in hand on the former claim. In the past the Meteor has been a shipper of high-grade silver ore, and it is expected it will continue to make a production of a similar class of ore.

Trout Lake Division.—On the Winslow, a gold claim situated a few miles from Trout Lake, Mr. Bruce White has driven a tunnel between 200 and 300 feet, and has cut a gold-bearing vein. Recently work was stopped for the winter, snow being deep in the locality during winter months, but next spring development will be undertaken on this property. The Silver Cup, in Ferguson Camp, continues to make shipment of high-grade ore to Trail, though its tonnage for this year has fallen somewhat short of that of several earlier years. Little else in mining has been reported from this part of West Kootenay, notwithstanding that there are many good showings of ore that appear to be well worth developing.

Golden Division. — The Vanvoucer organization that, under the name of the Mt. Stephen Mining Syndicate, is operating the old Monarch mine, near Field, on the main transcontinental line of the Canadian Pacific Railway Company, has done much development work, and made many surface improvements, the latter including the erection and equipment of a concentrating mill, putting in a pipe line to convey water to a Pelton wheel for operating mill machinery, and a compressor, installation of an auxiliary steam power plant for use when water power shall not be available, erection of an aerial tramway and establishment of a telephone system, from mine to mill, and building houses for the accommodation of miners, etc. Much underground work has also been done to develop the big body of lead ore occurring here. Altogether considerable activity has been shown, and the prospects are that the old Monarch mine will next year become productive to a degree that will show the enterprise and confidence of the syndicate to have been well warranted.

Boundary.—The Argo Mining and Tunnel Company, of Greenwood, is driving a 6 by 7-foot tunnel to cut several veins outcropping on the surface of the hill, more than 300 feet above the present face of this adit. It is believed that one of the bigger veins will shortly be cut. It is proposed to continue driving until a distance of 1,000 feet from the portal shall have been reached, by which time the face of the tunnel will be about 600 feet below the surface. Thus far only stringers of ore have been cut, but it has been known all along that it would be necessary to drive more than 600 feet before the first of the larger veins could be reached. The work is being continued with the expectation of soon reaching ore in quantity.

Similkameen.—The British Columbia Copper Company has commenced prospecting work on the large group of mineral claims in Voigt's camp, Copper Mountain, near Princeton, described in the Canadian Mining Journal of August 1 (p. 493). A newspaper story to the effect that the price agreed upon should this property be purchased under the bond, is $2,000,000 is a flight of imagination, as is also the statement that other expenditure provided for will bring the total up to $3,000,000. The price named in the bond is only about one-fifth of $2,000,000, while but a limited amount has been appropriated for prospecting and development work. If sufficiently encouraging results shall be obtained, most likely development work will be continued, but not otherwise.

Coast District.—The most important metal mining in progress in the Coast district is that at the Britannia Mining and Smelting Company's Britannia mine, in New Westminster mining division, and the further exploitation of the Hidden Creek group, by the Granby Consolidated M. and S. Company. During the autumn up to more than 300 men were employed on the Britannia, and within 50 or 60 of that number at Hidden Creek. Coal mining developments on Vancouver Island are also important. Information from Hazelton district, Skeena River, indicates the opening of promising shoots of silver-lead ore there.

GENERAL MINING NEWS.

ONTARIO.

[Editor's Note.—The following is editorial comment that was written too late to insert in the proper column. It is none the less important. If any of our readers think that we have been unfair we shall be glad to hear from them.]

Toronto, Nov. 24.—There appeared in the Toronto Globe of this date certain extracts from an article in The Boston Commercial. Mr. George L. Walker, the editor of The Commercial, is the author of the article, and his subject is Porcupine.

From his own account Mr. Walker went to Porcupine to find out whether the camp is or is not a bubble. The net result of his visit was that he came away satisfied that Porcupine has a "big future." A few sentences here will show the tenor of Mr. Walker's remarks.

He points out that for work done there are surprisingly many gold showings of commercial value. Diamond drills have disclosed "free gold" (by which is meant "visible gold") to a depth of 800 feet. He refers to the Dome as having several million dollars of "profits demonstrated"; and to the Hollinger as having about 100,000 tons of ore actually in sight.

Both of these statements are undigested. There is no room for guessing and less cause for knowing that the Dome has some millions of dollars in profits developed. In fact, the Dome management has made public nothing to indicate this. Moreover, the Hollinger, if we may gather anything from the announcements of its directorate, has much more than 100,000 tons in sight. To put it briefly, there is no more foundation for Mr. Walker's conclusions than there is for the wildest vision of the cub reporter.

But with Mr. Walker's strictures on financial and promotion methods we are fully in accord. After scoring the futile schemes of floating the average "claim," he expresses the belief that Porcupine's future depends upon underground exploration, and upon the development of large tonnages of ore that will yield from $1 to $3 net profit. Porcupine, to succeed, must be organized much more conservatively. Working capital must be enlarged, and promoters' first profits must be cut down.

Mr. Walker's remarks would have been immeasurably stronger if he had left out specific references that weaken his argument, and tend to throw discredit upon his ability to observe without bias.

Ottawa, Nov. 22—The first organized demand for higher protection for the vested interests was presented to the Government to-day by the representatives of all the steel and iron companies in Canada. The conference lasted over two hours. The companies applied for a renewal of the bounties on pig iron as a provisional expedient to be effective until the tariff could be revised.

The discussion was almost entirely confined to this application. The question of aid by bounty to steel rods will be dealt with at another time.

The Government gave the steel men a sympathetic hearing and asked for statistical information. The members of the Government who heard the deputation were: Premier Borden, Finance Minister White, Minister of Customs Reid, Minister of Trade and Commerce Foster, Minister of Railways Cochrane, and Postmaster-General Pelletier.

Among the men on the delegation and the companies represented were J. H. Plummer, of the Dominion Steel; T. Cantley, of the Nova Scotia Steel; T. J. Drummond, of the Soo Company: Cyrus Birge, of the Steel Company of Canada, Hamilton; R. Hobson, and R. J. Mercure, representing the Deseronto Blast Furnace and the Atikokan Iron Company.

The Government was urged to take up the whole case of the iron and steel industry in Canada, and after thorough consideration to give it the aid by bounty or tariff protection to which it was found to be entitled. The steel men assured the Government that the industry in Canada to-day is at a disadvantage, compared with its competitors in other countries. There should be something done before an examination of the situation could be made. To relieve the immediate situation it was urged that there should be a restoration of the bounty on pig iron.

While the Government gave the steel men no promise beyond careful consideration of their application, the general belief is that something will be done. That is the feeling which the steel men have themselves, and it is shared by most members of Parliament.

QUEBEC.

Mr. R. M. Aitken, of the London house of Kilcat & Aitken, arrived in Montreal on November 20th, in connection with the contemplated reorganization of Amalgamated Asbestos.

"We hope," he said, "to get matters in such shape that the representatives of the bondholders will soon be able to get together and discuss plans for the future welfare of the company. I feel sure that the American, Canadian, and English representatives, when they meet to talk things over, will be able to work in harmony and will decide upon an arrangement that will put the company upon its feet again."

Montreal, Nov. 20.—One of the most important meetings ever held by the directors of the Dominion Steel Corporation was held this afternoon at the Bank of Commerce. The president, Mr. J. H. Plummer, occupied the chair, and the directors present were: Sir William Mackenzie, Sir Montagu Allan, William McMaster, George Caverhill, Sir Henry Pellatt, Senator Cox, Senator MacKay, Senator Dandurand, J. R. Silson, W. D. Matthews, and F. L. Wanklyn.

After the meeting the following official statement was given out: "The chief subject considered by the Board of the Steel Corporation to-day was the recommendation of the president that the Steel Company should not continue to provide for the expenditure on its new plant by the sale of bonds, which were

authorized in 1909, of which about $6,000,000 is still held in the treasury, but that capital should be obtained by the issue of preferred stock of the Corporation.

"The Coal Company has also entered upon important extensions, which will increase its fourteen producing collieries to twenty, and require greater facilities for transportation, etc. The capital required by that company can also be obtained through the Corporation.

"The advantage of this means of financing is that it avoids the increase of fixed charges and leaves the Steel Company with a large reserve of unissued bonds of established market value. Nothing definite was done with regard to making the issue, but the board decided that, under proper conditions, this would be the best method of obtaining capital for the building of the various plants. Its ultimate effect would be to interest people in London, and probably in Paris also, in the stocks of the Corporation, and it would put the latter in a position to take care of the future capital requirements of the subsidiary Company on good terms.

"Provision will be made for the exchange in due course of the preferred stock of the Coal and Steel Companies for the Corporation preferred, on an equitable basis; with an established market for the new security in Europe. Such an exchange would benefit the present holders.

"The Company has been asked to give certain rights as to common stock in connection with the sale of the new preferred. Whenever that point may be reached it is not unlikely that this may lead to considerable investments in the common stock abroad. In any case, it is the interests of the common stock holders which the Board have most in mind. The whole object of the policy of extension, which is being vigorously pursued, is to increase output, decrease cost, and enlarge profits. The benefit of this, after payment of interest on the new capital, necessarily accrues to the common stock holders.

"Whether it is better to get the capital needed to enlarge the works by continuing to sell bonds, or to initiate a financial policy which will serve for future growth, as well as for present needs, and make those who supply the capital partners, instead of creditors, is purely a question of judgment; the object is to get capital for the new works on the most favourable terms.

"The new policy is most strongly supported by those who have the largest interest in the common stock, and was adopted by the Board without a dissenting voice."

BRITISH COLUMBIA.

Fernie.—The stupendous sum of $4,400,000, it is estimated by Mr. Elias Rogers, president of the Crow's Nest Pass Coal Company, who paid a brief visit to Victoria recently, was lost to the men in wages as a result of the strike which, after extending over many months, is just reaching a conclusion, more or less satisfactory to both parties.

Mr. Rogers said: "Our company has been paying out approximately an average of nearly eight thousand dollars less every day since April 1st than we were a year ago during the same period, and I think on all the mines affected the reduction in wages would be equal to about $20,000 per day."

Fernie.—There will be an increase in the price of coal from the mines concerned in the strike in the Crow's Nest Pass and Alberta when a settlement has been reached, and fuel from the properties now closed down again commences to reach the city, according to an opinion expressed last night by a local coal merchant.

The increase, he believed, would be about equal to the increase in the rate of wages granted to the miners under the settlement, which will mean that Galt coal, which previous to April 1st last cost $8.25 per ton here, will be sold at $9 per ton. The increase in the prices of other coals from the present strike area will, it is said, increase proportionately.

At present a large proportion of the coal being consumed in Nelson comes from Wyoming. It sells at $8.75 per ton. Coal from Vancouver Island, Princeton, and Pennsylvania is also being used by local consumers. Prices range from about $8 for Princeton coal to about $16 for the eastern fuel.

Fernie.—The large force of special police which has been assembled here for the protection of miners who want to work at Coal Creek were out in force this afternoon to meet the mine train which came down at 4 o'clock with the four Barrs, who returned to work this morning.

Sergt. Tucker and 15 mounted men and 20 foot policemen lined up and the four men were escorted to their homes, without being disturbed except by the derision expressed by the large crowd of miners who turned out to greet them. Chief Inspector Campbell, Chief Constable Minty, and City Chief Bowen were also present, and the force was well arranged and well handled.

The trial of Sweeny, charged with intimidating Alex. Barr on October 31st, was concluded this afternoon, but Magistrate Whimster reserved judgment until next Monday in order that he may have time to go over the transcript of the evidence. George Linn will come up for trial on a similar charge next Monday.

Nothing has been heard from Frank to-day regarding the progress of the work engaging the attention of the joint scale committee.

Nelson.—Bob Mabry, of Spokane, yesterday closed mining deals aggregating $140,000, purchasing the Yankee Girl for $100,000 from John Frazer, acting on behalf of the creditors, in addition to the Bi-metallic and the Lost Cabin group, all the properties being near Ymir.

He has already 15 men working at the Yankee Girl, three at the Bi-metallic, and six at the Lost Cabin group, and is restoring the cabins and workhouses at the Nelly B. mine, as well as continuing the sinking of the double compartment shaft of the last named, which is down 55 feet.

He said that over $400,000 worth of ore is ready to be mined at the Yankee Girl, and a flume is being built for generating compressed air.

At the Yankee Girl and Bi-metallic, on account of there being two feet of snow at Ymir and three feet at the mines, the work is being carried on under difficulties. At both the Bi-metallic and the Lost Cabin group tunnels are being driven to crosscut the ore.

STATISTICS AND RETURNS

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending Nov. 17, and those from Jan. 1, 1911, to date:—

	Nov. 17. Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger	.....	55,200
Bailey	.....	40,000
Beaver	.....	1,520,217
Buffalo	55,161	3,328,024
Chambers-Ferland	64,000	1,214,900
City of Cobalt	.....	727,980
Cobalt Lake	.....	3,760,920
Cobalt Townsite	.....	1,189,881
Colonial	.....	183,410
Coniagas	40,893	3,661,380
Crown Reserve	46,769	2,049,829
Drummond	60,000	1,140,000
Green-Meehan	.....	146,800
Hargraves	.....	161,100
Hudson Bay	62,452	1,382,859
Kerr Lake	60,950	2,294,620
King Edward	.....	40,000
La Rose	110,560	6,504,599
McKinley-Darragh	148,127	5,851,397
Nipissing	191,583	5,319,251
O'Brien	.....	1,257,958
Peterson Lake, Little Nip.	.....	58,430
Provincial	.....	202,050
Right of Way	.....	1,274,027
Silver Cliff	.....	106,680
Standard	.....	102,813
Temiskaming	48,980	1,536,262
Trethewey	.....	1,159,630
Wettlaufer	.....	117,232

The shipments for the week were 889,475 pounds, or 444 tons, against 348 tons the previous week.

The shipments from Jan. 1 to Nov. 17 were 45,396,262 lbs., or 22,698 tons.

B. C. ORE SHIPMENTS.

The ore shipments for the week ended Nov. 11 totalled 19,494 tons, making the total for the year to date 1,381,102 tons. The smelter receipts for the week and year respectively are 17,055 tons, and 1,254,317 tons.

Boundary Shipments.

Mother Lode	6,670	270,309
Rawhide	4,202	47,525
Jack Pot	359	22,894
Athelstan	100	17,218
Unnamed	638	9,725
Other mines	.....	630,490
Total	11,969	998,161

Rossland Shipments.

Centre Star	3,363	172,084
Le Roi No. 2	270	25,564
Le Roi No. 2, milled	300	13,500
Le Roi	857	15,311
Other mines	.....	494
Total	4,790	226,953

Slocan-Kootenay Shipments.

Van Roi, milled	800	33,849
Molly Gibson, milled	300	5,100
United Copper	38	114
Mountain Con	6	6
Royal Canadian	26	26
St. Eugene, milled	420	23,556
Richmond-Eureka	89	2,033
Queen, milled	420	18,950
Granite-Poorman, milled	250	11,260
Nugget, milled	110	4,950
Emerald	36	1,775
Society Girl	43	520
Knob Hill	197	4,434
Other mines	.....	29,825
Total	2,735	136,038

Consolidated Company's Receipts.

Trail, B.C.

United Copper	38	114
Mountain Con	6	6
Royal Canadian	26	26
Knob Hill	197	4,434
Van Roi	62	1,403
Centre Star	3,363	172,084
Le Roi No. 2	270	25,564
Le Roi	857	15,311
Richmond-Eureka	89	2,033
St. Eugene	420	23,556
Emerald	36	1,775
Society Girl	43	520
Queen	34	622
Other mines	.....	55,407
Total	5,086	285,584

B. C. Copper Company's Receipts.

Greenwood, B. C.

Mother Lode	6,670	270,309
Rawhide	4,202	47,525
Jack Pot	359	22,894
Athelstan	100	17,218
Unnamed	638	9,725
Other mines	.....	10,652
Total	11,969	378,323

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending November 24th, and those from January 1st, 1911 to date:

	Nov. 24. Ore in lbs.	Since Jan. 1. Ore in lbs.
Badger	.....	55,200
Bailey	.....	40,000
Beaver	.....	1,520,217
Buffalo	.....	2,228,024
Casey Cobalt	60,000	60,000
Chambers-Ferland	.....	1,214,900
City of Cobalt	.....	727,980
Cobalt Lake	.....	3,760,920
Cobalt Townsite	.....	1,189,081

Colonial	44,500	227,910
Coniagas	62,482	3,733,862
Crown Reserve		2,049,829
Drummond	60,000	1,200,000
Green-Meehan		145,000
Hargraves		161,100
Hudson Bay		1,382,859
Kerr Lake	40,500	2,335,120
King Edward		40,000
La Rose	170,032	6,684,631
McKinley-Darragh	59,732	5,911,129
Nipissing	206,200	5,525,441
O'Brien		1,257,958
Peterson Lake, Little Nip.		258,430
Provincial		202,050
Right of Way		1,274,037
Silver Cliff		106,680
Standard		102,813
Temiskaming		1,636,262
Trethewey		1,159,633
Wettlaufer		117,232

The shipments for the week were 703,446 pounds, or 351 tons, gainst 444 tons the previous week.

The shipments from Jan. 1st to Nov. 24th, were 46,099,708 ounds, or 23,049 tons.

B. C. ORE SHIPMENTS.

Two Slocan properties are added to the list of producing ines in the week ending November 18th. Both mines are lver-lead propositions and have been developed steadily dur- ig the past summer. These are the Hampton group and the lkhorn group. The shipments in this district last week to- alled 15,054 tons, and the smelter receipts 13,551 tons. For he year to date the ore shipments total 1,376,113 tons and the nelter receipts 1,299,721 tons.

Boundary Shipments.

Mother Lode	5,310	275,619
Rawhide	2,934	50,459
Jack Pot	289	23,183
Athelstan	101	17,219
Unnamed	298	10,023
Other mines		630,490
Total	8,932	1,006,993

Rossland Shipments.

Centre Star	3,669	175,753
Le Roi No. 2	146	25,710
Le Roi No. 2, milled	300	13,800
Le Roi	491	15,802
Other mines		494
Total	4,606	231,559

Slocan-Kootenay Shipments.

St. Eugene, milled	420	23,976
Ruth	36	490
Queen, milled	420	19,010
Granite-Poorman, milled	250	11,510
Nugget, milled	110	5,060
Utica	21	97
Meteor	19	30
Knob Hill	115	4,549
Van Roi, milled	800	34,649
Molly Gibson, milled	300	5,400
Hampton	1	1
Elkhorn	24	24
Other mines		32,765
Total	2,516	137,561

Consolidated Company's Receipts. Trail, B.C.

St. Eugene	97	6,382
Centre Star	3,669	175,753
Le Roi No. 2	146	25,710
Le Roi	491	15,802
Ruth	36	490
Utica	21	97
Meteor	19	30
Knob Hill	115	4,549
Hampton	1	1
Elkhorn	24	24
Other mines		23,924
Total	4,619	252,753

B. C. Copper Company's Receipts.

Mother Lode	5,310	275,619
Rawhide	2,934	50,459
Jack Pot	289	23,183
Athelstan	101	17,219
Unnamed	298	10,023
Other mines		10,652
Total	8,932	386,555

LA ROSE IN OCTOBER.

La Rose mine in October made a net profit of $75,500. The October production was rather larger than usual, being 255,800 ounces, the gross value of which was $136,000. The October income was $141,000, and the total expenses $65,500. La Rose is evidently looking to make a record before the end of the year.

TORONTO MARKETS.

Nov. 20.—(Quotations from Canada Metal Co., Toronto):
Spelter, 6.75 cents per pound.
Lead, 4.50 cents per pound.
Antimony, 7 to 9 cents per pound.
Tin, 44 cents per pound.
Copper, casting, 12.95 cents per pound.
Electrolytic, 12.95 cents per pound.
Ingot brass, 7 to 12 cents per pound.

Nov. 21.—Pig Iron—(Quotations from Drummond, McCall & Co., Toronto):
Summerlee, No. 1, $23.00 (f.o.b. Toronto).
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GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.

Nov. 17.—Tin, straits, 43.35 cents.
Copper, Prime Lake, 12.75 cents.
Electrolytic Copper, 12.75 cents.

Copper wire, 13.50 cents.
Lead, 4.35 to 4.40 cents.
Spelter, 6.70 cents.
Sheet zinc (f.o.b. smelter), 8.00 cents.
Antimony, Cookson's, 8.00 cents.
Aluminium, 19.00 to 19.50 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $46.00 per ounce.
Platinum, hard, $48.50 per ounce.
Bismuth, $1.80 to $2.00 per pound.
Quicksilver, $46.00 per 75-lb. flask.

SILVER PRICES.

	New York cents.	London. pence.
Nov. 7	Holiday	25¼
" 8	55	25 5/16
" 9	56½	26
" 10	56¼	25⅞
" 11	56⅛	25 13/16
" 13	56	25 13/16
" 14	56⅜	25 15/16
" 15	56½	26
" 16	56⅜	25 13/16
" 17	56⅛	25 13/16

SHARE MARKET.

(Courtesy of E. D. Warren & Co.)

NEW YORK CURB.

	Bid.	Asked.
Braden	5¼	5⅜
B. C. Copper	3⅞	4
Butte Coal.	17	18
Ely Central	..	..
Ely Cons.	5/16	⅜
First National	1½	1¾
Giroux	4 5/16	4⅜
Greene-Can.	7⅜	7½
Inspiration	7⅞	8⅛
Nevada Hills	2⅝	2 11/16
Ohio Copper	1⅛	1¼
Ray Central	1 13/16	2
Union Mines	..	..
Yukon Gold	3⅜	3½
Goldfields	4½	4⅝
Nevada Cons.	17½	17¾
Miami	21	21⅛
Granby	off	60
Con. Mining & Smelt.	44	46
Davis-Daly	⅞	1
Cons. Arizona	9/16	⅝
Rawhide Cons.	..	..
Ray Cons.	14½	14⅝
Chino	23	23½
New Baltic	..	..
United Copper	1⅜	1⅝

PORCUPINE STOCKS.

American Gold	.90	.95
Apex	.11	.13
Coronation	.02⅜	.02¾
Nor. Exploration	...	...
Dobie	1.00	1.10
Dome Ex.	.78½	.79
Foley-O'Brien	.71	.75
Rea	3.02	3.05
Hollinger	11.00	11.20
Monita	off	.12
Pearl Lake	.47½	.48
Central	off	3.90
Imperial	.09¾	.10
Northern	.81	.85
Tisdale	.05	.06½
Preston East Dome	.23⅝	.24
Standard	.16	.17½
Swastika	.34¼	.34½
United	.03¾	.03⅞
Porcupine Gold	.58¼	.58½
West Dome	1.02	1.03
Crown Chartered	.53½	.54
Eldorado	.11	.14
Gold Reef	off	.20
Porcupine Canada	.85	1.00
Dome Mines	41.25	41.50

COBALT STOCKS.

Bailey	.02	.02⅛
Beaver	.45	.46
Buffalo	1.40	1.90
Chambers-Ferland	.11	.12
City of Cobalt	off	.09
Cobalt Lake	.29	.29¼
Coniagas	6.25	6.40
Crown Reserve	2.85	3.00
Great Northern	.13½	.14
Green Meehan	.01¼	.01¾
Hargraves	.05	.07
Kerr Lake	3.00	3.50
La Rose	3.83	3.85
Little Nipissing	off	.02½
McKinley-Darragh	1.80	1.82
Nipissing	7.40	7.52½
Nova Scotia	off	.10
Peterson Lake	.06½	.07
Right of Way	.07	.07½
Rochester	.01½	.01⅞
Silver Leaf	.03	.03⅛
Temiskaming	.34½	.35
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Wettlaufer	.80	.85

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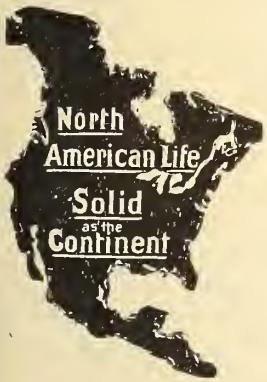

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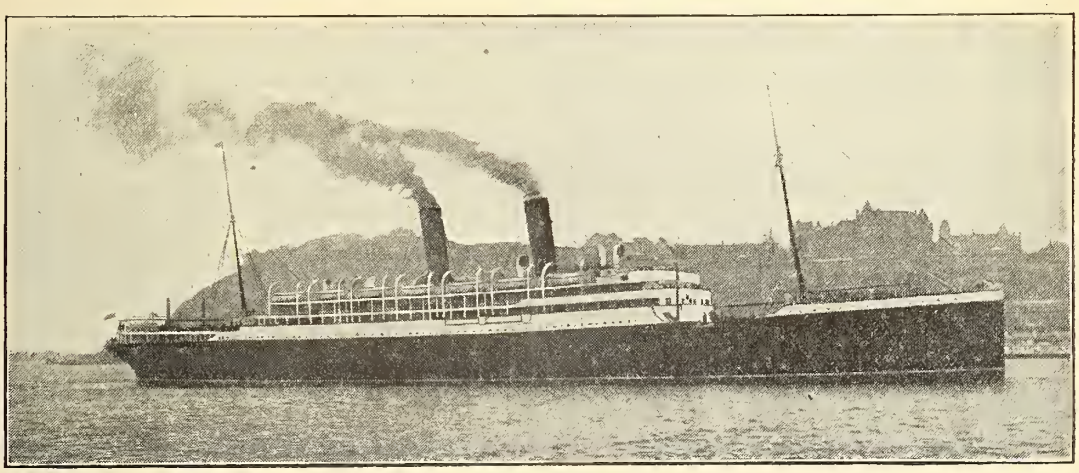

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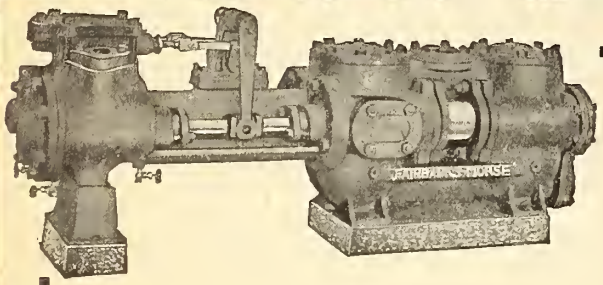

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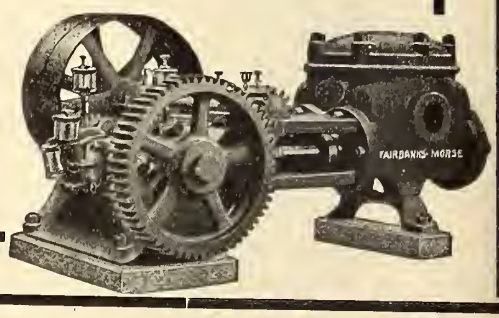

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Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

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1170. Summary Report of the Geological Survey for 1910.

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1110. Memoir No. 4. Geological reconnaissance along the line of the National Transcontinental Railway in Western Quebec, by W. J. Wilson, accompanied by a map.
1064. Geology of an area adjoining the east side of Lake Timiskaming, by Morley E. Wilson.

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1091. Memoir No. 1, Geology of the Nipigon Basin, Ontario, by A. W. G. Wilson.
1137. Memoir No. 10 An instrumental survey of the shore-lines of the extinct lakes Algonquin and Nipissing in South-western Ontario, by J. W. Goldthwaite.

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1115. Memoir No. 8. The Edmonton Coal Field, Alberta, with maps, by D. B. Dowling.

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1139. Memoir 11-T Triangulation and Spirit Levelling of Vancouver Island, 1909, by R. H. Chapman.

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1080. Report on a part of the North West Territories drained by the Winisk and Attawapiskat Rivers, by Wm. McInnes.
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1091. Map 8 A, Lake Nipigon, Thunder Bay District, Ontario. Scale 4 miles to 1 inch.

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1132. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.

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1135. Map 15A. Phoenix, British Columbia, topographical. Scale 400 ft. to 1 inch.
1148. Map 20A. Victoria sheet, Vancouver Island, B.C., topographical. Scale 1 mile to 1 inch.
1149. Map 21A. Saanich sheet, Vancouver Island, B.C., topographical. Scale 1 mile to 1 inch.
1164. Map 28 A. Sketch map of Portland Canal Mining District.

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1089. Map 9A. Explored Routes on Parts of the Albany, Severn and Winisk Rivers. Scale 8 miles to 1 inch.

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The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, Etc.

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is $10.00 and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year and a fee of $10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of $10 an acre for SUPERIOR METALS when more than 20 miles distant from a railway and $20 an acre when less than 20 miles.

For INFERIOR METALS the prices are $2.00 and $4.00 an acre respectively.

The attention of prospectors is specially called to the territory in the North-Western part of the province of Quebec, north of the height of land, where important mineralized belts are known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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Large deposits of iron also are known to exist at various places in the Province; and considerable mining has been done in connection with this mineral, the ore being used locally and shipped to foreign ports.

Among the most important minerals occurring in economic quantities may be mentioned, Coal, Gold, Silver, Manganese, Leadsilver, Copper, Barytes, Mineral Pigments, Gypsum and Tungsten.

Licenses are issued for prospecting for Gold and Silver for a term of twelve months.

The licenses are for areas 150 by 250 feet, and can be obtained for 50c. an area.

Leases can be secured for $2. an area, for a term of forty years; subject to annual rental of 50c. an area.

Licenses to search over five square miles, for a period of eighteen months, for minerals other than gold and silver, cost $30.

Leases for three renewable terms of twenty years each can be obtained for $50., and are subject to a yearly rental of $30.

Royalties are as follows:—

Gold, two per cent on the gross value thereof; Copper, four cents a unit; Lead, two cents a unit; Iron, five cents a ton; Tin and Precious Stones, five per cent; Coal, ten cents on every long ton sold or removed from the mine.

Copies of the mining law can be had gratis, by applying to the Department of Public Works and Mines, Halifax, Nova Scotia, or to Mr. John Howard, Agent General for Nova Scotia, 57a Pall Mall, London, England.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. W. H. HEARST,
Minister of Lands, Forests and Mines,
Toronto, Canada.

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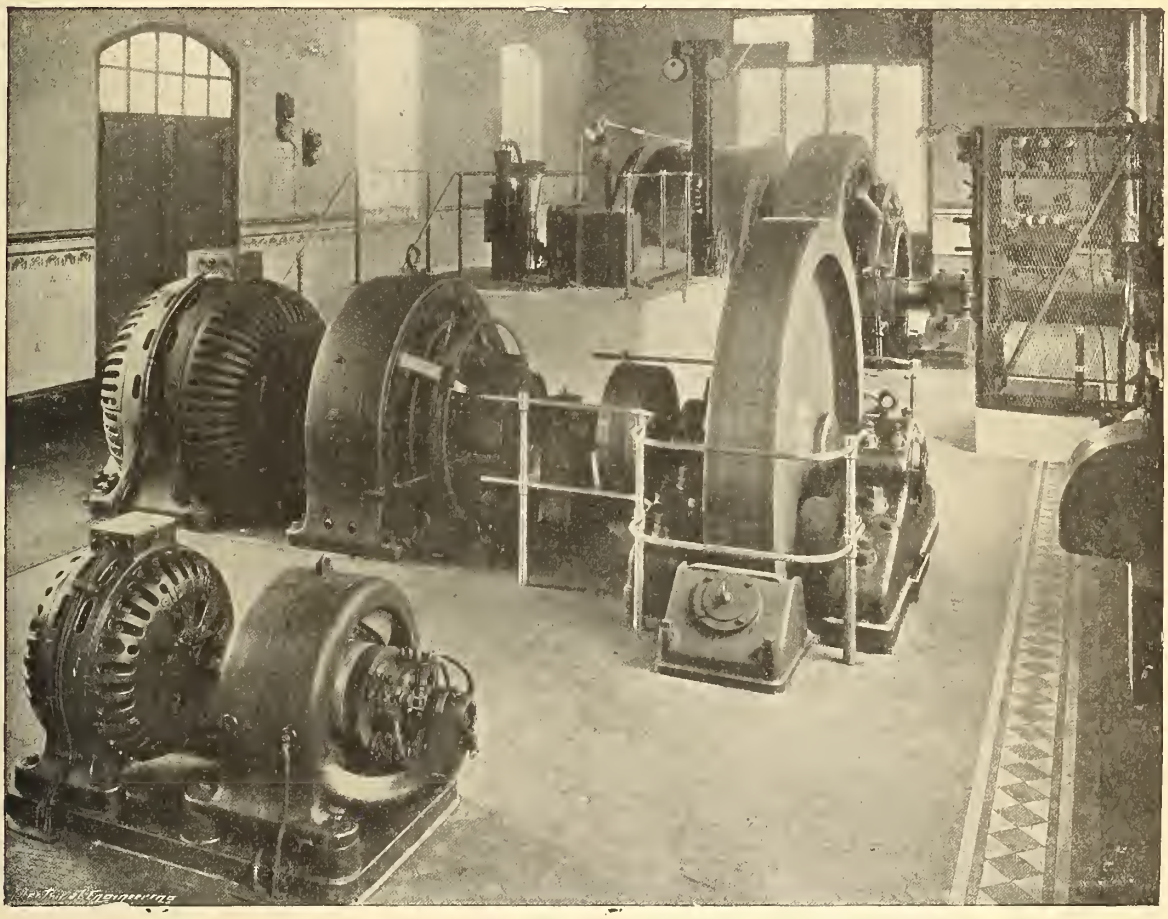

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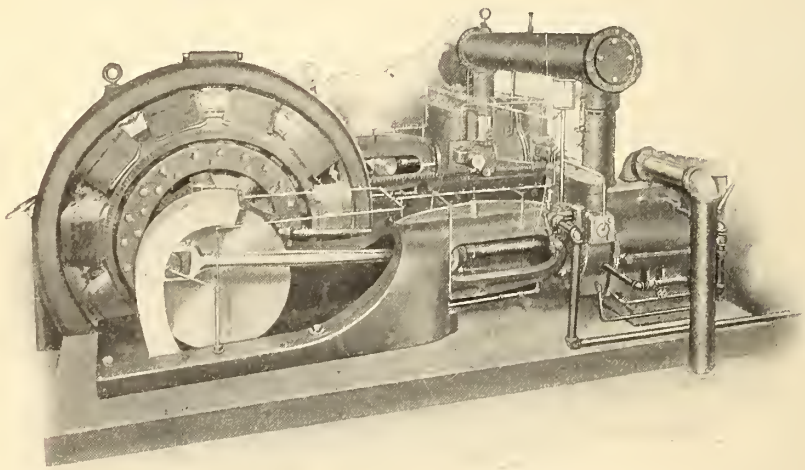

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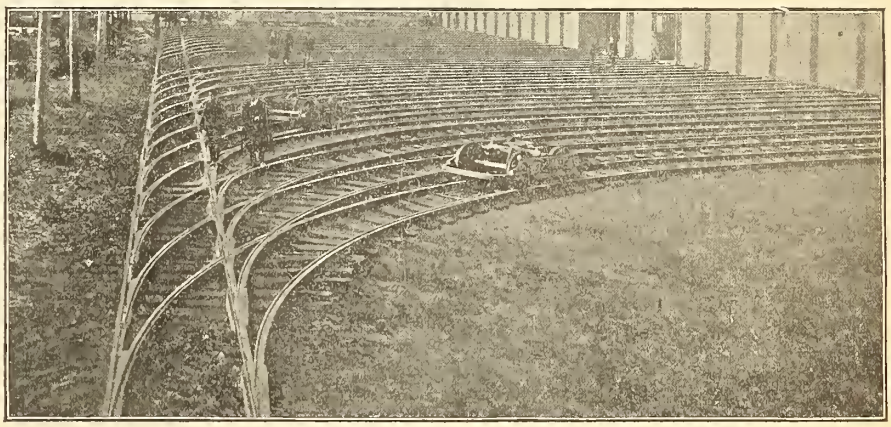

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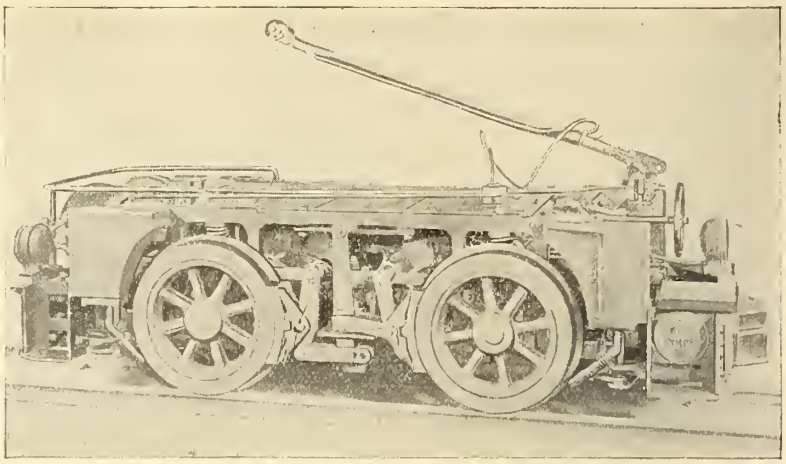

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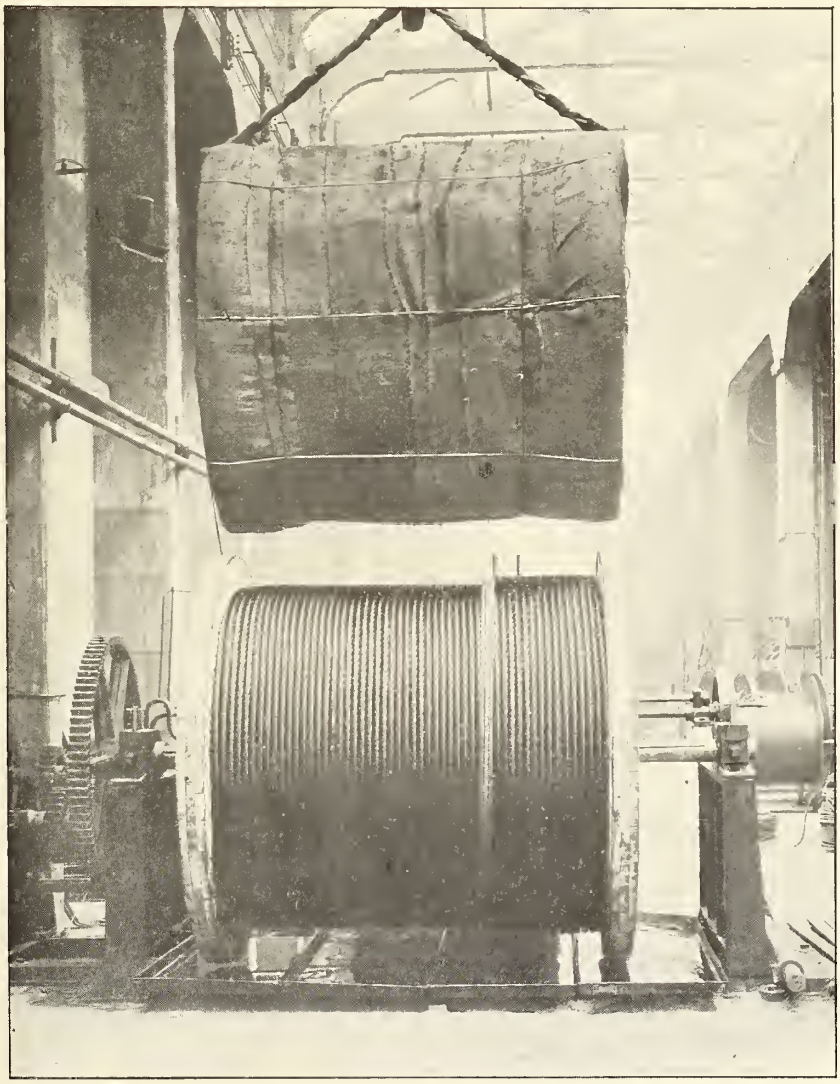

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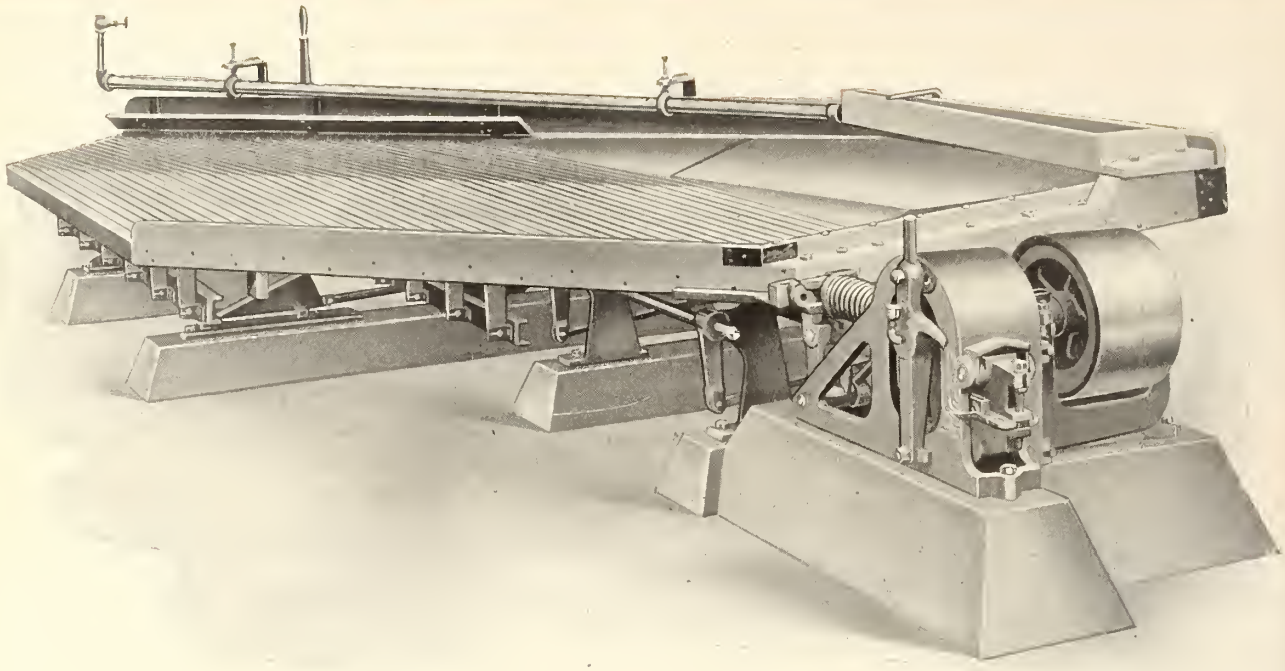

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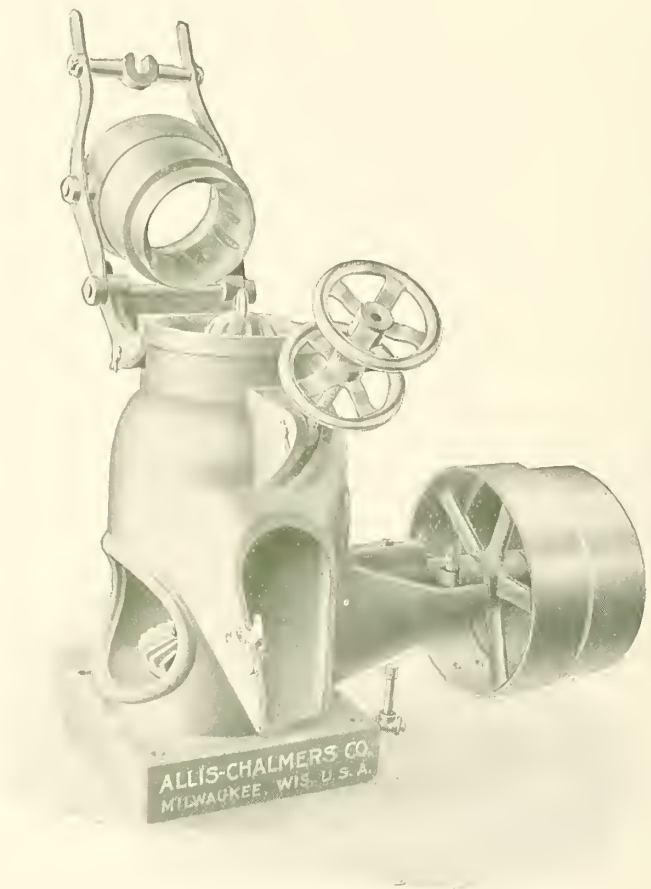

Style "B" Sample Grinder with Hopper Open
(Patented)

To vary the size of the product or to compensate for wear of the grinding surfaces, the practice heretofore has been to make the adjustment by raising or lowering the grinding head. In the Style "B" machine the adjustment is made by raising or lowering the hopper which carries the liner; this is accomplished by means of the hand wheels shown in the illustrations.

The cut shows the Style "B" Sample Grinder with the hopper thrown back. While in this position the hopper is self-supporting and an inspection of the wearing surfaces can thus be easily made.

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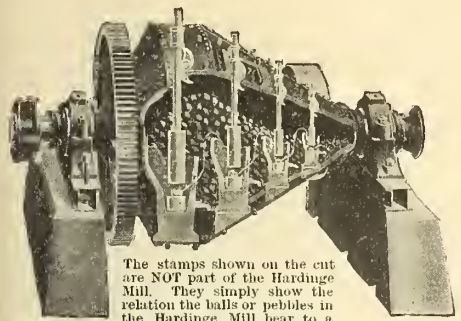

The stamps shown on the cut are NOT part of the Hardinge Mill. They simply show the relation the balls or pebbles in the Hardinge Mill bear to a number of stamps arranged for **Ideal Stage Crushing**

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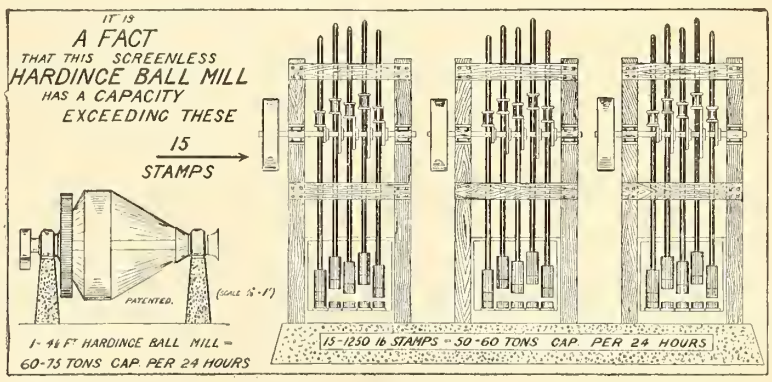
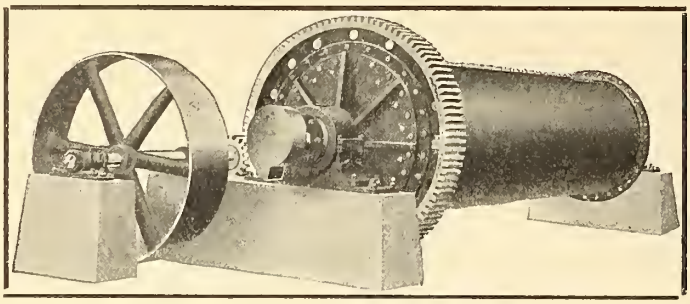


TUBE MILLS with Spiral SELF FEEDER



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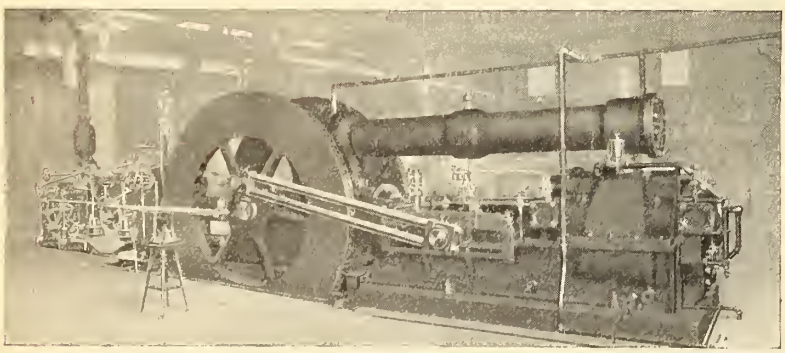

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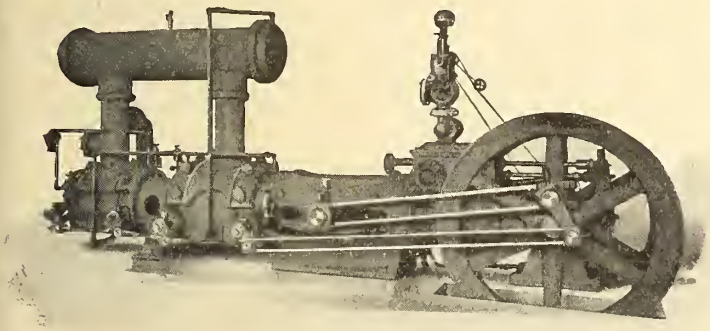

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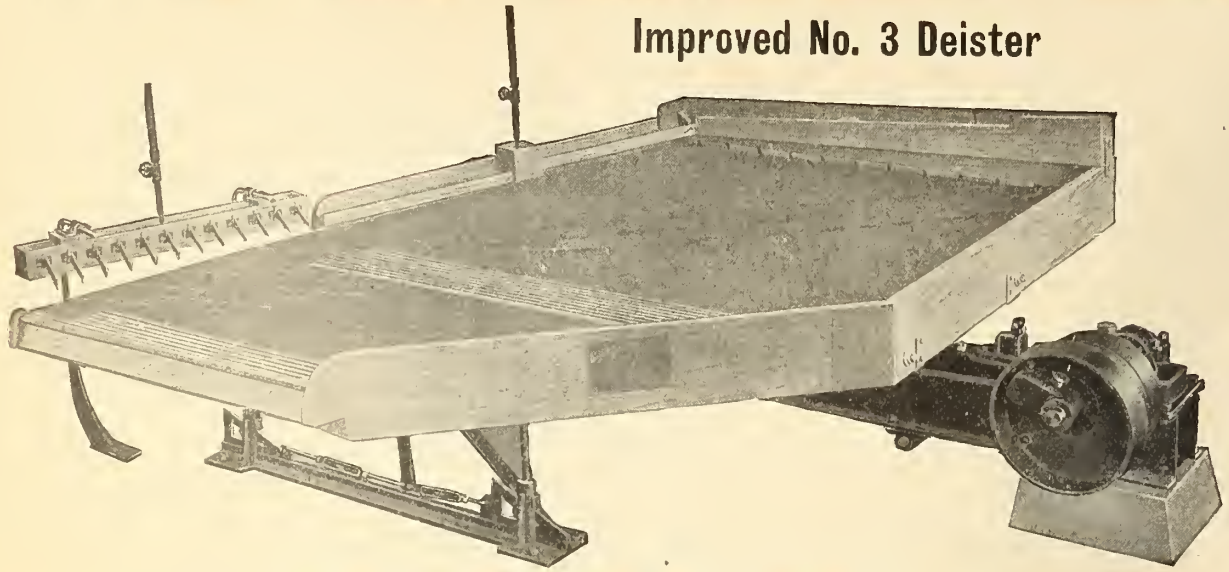

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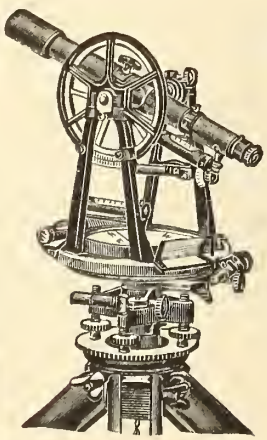

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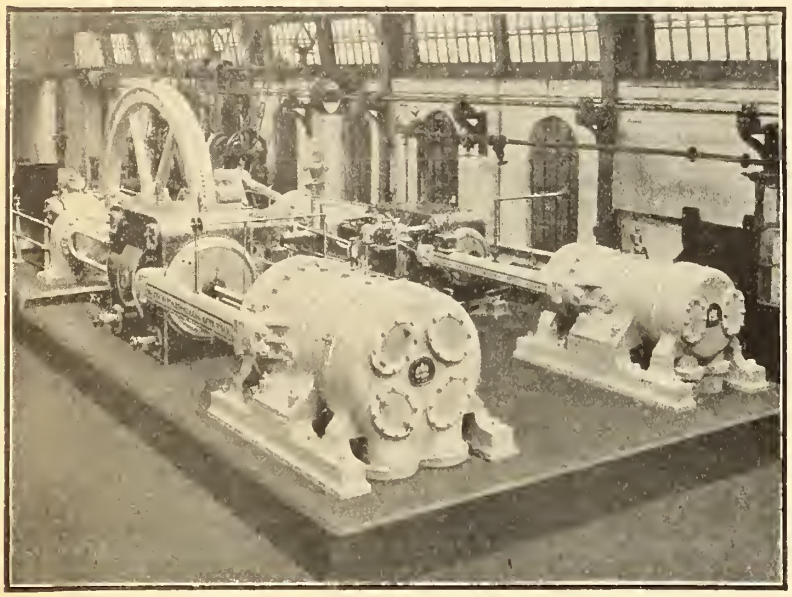

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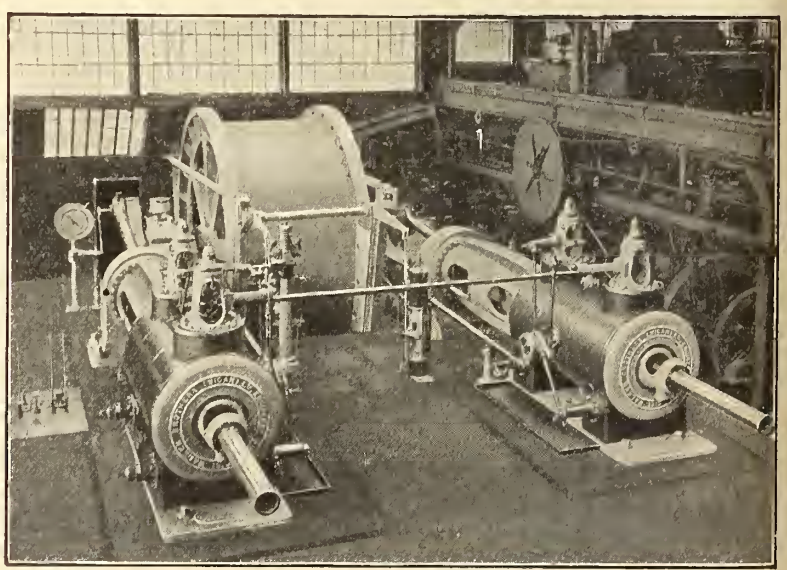

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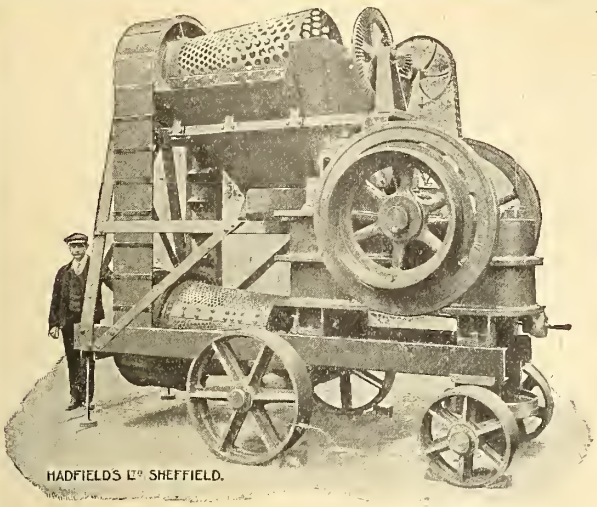

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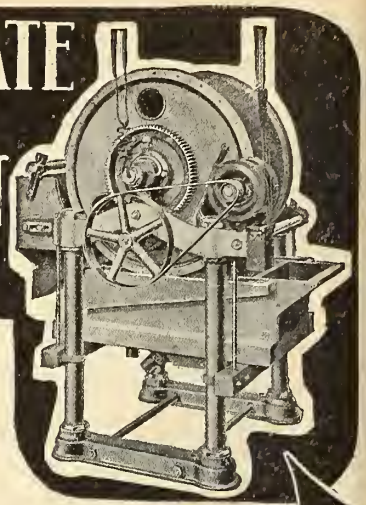

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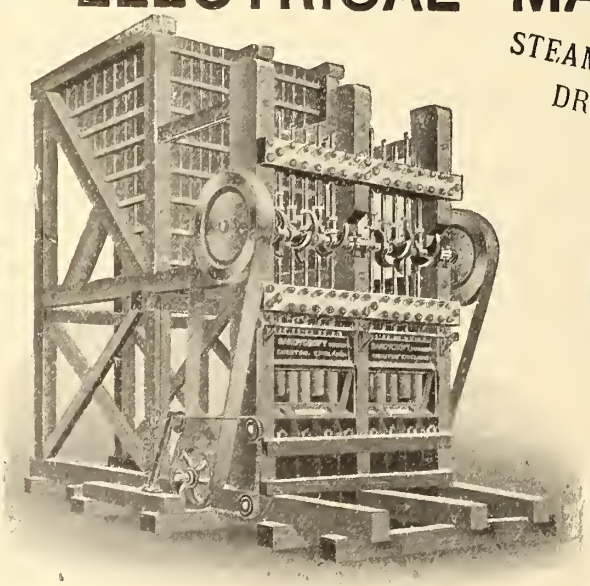

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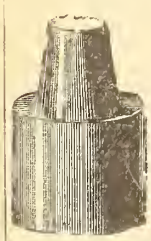

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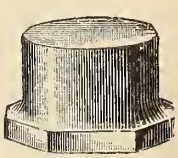

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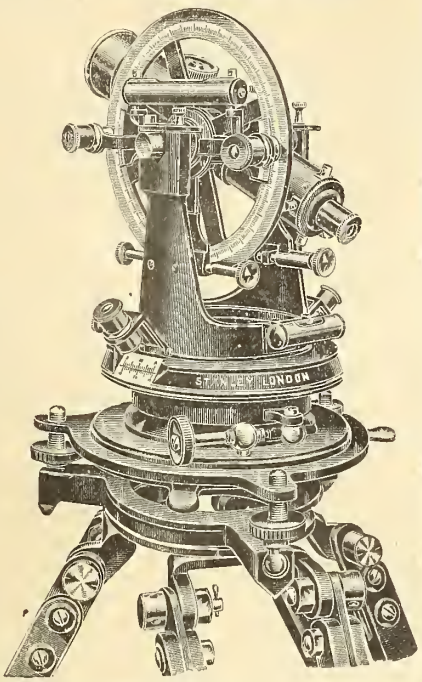

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SWASTIKA Public Notice

Our attention has been drawn to advertisements which have appeared in some of the Toronto papers over the name of CHAS. A. STONEHAM & CO., of 23 Melinda Street, Toronto, also to a circular purporting to be issued by the same parties from their Chicago office at 178 West Jackson Boulevard, also to a circular letter dated 6th November, 1911 and a pamphlet enclosed therein, purporting to emanate from their Chicago office. We feel it to be our duty to the public to state that CHAS. A. STONEHAM & CO. do not in any way represent us and have no authority whatever to make any statements regarding the conduct of our business or the management of our mine. We do not endorse any of their statements and they are not in any way in the confidence of our directorate or mine management and the public are warned accordingly. The company has also caused CHAS. A. STONEHAM & CO. to be notified by its solicitors to desist from any further publications relating to this company's affairs in any and every way. The affairs of this company have always been conducted with an eye single to an honest, clean and capable management and the directors feel that this will be appreciated by the investing public generally.

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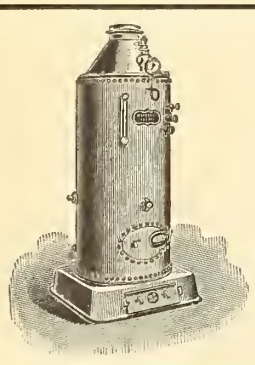

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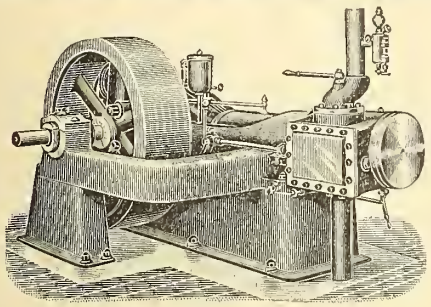

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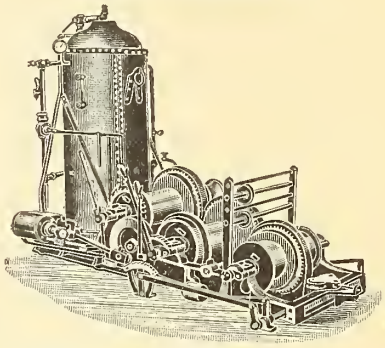

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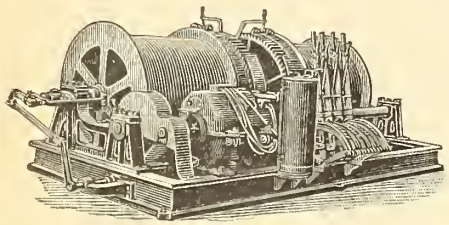

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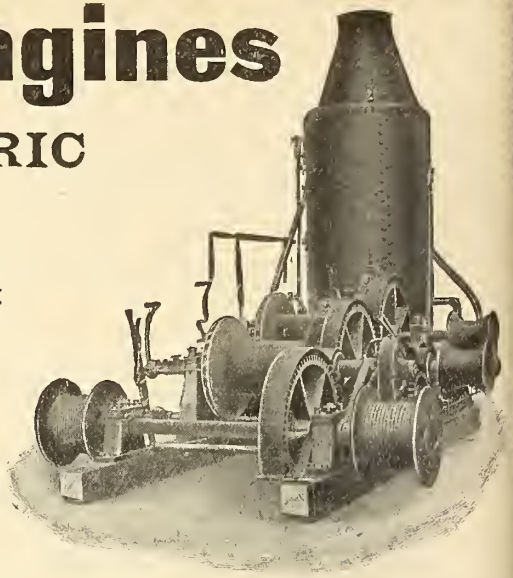

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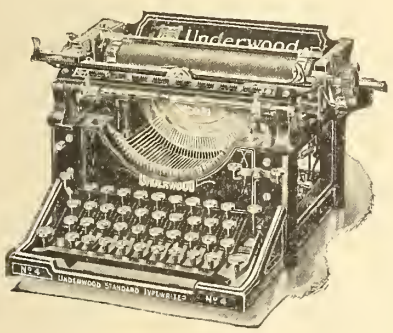

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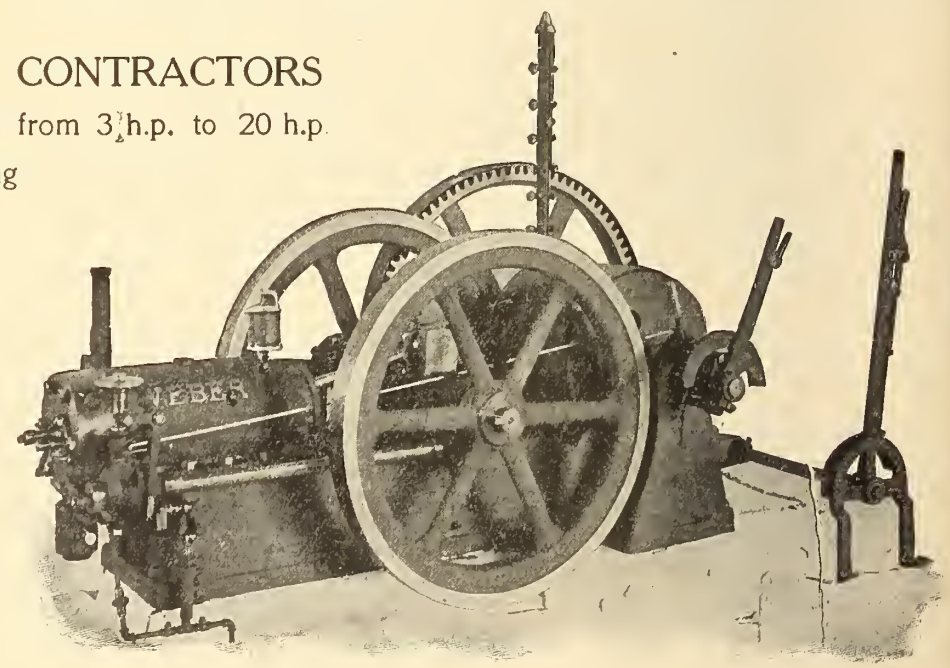

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CHRISTMAS APPEAL
FOR
The Hospital for Sick Children

Dear Mr. Editor,—

Thanks for your kindness in allowing me the privilege of appealing at this Christmas time on behalf of the Hospital for Sick Children, Toronto.

I make this direct appeal to the people of Ontario, for the fathers and mothers of Ontario, outside the City of Toronto, have precisely the same claim for their sick children as regards the privileges of the Hospital, as parents who reside in this city.

In brief the sick children from any place in Ontario whose parents cannot afford to pay, is, on certificate from a municipal officer of any city, town, village or township, treated free.

This is a privilege not granted by any Hospital in the Dominion, or on this Continent.

Let me, in a few words, state that in the last 20 years, since 1891, there have been 4,731 patients from 450 places outside of this city treated free, as the parents were unable to pay for treatment. Last year 384 patients from 234 places outside Toronto were so treated.

The Hospital is not a city but a Provincial institution. The Corporation of Toronto grants $18,000, not only for city children, but towards the maintenance of every patient in the Hospital, and the citizens of Toronto donate an average of $10,000 to the maintenance fund of the Hospital.

It would take more space than you can spare to tell of the good work done for the sick and deformed children of this Province.

Why, in the Orthopedic department in 20 years, nearly 700 children, boys and girls, have been treated for club feet, and about 600 were corrected. Two-thirds of these came from places outside of Toronto, from parents who could not afford to pay.

Surely we have a fair claim for help from the people of this Province.

Every day is Christmas to the child whose little life is saved, or whose crippled limb is straightened with the might of money—your money—and the mercy of the Hospital.

Will you, the reader of this letter, think of what your dollar will do? It helps to restore health and strength, and gives sound limbs and straight feet to crippled boys and girls.

You give wealth to the Hospital, and the Hospital gives health to the children.

Yes, your money can put golden hinges on the door of the Hospital's mercy.

Will you, kind reader, help us and send a spare dollar to Douglas Davidson, the secretary-treasurer of the Hospital, or

J ROSS ROBERTSON,
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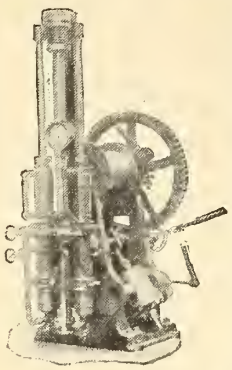

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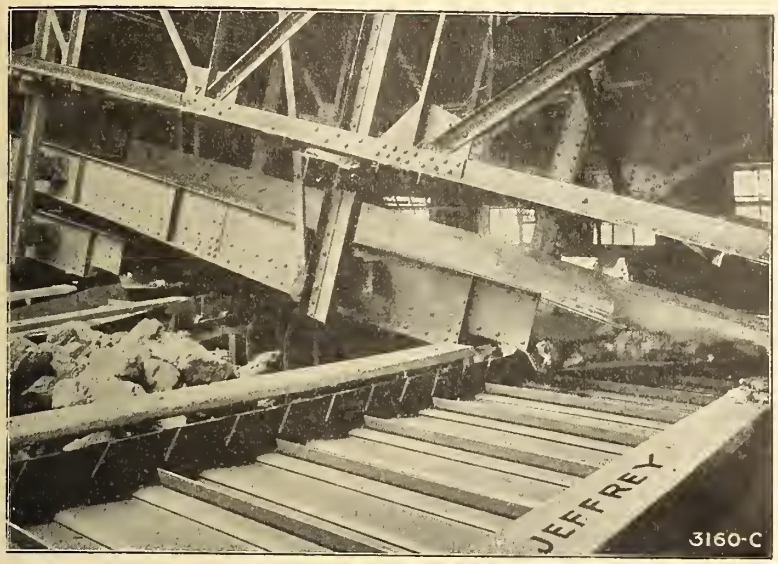

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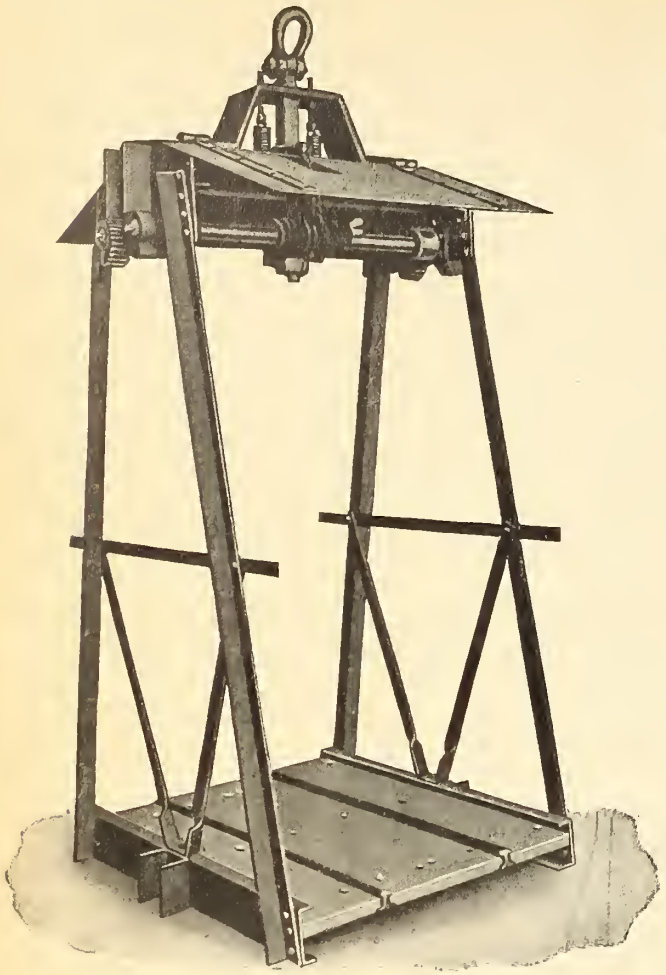

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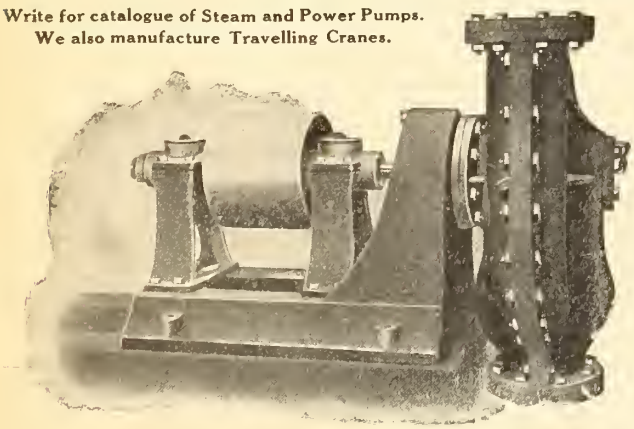

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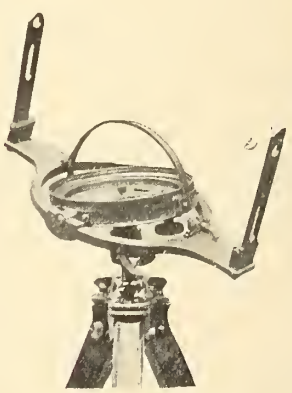

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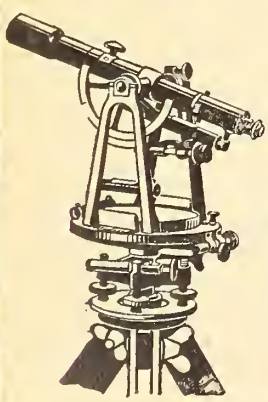

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THE CANADIAN MINING JOURNAL

VOL. XXXII. TORONTO, Dec. 15, 1911 No. 24

The Canadian Mining Journal

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A MERRY CHRISTMAS.

Five years have come and gone since the CANADIAN MINING JOURNAL first greeted its readers. In extending to our Canadian and foreign friends our heartiest wishes for a Merry Christmas, we do so with a full sense of the kind and consistent support that has been given the JOURNAL.

Christmas to all of us is a day of gladness. In the mining camp it should be the best day of the year. It is our sincere hope that the approaching Christmas will be bright and cheery in city, town, and camp.

WORKMEN'S COMPENSATION IN GERMANY.

The Toronto members of the Canadian Mining Institute have, through a committee, framed certain recommendations as to the manner in which employers' liability for the compensation of injured workmen is to be measured and determined. Circumstances do not permit us to discuss these recommendations at present. It may be timely, however, to glance at the way in which the problem is met in Germany. This is all the more appropriate for the reason that we are convinced that some form of compulsory state insurance will prove the only adequate solution of the question in Canada.

German state insurance laws are widely inclusive. Workmen and officials who are in receipt of salaries of $750 per annum, or less, come under the provision. The total number of persons thus insured is about 13,000,000. Compensation for accident amounts to the tremendous sum of $50,000,000 per annum. Nearly $10,000,000 is paid yearly to the families of those killed.

To provide for this outlay the employers are required to organize themselves into associations. The decision of the association can be appealed to an arbitration court.

Until a period of thirteen weeks has elapsed from the date of the accident, no payment is made to the injured person. Support comes meanwhile from a fund to which the employers contribute one-third, and the employee two-thirds. When the accident is traceable to gross carelessness no compensation is paid. It may also be withheld where intentional wrongdoing can be proved.

In the event of death, the family of the victim receives a sum sufficient to cover burial expenses, or a single allowance equivalent to from 20 to 60 per cent. of the annual earnings of the deceased.

It is to be noted that where an injury is so serious as to call for special medical attendance, or to necessitate the services of a trained nurse, the rate of compensation equals the full previous earning capacity of

the injured person. Complete incapacity brings a compensation through life amounting annually to two-thirds of the last year's earnings.

Serious friction occurs in Germany over the question of medical services. Each group, or association, of employers employs its own doctors. These are not always acceptable to the men. In fact, this appears to be a constant source of trouble.

That practically all the expense should fall upon the employers does not seem equitable. The state, the employer, and the workman should share the burden. The interests of all three are inseparably blended. A plan that works injustice to the workman, harms both the state and the employer. In the long run a fair division of responsibility is the only means of achieving peace and harmony.

LEGISLATION ON EXPLOSIVES.

The last two or three years have witnessed a number of shocking accidents in coal mines and in dynamite factories in Canada. Time and time again the Canadian Mining Journal has urged upon the Dominion Government the pressing need of restrictive legislation bearing upon the manufacture, handling, storage, and use of explosives. It was a matter of congratulation that last year the Mines Branch engaged Captain Desborough to look into the whole question of manufacturing dynamite and powder. At the conference held at Ottawa last autumn, Captain Desborough's recommendations were heard by representatives of all the Canadian manufacturing interests and by delegates from many large consumers. Subsequently a bill was drafted under the direction of the Mines Branch. This bill, entitled "An Act to regulate the manufacture, testing, storage, and importation of Explosives," has never become law. For certain reasons it was shelved last session. We had confidently expected that it would be submitted to Parliament this winter. Much to our disappointment we notice in the report of the House of Commons Debates, December 4th, a categorical affirmation by Premier Borden to the effect that the Government has no intention of introducing this session legislation regulating the manufacture, sale, and use of explosives.

It is incredible, of course, that the Dominion Government intends to drop the whole question. Possibly the pressure of business makes it seem necessary to postpone the consideration of the matter. But even this is inexcusable. Legislation is needed at once. At any moment the country may be shocked to learn of scores of lives lost through the improper handling or use of explosives. Such calamities can be prevented. Every civilized country does its utmost to remove the causes of such danger. In the name of humanity, we demand that Captain Desborough's report be acted upon at the earliest possible moment. Criminal negligence may not be too strong a phrase to use in the event of the matter being shelved.

THE MINERAL ALBERTITE.

Forty-seven years ago, Dr. Henry Youle Hind, one time professor of chemistry and geology at the University of Trinity College, Toronto, was requested by the Hon. S. L. Tilley, then Provincial Secretary of New Brunswick, to report upon the geology of that Province. Dr. Hinds' preliminary report was brought out in the year 1865. While it is wide in scope and interesting in almost every page, there are several chapters that, in the light of recent events, are of distinct historic value. To only one of these chapters shall we refer. We hope, later, to touch upon others.

Chapter V. of the report deals exclusively with the origin and geology of the Albert County shales and the mineral albertite. The bituminous shales have received much attention of late years, as also has the albertite. It is in this region also that Dr. J. A. L. Henderson, of London, England, has so successfully exploited the gas and oil measures. Dr. Hind's description of the Albert mine, where the mineral albertite was then being mined extensively, is, in these circumstances, worth noting.

From Dr. Hind's account we learn that, in the year 1849, Dr. Robb, accompanied by Professor Johnston, visited Albert County. Dr. Robb first noticed albertite in October of that year. He describes it as "a mineral pitch or hard bitumen." This is the first recorded discovery. The actual beginning of mining was due, later, to the bursting of a dam on a branch of Frederick's Brook, which exposed a series of massive lustrous veins of albertite. The mineral was christened by Dr. Robb.

Mining operations were in full swing in the year 1852, in which year an extraordinary law suit, Abraham Gesner vs. William Cairns, was commenced. The case hinged upon the character of albertite, the plaintiff contending that it was "true asphaltum"; the defendant holding that it was a coal. A vehement controversy ensued. Embattled scientists smote each other with turgid phrases. The lie direct was given and taken. At last Mr. Justice Wilmot, wearying of the flood of words, instructed the jury to retire. After the jury had deliberated long the decision was reached that the material was coal! Fortunately, this did not, as was at first feared, affect the case. Dr. Hind made several caustic comments upon the flexibility of scientists' convictions.

Let us return ao the Albert mine. Dr. Hind's visit took place in October, 1864. It had then been working for twelve years. An inclined shaft had been sunk to a depth of 1,000 feet, continuously in bituminous shales. The relation of the albertite veins to the adjacent rock, according to Dr. Hind, was not determinable. That they were veins, and not beds, was evident. A great fissure filled with albertite had been worked out to the depth of 750 feet. In the fissure were numerous "horses" of rock. The places from which these "horses" had fallen were filled with al-

bertite. The thickness of the vein ranged 17 feet to nothing. Minute fissures filled with albertite ran in all directions into the walls. From this and other evidence, Dr. Hind rightly concluded that the mineral had been injected into the fissure in a liquid state under great pressure.

After traversing severely the diagnoses of contemporary geologists, Dr. Hind proceeds to show that there were two periods of injection of the material that produced albertite; that albertite is an inspissated or hardened petroleum, and that its source lies in rocks below the Albert shales, rocks probably of Devonian age. His lucid process of reasoning, space will not permit us to trace.

Certain paragraphs in the chapter under consideration discuss tentatively the geology of petroleum. These show that Dr. Hind was much in advance of his day and generation.

No other report of the learned and versatile doctor has more meat in it than this New Brunswick pamphlet. Our patient readers will hear more of it anon.

THE GYPSUM DEPOSITS OF THE MARITIME PROVINCES.

The latest monograph issued by the Dominion Mines Branch is a bulky volume on the gypsum deposits and industries of Nova Scotia and New Brunswick. The author is Mr. W. F. Jennison, who has had long experience in the gypsum-bearing regions of both Provinces.

The status of the gypsum industries in the Maritime Provinces may best be shown by comparing a few statistics. The total quantity of crude gypsum mined annually in the United States is something less than 2,000,000 short tons. Practically all the gypsum imported into the United States, amounting to about 450,000 tons per annum, comes from Nova Scotia and New Brunswick, and is shipped crude. The greater part of it is calcined and manufactured into wall plasters in plants along the New England coast. Relatively small quantities are turned into finished products in the Maritime Provinces.

As the Canadian mineral is of much higher quality than most of the available United States material, the American manufacturer has sought to protect his own market by securing duties of 35 per cent. and $1.75 per ton respectively on manufactured and ground or calcined gypsum; while, as he desires the Canadian crude, only 30 cents per ton is imposed. The Canadian tariff, on the other hand, admits crude gypsum free, places a duty of 8 cents, 11 cents, or 12½ cents per 100 pounds on prepared wall plaster, and 10 per cent., 12½ per cent., or 15 per cent. on gypsum ground but not calcined.

It will be seen that the Maritime Province operators are in a good position to develop the domestic market for manufactured products, and still retain a large export trade in crude. Domestic finished products can be sold at less than $4 per ton at the mill. The American products cannot be profitably disposed of in this country unless at least $6.50 per ton is charged at the mill.

As with all such minerals, the real profit in the gypsum business lies in the grinding, calcining, and further preparation. The average price of crude lump is about $1.10 per ton. The crude ground ranges from $2.50 to $3.10, and the calcined runs up to $8.00 per ton. The cost of quarrying and of handling is very low. Manufacturing costs are extremely moderate. Transportation and marketing are the controlling factors.

There is no sufficient cause for the lack of expansion in this eastern industry. With all the advantages of tide-water shipment, of high grade deposits, of an already established trade in crude and a growing market for finished products, the situation deserves the immediate attention of Canadian investors.

We hope that Mr. Jennison's volume will stimulate interest in the immediate future.

ORGANIZED LABOUR.

The whole truth concerning the horrible series of crimes committed by the McNamaras and their fellow-criminals will probably never be known. Enough, however, has been revealed to show that behind the dynamitards was the carefully disguised influence of persons who were identified with the headquarters of organized labour. This does not mean that the labour organization officially approved the criminal activities of the McNamaras. But it implies certainly that labour organizations in the United States lend themselves to the machinations of the worst kind of nihilists.

This fact has a particularly cogent bearing upon Canada. For instance, the U.M.W.A. spent many thousands of dollars, over one million in all, in attempting to establish its walking-delegates in Nova Scotia. In this attempt, despite the use of most reprehensible methods, it failed.

This is but one instance of the desire of demagogues from the United States to control Canadian labour, to add to their own exchequer the revenues derivable from Canadian miners and other workmen.

We cannot see why Canadian workmen are not capable of managing their own affairs. Much less can we see what Canadian workmen can gain by permitting themselves to be governed by the paid agents of foreign organizations. A broad continental affiliation may be desirable. But actual assimilation must prove disastrous.

Canada has not been cursed with the hired assassin and the professional dynamitard. Why her workmen should contribute to the support of these classes in the United States is not clear.

EDITORIAL NOTES.

The milling costs at Stratton's Independence mill are about $1.25 per ton of ore treated. The average recovery on $3 ore is about 70 per cent., and the capacity of the mill is 4,500 tons monthly.

At Trollhattan, Sweden, an electric smelter has been operating to good effect on zinc-lead ore. The recovery on Broken Hill slime was 64 per cent. of the zinc, 74 per cent. of the lead, and 46 per cent. of the silver.

It is time that the Dominion Government reached some decision as to the status of the Department of Mines. If a capable and responsible minister is not given a separate portfolio we can predict a considerable disturbance.

Deep drilling in Porcupine has aroused much interest. It is announced that at Pearl Lake a depth of 1,200 feet was recently attained, and that ore of commercial value was discovered at that depth. This is good news, although, of course, it requires careful substantiation.

At the suggestion of the Denver Republican, a public Grubstake Fund amounting to $10,000 was collected under the auspices of a committee of the Denver Chamber of Commerce. Thirty-four parties of carefully selected prospectors were sent out to prospect certain localities remote from old camps. Valuable discoveries of gold, silver, lead, and copper were made. It is proposed now to form a Chamber of Commerce Company to develop the claims.

The last meeting of the Toronto Branch of the Canadian Mining Institute was one of the most profitable yet held. While the attendance of Toronto members was not as large as might be, there were several outside members present, including three from British Columbia. The presentation of the report upon Workmen's Compensation was the signal for a long debate. The report was not modified in any respect. It is soon to be submitted to Sir William Meredith.

The cut in the dividend of the Yukon Gold Company's dividend—from 2 per cent. to 1½ per cent.—is explained away by Mr. S. R. Guggenheim, who attributes the reduction to "the extraordinarily dull "season prevailing in different parts of the world," and to the fact that two new steel dredges were not finished in time to be of much use. Glittering generalities don't go far towards soothing disappointed shareholders.

CORRESPONDENCE

THE ORIGIN OF PETROLEUMS.

Editor, The Canadian Mining Journal:

Sir,—Permit me to thank you for your notice in your issue of November 1st, of the paper I contributed a short time ago to the Institution of Mining and Metallurgy on the origin of petroleums, and for your excellent short resume of some of the important points made by me in this paper.

But I would like to be allowed to take exception to the following remark in your article, viz.: "The chief bar to proper discussion, however, is the fundamental divergence in the postulates of each party." This remark most certainly applies to the defenders of the organic theories, who assume so many unsupported positions in this discussion; but I claim that it cannot justly be said that I postulate or assume when I back my position and arguments with so much evidence.

My opponents, the "organics," assume, for instance:

That hydrocarbon compounds (such as petroleums) must necessarily have an organic source, because they are carbon or organic chemical compounds. This is evidently an assumption, a postulate, founded merely on a play on words.

They also assume that the petroleums found in the "sands," evidently come from bituminous shales—that is to say, that the petroleums found in a certain kind of reservoir, "the sands," come from the bitumen found in another kind of reservoir, the shales. This position is asserted without evidence, and is a reasoning in a circle which can prove absolutely nothing as to the origin of the petroleums, or bitumen, in either the sands or the shales.

They also assume that the petroleums are the product of distillation of "coals," or other organic remains, in the sedimentary strata; although the oil bearing strata are always found to be in the unaltered and undistilled state.

They also assume that the above distillation of organic remains can proceed at low temperatures—although all known processes of distillation are always the result of high temperatures.

They also assume that time—long time—can take, and has taken, the place of temperature in the distillation of certain of the organic remains entombed in the strata, and has thus slowly distilled them into petroleums. Why are not the coal beds and the unaltered sediments all distilled then? All of them have had ample time.

They also assume that, because some of the sediments are rich in fossils, these beds are bound, or were bound, to be highly bituminous—although, as every paleontologist knows, it is the rarest thing in the world to find bitumen or petroleums of any kind in a fossil. It is not found in one out of a million cases; and the geologist knows that the oil sands (some of which are enormously productive in petroleums), are not fossiliferous. In the above postulate, they take the assumed position that the soft tissues of animals are preserved and entombed with their shells or bones during the formation of strata, when we can observe every day in the actual processes of entombment in nature, that the very reverse is the case.

They also assume that petroleums can originate in fine-grained sediments, such as shales, and travel through the pores of these sediments for miles, laterally to accumulate under a distant anticline, when, if that was possible, it is quite evident that these petroleum products would, instead, travel up to the surface only a few hundred feet, or one-half or three-quarters of a mile away, at most, and escape. This postulate of possible migration and accumulation of petroleums through and from the mass of the surrounding sediments, is assumed against ample evidence furnished in every oil-field, that the sedimentary strata surrounding the oil-fields or pools, are absolutely impervious, since they keep the petroleum hemmed in their porous reservoirs, under very strong gas pressures always recorded in every field. If these surrounding sediments are impervious enough to prevent the gas from escaping, they cannot be the source from which this gas comes in. I have shown in my papers, that the "organics" use a number of other postulates without any more evidence in support than they can adduce for the assumptions mentioned above. It remains to be shown by them, that I have done likewise, and that I have proceeded also by "postulates." Let them take up one by one the facts and arguments which I have repeatedly advanced, and show that they are also assumptions—not founded on real evidence. I have been waiting for many years, to have some one do that, and would like to have him come forward at last. If not, I shall be forced to conclude that neither you, Mr. Editor, nor any one else, can prove that I have "postulated" or assumed in my presentations and discussions of this most important subject.

Yours, etc.,

EUGENE COSTE.

Ottawa, December 4th, 1911.

The Editor, CANADIAN MINING JOURNAL:

Sir,—Permit me to call your attention to an erroneous statement made by Mr. A. Gordon French, reported under the heading "Urges Bounty on Zinc," p. 779 in your December issue. The erroneous statement is as follows: "While in Ottawa, said Mr. French, he had been told that both Dr. Haanel and Dr. Ingalls had abandoned the problem," referring to the investigation of processes for the treatment of the complex zinc ores of British Columbia. Such is not the case. In fact, the investigation and experimentation are being pushed with earnestness and vigour.

In order to make more rapid progress in our enquiry, we have added to the staff by availing ourselves of the services of Mr. Dedolph, who has assisted Mr. Snyder in his electric smelting experiments at Nelson, B.C., and who is a metallurgist, well known in British Columbia.

Yours sincerely,

EUGENE HAANEL,
Director of Mines, Ottawa.

CONCENTRATION AT HUDSON BAY MINES.

Editor, CANADIAN MINING JOURNAL:

Sir,—I read with much interest the article by Mr. H. G. Young, in your issue of November 15th. Mr. Young describes very clearly the methods employed at his mine. There are one or two points, however, on which I would like to interrogate him.

In the first place, why use a 16-mesh screen, when there is no after-grinding of the ore?

In the second place, why use stamps at all, if the ore is amenable to treatment at such a coarse mesh?

Of course, Mr. Young's answer may be easy enough. I shall appreciate a full one.

Yours, etc.

Madoc, Ont. G. H. GILLESPIE.

BOOK REVIEWS.

THE TECHNICAL ANALYSIS OF BRASS AND THE NON-FERROUS ALLOYS — By WILLIAM BENHAM PRICE AND RICHARD K. MEADE — 267 PAGES — PRICE, $2 — PUBLISHED BY JOHN WILEY & SONS, NEW YORK, AND THE RENOUF PUBLISHING COMPANY, LTD., MONTREAL.

It has been estimated that on the rolling stock of American railways alone there is over $21,000,000 invested in bearing metal. This sufficiently accurate approximation gives one some idea of the importance of right technical control of the manufacture and use of alloys.

The book whose title appears above purports to cover the whole field of the chemical analysis of brass and the non-ferrous alloys.

In chapter I., engineering alloys are dealt with generally. Chapter II. takes up apparatus for electro-chemical analysis. After these introductory chapters, there come fifteen successive chapters, describing the methods of determining each metal used.

The last 110 pages are occupied with careful outlines of applied examples of alloy analysis.

The general plan of the book is well conceived. The arrangement is logical, clear, and convenient. Possibly enough general facts about alloys are not included. But, on the whole, the book is by far the best presentation of the subject that we have seen.

GEOLOGY OF THE LAKE SUPERIOR REGION — "Monograph 52 of the United States Geological Survey, entitled 'The geology of the Lake Superior Region,' by C. R. VAN HISE and C. K. LEITH, is now ready for distribution. This monograph represents the first attempt of the Geological Survey to cover the geology of the entire region in a single volume. It contains 641 quarto pages and includes chapters on all the iron and copper producing districts and full descriptions of the iron and copper ores. It is accompanied by accurate maps of all the producing districts and a general geologic map of the region. The illustrations number 49 plates and 76 text figures, comprising maps, sections, diagrams, and half-tone reproductions of photographs of ores and minerals. The price is $2.50, the cost of publication. Remittance should be made by postal or express money order to the Director, United States Geological Survey, or in cash—the exact amount."

In this concise and unappreciative way the director of the United States Geological Survey announces the publication in revised and condensed form of a vast amount of painstaking study of the iron and copper deposits of Lake Superior. The geological map covers approximately 181,000 square miles, of which about three per cent. are of commercial importance as ore-bearing areas. The region includes the native copper mines of Keweenaw Point, the most important of their kind in the world. There are also included the Marquette, Menominee, Gogebic, Mesabi, and Vermilion iron ranges, not to mention several smaller ones, which make the region the most important iron ore centre in the world.

All of these regions are described in detail, with excellent coloured geological maps and numerous illustrations. A full chapter is given to "the pre-Animikie iron districts of Ontario," wherein the geology and iron ore occurrences of the Lake of the Woods, Steep Rock Lake, Atikokan, Mattawin, and Michipicoten districts are described. Another chapter describes the geology and ores of the Gunflint Lake and Loon Lake areas of the Animikie, and makes comparisons with the Mesabi.

In a chapter on the Keweenawan series the geology of Lake Nipigon, of Nipigon and Black Bays, of Michipicoten Island, and of the east shore of Superior is discussed.

Chapter XVII., of 110 pages, on iron ores, is a most important exposition of ore deposits. Conditions of sedimentation and methods of secondary concentration are discussed. There is also a description of the iron formations, methods of exploration, ore reserves, methods of mining and transporting. The statement is made that 7,200,000 feet of diamond drilling has been done on the American iron ranges in the search for ore, at a cost of at least $21,600,000.

Another chapter discusses in an equally thorough manner the origin of the copper ores. A short chapter deals with the silver ores, confined almost wholly to Ontario. Chapters are included on the general geology, on the physical geography, on the history of mining, on the plaistocene geology, and one giving a full bibliography.

To all students of the pre-Cambrian areas of Canada, and to engineers and others interested in the exploitation of iron or native copper ores, the volume is invaluable.

PERSONAL AND GENERAL

Mr. Frank Loring, with two assistants, is examining the St. Anthony mine, Sturgeon Lake, Ontario.

Mr. W. M. Brewer has retired from the management of the Matanuska Gold Mines, Ltd., with mining property in Alaska.

Mr. H. P. Davis has returned to New York. He will presently visit Cobalt, Swastika and Porcupine to gather material for his annual review.

Mr. A. D. Miles, who represents the Canadian Copper Company, has taken an office in the new Standard Bank Building, King Street west, Toronto.

Mr. George F. Loudon has retired from the directorate of the Scottish Ontario Gold Mining Syndicate, Limited. Colonel William Clark, of Glasgow, has been appointed in Mr. Loudon's place.

Mr. J. M. Ruffner, manager of the North Columbia Gold Mining Company, operating hydraulic placer-gold mines in Atlin camp, British Columbia, has gone to his home in Cincinnati, U.S.A., for the Winter.

Mr. John Hopp, who owns four or five placer-gold mines in the Barkerville section of Cariboo district, British Columbia, and whose hydraulicking operations are on the largest scale of any in the district, is spending the winter on the coast.

Mr. D. L. H. Forbes, mining and metallurgical engineer, has opened an office at 306 Manning Chambers, 72 Queen Street west, Toronto. In addition to his private practice, Mr. Forbes will undertake metallurgical testing and designing on behalf of the Merrill Metallurgical Company of San Francisco.

Mr. Anthony J. McMillan, liquidator of the Le Roi Mining Company, Ltd., has gone to London, after having spent several weeks in British Columbia and the adjoining State of Washington, in connection with the disposal of the company's mining and smelting properties.

Mr. J. W. D. Moodie, of Salt Lake City, Utah, U.S.A., has been appointed general manager of the Britannia Mining and Smelting Company, Ltd., in the place of Mr. Robert H. Leach, resigned. Mr. Moodie has been general manager of the Tintic Mining and Development Company and the Yampa Smelting Company, both operating in Utah.

Messrs. W. E. Carter and Alexander H. Smith, both well-known Toronto mining engineers, have formed a partnership, under the name of Carter and Smith. The temporary Toronto address is "care of CANADIAN MINING JOURNAL, Toronto. The firm's northern address is South Porcupine. Both Mr. Carter and Mr. Smith have a thorough knowledge of Canadian mines and ore deposits.

Mr. O. B. Smith, jr., superintendent of mines of the Granby Consolidated M., S. & P. Co., Ltd., lately returned south, after having spent some time at the company's Hidden Creek copper mine, Observatory Inlet. Mr. George W. Wooster, treasurer and director of the company, and Mr. Wakely A .Williams, superintendent of the company's large smelting works, are both back at Grand Forks, B.C., from visiting the Hidden Creek property.

Mr. W. H. Trewartha-James has resigned the position of general manager of the Tyee Copper Company, Ltd., with mines and smelting works on Vancouver Island, British Columbia. He left Victoria for England about the middle of November. Mr. W. J. Watson, manager of the company's smeltery, has been appointed acting general manager. Messrs. T. H. Wilson (chairman), Harry von Berg, and J. Hancke, directors of the company, all of London, have lately been visiting the company's offices and properties.

Mr. Robert H. Leach has resigned as general manager of the Britannia Mining and Smelting Company, after having during several years successfully directed development work at the company's mines on Britannia Mountain, Howe Sound, British Columbia, and the varied experimental work done in the works at Britan-

nia Beach in connection with the milling and concentration of copper ores. He will spend the winter in Southern California, whence he has gone for a few months' rest and recreation.

Mr. R. G. Drinnan, formerly general superintendent of the Crow's Nest Pass Coal Company, was in Toronto during the first week of December. He was one of several British Columbian members who attended the meeting of the Canadian Mining Institute (Toronto branch), meeting at the Engineers' Club on Saturday, December 2nd. He has returned to Vancouver for the winter.

Mr. Colin Campbell, of Campbell and Deyell, attended the last meeting of the Toronto branch of the C. M. I., and spoke briefly upon the formation of the Porcupine branch, the organization meeting of which will be held in South Porcupine on December 16.

Upon his return to British Columbia from Pittsburg, Pennsylvania, whence he went with Mr. R. F. Tolmie, Deputy Minister of Mines for British Columbia, Mr. Robert Strachan, district inspector of mines, Hosmer, Crow's Nest Pass, made a full and comprehensive report on the proceedings he witnessed at the United States National Mine Safety Demonstration, and as an outcome of which he has made recommendations to the Provincial Minister of Mines, with a view to the further improvement of several matters connected with the coal mining industry in his (Mr. Strachan's) inspection district.

The Gypsum Deposits of Nova Scotia

By W. F. JENNISON, M.E.*

Description of Deposits.

The deposits present much variety of colour and texture. The greater part in texture may be classed as compact or crypto-crystalline, with lesser quantities of granular or saccharoidal. In some places considerable quantities of selenite occur, showing folia, sometimes a foot or more across and transparent throughout, as shown in Plate III.; and the fibrous varieties are seen in many places associated with the gypsum and marls, Plate IV. Crystals of selenite are often found disseminated irregularly through the gypsum beds. A characteristic example of this is shown in Plate V., usually in groups or bunches, sometimes in veins of importance.

Anhydrite often occurs in extremely variable proportions in many of the deposits, with great irregularity, and the occurrence of this mineral, which is practically valueless, with the gypsum, often interferes with the economic operation of the quarries.

The following brief description of the gypsum deposits of Nova Scotia, with analyses furnished by Mr. F. G. Wait, chemist for the Mines Branch of the Department of Mines, is intended to give essentially the conditions of most economic importance, rather than to deal at length with the geological conditions of each deposit, which are very similar.

Sheet No. 2, Aspy Bay, Victoria County.

Extending from the Atlantic Ocean, inland about six miles, in a somewhat triangular shape, occurs one of the most important gypsiferous areas on the island of Cape Breton. Its occurrence, comprising nearly 8 square miles. is in comparatively low lands surrounded by hills of the older Pre-Cambrian rocks, often 1,000 feet in height, and it is practically all underlain with gypsum.

Two rivers, the North Aspy River and the Middle River, run through this area, exposing cliffs having a height from 40 to 70 feet, and their meadows make a very easy gradient from the deposit to the sea.

The exposures are extensive. The rock is white, and mottled white and grey, compact crystallization showing some little anhydrite, which carries petroleum in small (pea size) cells at the base of exposure.

At present the deposits are inaccessible for want of a harbour. The natural outport would be North Pond, at Dingwall. This pond, which has sufficient depth of water for shipping purposes, has been separated from the ocean by the washing of sand and gravel up from the ocean bed, forming a narrow bar across the entrance, and thus closing to navigators one of the best harbours on the coast.

Sheet No. 4, Cheticamp, Inverness County.

On this sheet will be seen a gypsiferous belt, skirting the metamorphic hills from the mouth of the Cheticamp River on the north to well below Friar Point on the south, a distance of over 13 miles, and at no place a greater distance than 2 miles from the sea coast. Its width varies from about 600 feet to over 2,500 feet.

The principal outcrops occur on the southeast side of Aucoin or Mill Brook, about 3 miles from the northern extremity, and at Grand Etang harbour, about the same distance from the southern extremity.

Between these two points, and their extensions both north and south, the gypsum is mostly concealed, but is traceable by the characteristic sink holes and hummocky ground, under an overburden of clay.

The northern exposures, shown in Plate VIII., on the east side of Aucoin Brook, are composed of a series of precipitous cliffs, from 60 to 180 feet high, above the level of the brook, and forming a narrow plateau parallel to and at no great distance from the base of the great plateau of northern Cape Breton.

The southern exposure occurs near the head of Grand Etang harbour, where the high cliffs of white compact gypsum outcrop near the water's edge.

The northern exposures have been developed by the Great Northern Mining Company, who have established a plaster mill near the face of the cliff. This area alone contains very extensive deposits of gypsum, made up of different beds interstratified with limestone. The first or lower bed, overlying the metamorphic series, consists of a compact variety of snow-white and white gypsum; resting on this is a bed of

*Abstracted from monograph, "Report on the Gypsum Deposits of the Maritime Provinces," issued by the Mines Branch, Ottawa.

carboniferous limestone having an average thickness of about 100 feet; above the limestone is a very extensive bed of grey and white selenitie gypsum. The valley of the Mill Brook is all underlain with gypsum, and eovered with from a few inches to a few feet of red clay; on the western side the gypsum again erops out with considerable prominenee.

The high bluff of selenitie grey and white gypsum is often cut by vertieal veins of pure transparent selenite, running parallel to the strike, with veinlets or stringers cutting off horizontally. One of these veins has a width from 8 to 20 feet, and may be traeed for at least half a mile.

Sheet No. 11, Mabou, Inverness County.

In this seetion there are numerous gypsiferous areas which are more or less available for eommereial purposes. They eomprise a total area of 6.55 square miles.

At Finlay point, on the sea eoast, and about one mile north of Mabou eoal mines, oeeur cliffs of exeellent white eompaet gypsum from 35 to 50 feet in height. This area extends along and borders the sea coast for nearly 3½ miles. The exposures here are large, and every indieation points to an extensive deposit of gypsum of a quality suitable for all ordinary manufaeturing purposes, but the sea eoast is rugged, and very little proteetion eould be given to shipping. To operate this deposit it would, therefore, be necessary to make the shipping point at Mabou harbour, a distanee of 3½ miles over a rather diffieult pass.

At Mabou harbour the most important deposits are located, and known as the Col. Snow property, and the Beaton property.

The roek is exposed in eliffs from 45 to 60 feet high, and consists almost wholly of a white eompaet gypsum, with smaller quantities showing microseopie erystals of selenite. Small quantities of anhydrite may be seen at the base of the cliffs.

Following east to Hillsborough, and south to Southwest Mabou, large gypsiferous areas oeeur, but eonsist in the greater part of eoneealed measures. Large outerops of a very soft, grey, and dark grey, granular gypsum, suitable only for land plaster, oeeur at Hillsborough. At Southwest Mabou the roek is similar in texture, and has assoeiated with it fine erystals of selenite.

Sheet No. 12, Smith Island, Inverness County.

On this sheet oeeur three small gypsiferous areas eonsisting of 212.8 aeres. The largest and most important of these is that of 148.8 aeres, on Smith Island.

This island is situated about one mile from the mainland, and opposite Port Hood. Its topography is low, and the exposures, whieh in the greater part are on the exposed side of this island, appear as extensive beds assoeiated with shales and earbonate of lime, and may be traeed from shore to shore by broken land and pits or sink holes.

The gypsum oeeurs in alternating layers with the earbonate of lime and marls, the latter earrying extensive quantities of fibrous gypsum.

At Ragged Point, and at Cape Susan, at one time, was an area of eonsiderable importanee, whieh has been, by erosion of the sea, divided into two, having a total area of 64 aeres. The oeeurrenee here, like Smith Island, has few outerops, and the gypsum and limestone are elosely assoeiated. Large quantities of marl are also prominent.

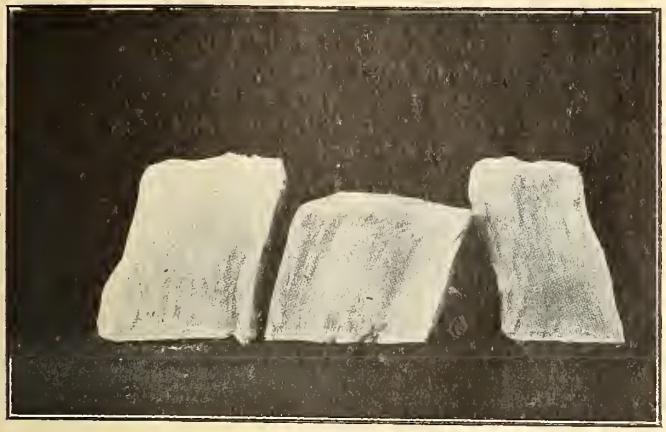
Transparent crystal of Selenite.

The close proximity of these areas to the railway and eoal fields makes them desirable for manufacturing purposes.

Sheet No. 15, Malagawatchkt, Inverness County.

On the south side of Denys basin is a narrow gypsiferous area skirting the shores of the Bras d'Or lakes from McKenzie Brook on the northwest, to about half a mile southwest of Matheson's wharf, and eontinuing southwest by numerous small islands and peninsulas to West Bay. In this area of 6.44 square miles, including that portion of sheet No. 16 southwest of Denys basin, numerous outcrops of gypsum are seen as at Plaster Island, and on the River Denys road, George Island, Green Island, and Floda Island.

Many of these outcrops are of little importanee, being low and having but small quantities above sea-level. Several, however, have sufficient prominenee to be considered as available supplies. The exposure on Donald McKinnon's farm, River Denys road, has a



Fibrous Selenite Crystals.

height averaging 50 feet, with a length of 275 feet. This deposit, and its extension 2½ miles northwest to Plaster Island, shows probably the most important deposit in the whole area. At Plaster Island the exposure is from 10 to 40 feet in height on the shore, and covers an area of 4 to 5 acres.

In texture and colour, this rock is a soft white compact variety, having some anhydrite associated with it.

Sheet No. 16, Washabuck Peninsula, Victoria County.

This area includes the deposits at McKinnon harbour, Ottawa Brook, Washabuck River, Nineveh, Little Narrows, Maciver point, Deadman point, McKay point, Boulaceet harbour, Lieutenant pond, Iona, Jamesville, Red point, and south side Whycocomagh Bay. The total area is 25.54 square miles. Here all varieties of texture and colour may be found. The exposures are many and large. Anhydrite occurs frequently, outcropping in large irregular masses. This is especially true at Nineveh, and at Washabuck, the former showing a perpendicular face of 60 to 80 feet and a length of over 800 feet. At the latter place it shows on a road leading from Washabuck River to Little Narrows, for nearly a mile in width.

At Ottawa Brook, the Newark Lime and Cement Company, of Newark, New Jersey, U.S.A., started operations in 1908. They have opened up several deposits, and built a railway connecting them with their shipping pier, constructed on the north side of Great Bras d'Or Lake.

The rock at some of the points opened up, although a soft white compact variety, shows much disturbance, being badly fractured and folded; due to local pressures—probably the conversion of anhydrite into gypsum. At another point, only a few hundred feet distant, a dark carbonate of lime is seen graduating into gypsum. The lower left corner shows the lime, with streaks of snow-white gypsum. The right and upper side is a soft white compact variety of gypsum, showing very little disturbance.

At Little Narrows (south side), on the properties of M. J. McAskill and widow McAskill, very large exposures are seen. At the latter the face is about 100 feet high and over 600 feet long; the rock is an excellent quality of soft white compact variety with but few irregularities. It is situated on St. Patrick channel, about one mile from the shipping point, to which a practically level route could be secured.

Composition is shown by the following analyses:

	Per cent.	Per cent.
Lime	33.30	33.67
Sulphuric anhydride	46.00	46.00
Water, loss on ignition	21.16	20.70
Insoluble mineral matter ...	0.24	0.20
	100.70	100.57

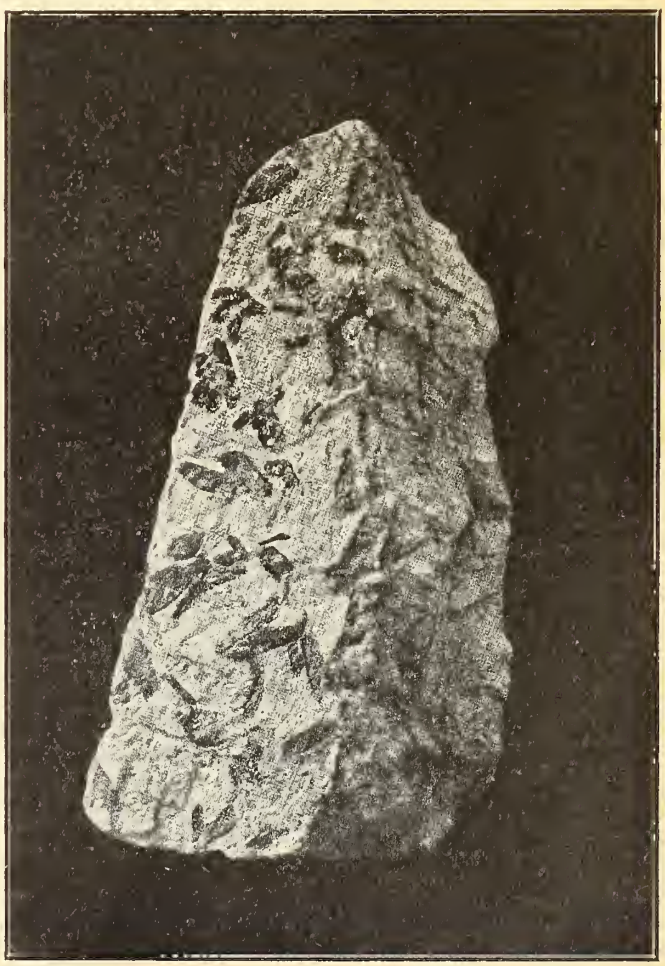
Sheet No. 18, Port Bevis or Big Harbour, Victoria County.

From Baddeck Bay on the west to St. Ann Bay on the east may be considered as one continuous gypsiferous bed, having an area of 15.83 square miles.

It contains many important outcrops of both gypsum and anhydrite. On the shores of the Great Bras d'Or Lake, west of Port Bevis, extensive cliffs of anhydrite occur. Another cliff, 70 feet high and 650 feet long, is shown in Plate X. The prominence of this mineral is greater on or near the shores of the lake, and again at the contact of these measures with the older rocks, and may be a conversion from gypsum by metamorphic action.

The farther it is possible to get from these points the freer the deposit seems to be from anhydrite. Thus, it is seen that the best exposures of gypsum are found at the head of Baddeck Bay, about 1 mile from deep water shipping, where very little disturbance is apparent. These exposures occur in a valley where there are extensive outcrops of soft, white, compact gypsum, without any appearance of anhydrite.

At Port Bevis a few years ago the Victoria Gypsum Company carried on extensive operations, but



Gypsum with embedded selenite crystals.

owing to inereasing oeeurrenee of anhydrite at depth, this plaee was abandoned. This is also true of a point west of Plaster mines, where a small quarry was operated many years ago (1875) by Mr. Duncan MacDonald, of Montreal, who exported annually about 5,000 tons. It has been notieed that both of these quarries are in the region of most disturbance.

Sheet No. 20, St. Ann, Victoria County.

In this seetion, at Goose eove and at Oregon, 4½ miles from the mouth of North River, occur small gypsiferous areas. At Oregon there are 134 acres; at Goose eove two areas, having a total of 230 acres. At the former plaee the measures are all eoncealed; at the latter large exposures from 40 to 60 feet in height are seen. One of these has been opened up and operated for several years by the Vietoria Gypsum Company. It is situated 3½ miles by rail from their shipping pier at Munroe point. The roek in eolour is white, light grey, and mottled white, the white having prominenee. The outerops indicate a soft eompact variety, and operations prove this to be true to a depth of 30 to 40 feet; but during the summer of 1908, while sinking on the floor of the quarry, anhydrite was discovered in eonsiderable quantities.

Sheet No. 23, Tom River, Richmond County.

On the southeast side of Great Bras d'Or Lake is a gypsiferous area of 2.7 squarc miles, eomprising Campbell eove, Hay cove, and MeNab Creek, in whieh oeeur several outerops of gypsum. Some of these outerops eonsist of a very excellent, snow-white, eompact variety, resembling alabaster; while others, espeeially at Tom River, show an exeess of lime. It is free from all evidenee of anhydrite, and is easily aeeessible to water shipment.

The following analyses show the average quality of the roek:—

	I. Per eent.	II. Per eent.
Lime	32.95	34.04
Sulphurie anhydride	46.64	44.28
Water, loss on ignition	20.93	21.07
Insoluble mineral matter	0.13	0.67
	100.65	100.06

Sheet No. 25, Madame Island, Richmond County.

This sheet eomprises not only the deposits of Madame Island, but of Port Riehmond, on the north side of Lennox passage, and a very small deposit near Pirate harbour in Guysborough County, making a total gypsiferous area of 6.57 square miles.

The most important of these deposits is that on the north side of Madame Island, and the south side of Lennox passage, where there is a large gypsiferous area of 3.77 square miles. The outerops of gypsum in this area having most prominenee are situated about 1½ miles west of Lennox Ferry landing, and about 1 mile from the shore. At this point the exposures eover many aeres in area, and have a height of from 30 to 70 feet. Here, years ago, H. C. Higginson, of Newburgh, New York, operated a quarry, and exported large quantities of the erude material to the United States. The gypsum is a white eompaet variety; but it has, irregularly assoeiated with it, mueh anhydrite. The oeeurrenee of this mineral, no doubt, had much to do with the elosing of the quarry, although there still remain large quantities of good gypsum. This, together with exeellent natural shipping faeilities, and the inereasing demand for the produet, should be an impetus to reopen and operate this extensive area.

Cliffs of anhydrite, Great Bras d'Or lake, C.B.

Analysis:—

	Per cent.
Lime	33.33
Sulphuric anhydride	45.32
Water, loss on ignition	20.92
Insoluble mineral matter	0.22
	99.79

Sheet No. 26, Askilton, Inverness and Richmond Counties.

In this seetion we have what may be known as the Hastings area, of 75 acres, at Port Hastings; the Beaver Dam Lake area of 1.6 square miles on the border line of Inverness and Riehmond eounties, and about 4½ miles east of Point Tupper; the Askilton area of 1.8 square miles, at Askilton, 3½ miles from the Intereeolonial Railway, or about 6 miles east of Port Hastings. Also a small area about 1½ miles south of Askilton, of 302 acres, on Inhabitants River.

The Inhabitants River area, and the Beaver Dam Lake area, have very little importanee, being situated

in low ground. The Beaver Dam Lake is only traceable by the pits or kettle holes, and hummocky ground. In the banks of Inhabitants River small outcrops are seen, but both areas seem to be covered heavily with clay.

The Askilton area is the most important in this section from all points of view. It has large outcrops, some as high as 70 feet above drainage level, and the greater part is an excellent white compact variety, with smaller quantities of granular.

The Strait of Canso, the natural outport for the deposit—being an open port all the year—makes this deposit desirable, especially to those who export large quantities of crude rock, as it is the nearest deposit to a winter port in the province.

The following analyses from samples of the different deposits will serve to show the average composition of this rock:—

	I. Per cent.	II. Per cent.
Lime	40.48	33.80
Sulphuric anhydride	55.48	46.08
Water, loss on ignition	3.90	19.86
Insoluble mineral matter ..	0.44	.....
	100.30	99.74

No. I. and II. Average samples, Hastings area.

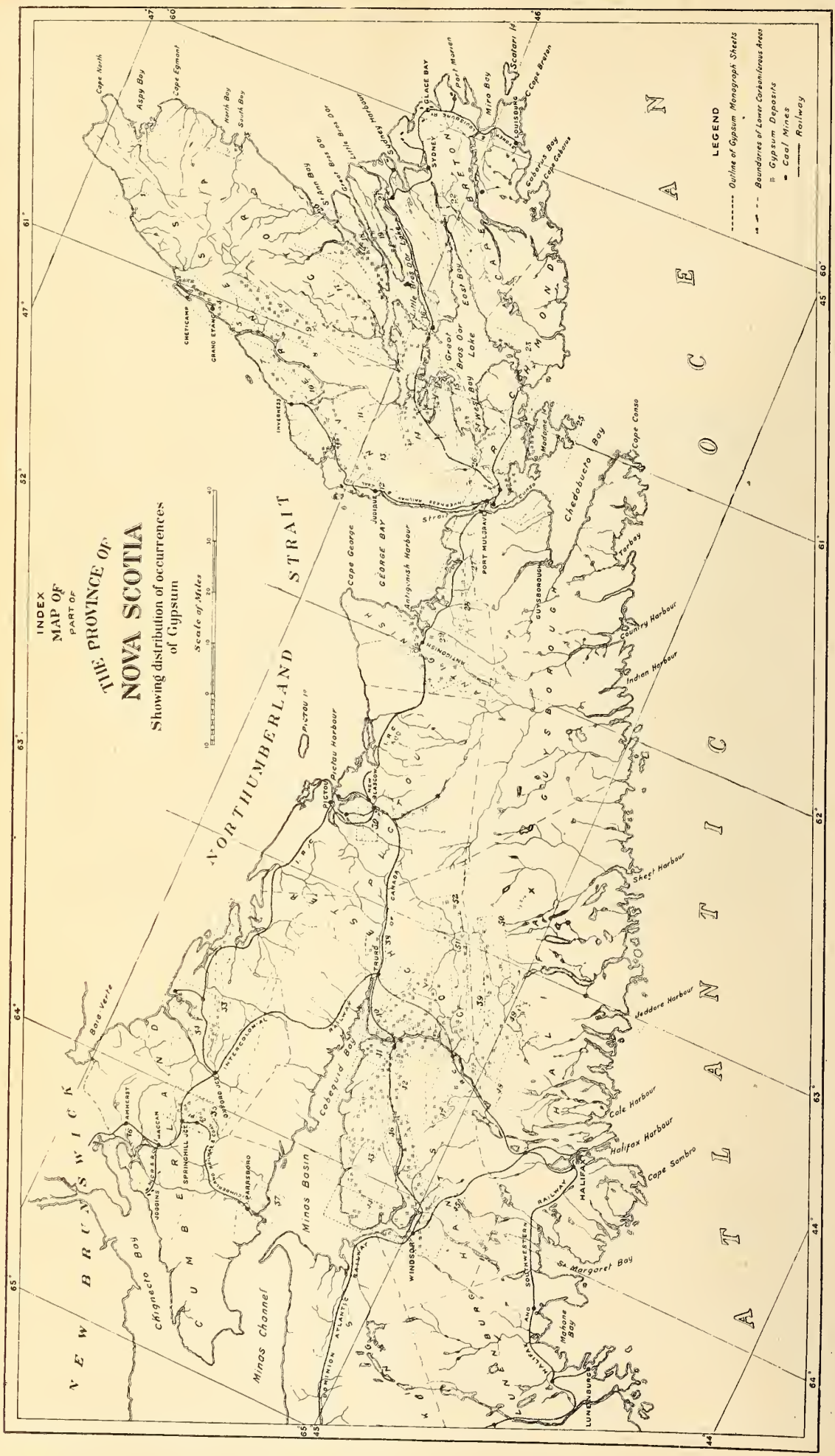
Sheet No. 40, Shubenacadie River, Colchester and Hants Counties.

At the mouth of the Shubenacadie River, on the east side, occurs a black Carboniferous limestone, known as black rock, carrying small veins of manganite. Succeeding this is a series of soft marls and sandstones, filled with veins of reddish fibrous gypsum running in all directions, and it is not until Pitch Brook is reached that we meet solid gypsum exposed in prominence. Here, about 1 mile from the shore, occur massive beds, which extend almost continuously eastward to Beaver Brook, and to Irvin Lake. At Pitch Brook the gypsum is light grey in colour, and has a compact texture. Many years ago the deposits were operated, and the product exported to the United States. At Beaver Brook the rock is a compact white variety, with some alabaster showing in some of the exposures; however, anhydrite has prominence. Ascending the river on the western side there is a small area known as Stephens area, where a good white compact variety of gypsum is seen, associated with soft reddish blue marls. Here is the largest deposit of fibrous gypsum known in the provinces, occurring in veins running through the marls in all directions, often 12 inches and 18 inches wide, and when cleaned from the associated marls is very pure. In 1869, these deposits were operated for the fibrous variety, and a mill was erected at Noel, 15 miles from the deposit, at a cost of $12,000, for manufacturing the product into terra alba. These works were destroyed by fire the following year, and all operations abandoned.

The Cove Quarry at Cheverie.

Proceeding up the river, on the west side, the next deposit of importance is that of Capt. John Graham, just above and opposite Eaglesnest point. This, formerly known as Big Rock, presented a snowy white front to the river, and for many years was operated for export purposes.

It is a massive bed arranged in layers and bent in conical shape; the base and interior showing anhydrite, and the whole resting on a base of Carboniferous limestone. It is here the Windsor series of the lower Carboniferous crosses the boundary line (Shubenacadie River) into Colchester county, and at this point it has a width of less than 1 mile, and west, about 1½ miles, it tapers to a mere connecting link, but soon widens again on the Fivemile and Kennetcook Rivers. Proceeding on the western side of the river, 1 mile south of the Fivemile River, again the gypsiferous area is met with in prominent outcrops of gypsum,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which are almost continuous for several miles. At Rose point, Urbania, and Admiral rock, massive white beds are exposed on the river bank, from 40 to 60 feet in height; and not only at the river bank, but from one to three miles west prominent exposures occur of excellent quality.

Crossing the river near Fort Ellis point, and descending again on the eastern side, large exposures are seen; but not in such prominence as those on the opposite side of the river. At Green Oak, on the property of Thos. Phillips, large and prominent exposures of white, snow-white, and blue gypsum occur, in compact crystallization. This property is near the river, where shipping facilities are good, and in the past was operated quite extensively. Again, on the property of G. W. Dart, and Tupper Fisher, outcrops occur, but here an excess of carbonate of lime is shown. The gypsiferous area included in the above description is 14.14 square miles in extent.

It will be seen by the above that in this section there is practically an unlimited supply of gypsum of good quality; and at one time considerable business was done exporting the crude material, but many causes have militated against the successful operation of these deposits. Operations were carried on in the days of small sailing vessels owned by those who were familiar with the tides of the Shubenacadie River, but as the size of vessels increased, and before the steamboat was known on this river, the plaster trade became controlled by a few, and these deposits were the first to suffer. To those interested in this trade it may be worthy of note to mention that the tide at the mouth of the Shubenacadie rises 30 feet in three hours and recedes in the same length of time. At Eaglesnest point the bore at high tide is often 10 feet high.

The following analyses will serve to show the different qualities of rock in this section:—

From Beaver Brook—	I. Per cent.	II. Per cent.
Lime	36.80	33.20
Ferric oxide and alumina	0.40	.....
Sulphuric anhydride	51.44	46.40
Water, loss on ignition	11.73	20.79
Insoluble mineral matter	.....	.....
	99.87	100.39

No. I. The interior of a boulder of anhydrite which has been exposed for about 25 years.

No. II. An outside coating about 1-inch thick taken from No. 1.

GYPSUM DISTRICT "E."

Sheet No. 41, South Maitland, Hants County.

The eastward continuation of the Kennetcook River valley is the valley of the Fivemile River, both rivers having their origin in close proximity, the Kennetcook flowing westwardly to the Avon, the Fivemile River eastwardly to the Shubenacadie. The Dominion Atlantic Railway (Midland division) follows these valleys for nearly 30 miles west of the Shubenacadie River, which makes the gypsum deposits in this section very accessible.

On this sheet there are three gypsiferous areas, comprising a total of 9 square miles.

The most important of these is that at Latties Brook, which is a continuation of the Windsor series eastward. It is here that the Windsor Plaster Company has a quarry and gets a partial supply for its calcining mill at Windsor. The quarry is situated near Burtons station, on the south side of the railway, and has an exposed face 40 feet high, covered with from 10 to 15 feet of clay. Attempts have been made, with a considerable degree of success, to remove this clay by the hydraulic method.

The rock is a white compact variety, well suited for the manufacture of plaster of Paris. This bed may be followed westward for some miles, but there are only a few outcrops, the greater part being concealed under a heavy overburden of clay. North, about 1 mile, near the public highway, prominent outcrops are again seen, but the rock is not as good in colour or texture as at Burtons.

Going east from Burtons we meet precipitous cliffs, from 75 to 140 feet in height, and over 2,000 feet long, on the Lawrence property, at Andrew Hayes (known as The Cave), and on the Royles property. On the Geary property, about 150 feet north of the railway and having a strike about parallel with it, is another exposure, with a length of 1,400 feet, and an average height of 85 feet.

On the Hayes property, the upper parts of the cliff show considerable disturbance, and are badly folded and contorted; while near the base the beds are more even in structure. The rock on this face shows considerable anhydrite, but on the south or opposite side of the ridge, where the rock has more covering, it is a good white gypsum, with some greyish white and blue associated. The face continues westwardly, with practically the same height, to the Lawrence property, and has a stratification more horizontal and even. In other conditions it is similar to the Hayes property.

On the Geary property, the rock again shows disturbance, with considerable anhydrite, and veins of dark carbonaceous and reddish gypsum of inferior quality cutting through it.

The natural shipping port for the deposits of this area would be the Shubenacadie River (distant from 3 to 5 miles), but it would necessitate the construction of a shipping pier above the railway bridge. Unfortunately, not sufficient attention was given to draw efficiency in the construction of this bridge, and the provision then made for this purpose is not suitable for modern shipping; and, therefore, makes what would be otherwise desirable gypsum properties (not only the above described, but several others on or near the Shubenacadie River), practically inaccessible for export purposes.

The next area of importance is that at Glencoe, which was mentioned in the description of sheet No. 40. It is to the south, and some distance from the valley of Fivemile River and on very much higher ground. The shipping port for this is on the Shubenacadie River, about 2 miles above the mouth of the Fivemile River.

Going north on this sheet to Selma, near the head of Cobequid Bay, there occurs a small isolated gypsiferous area of 1.7 square miles. The topography of this is generally low dike lands, and the outcrops, which have but little prominence, occur about 2 miles from the shore. The rock is a grey slaty structure, with small quantities of white granular.

(To be Continued.)

Notes on Workmen's Compensation Act

(Written for the Canadian Mining Journal by
R. G. Drinnan.*)

[Editor's Note.—At the request of the Journal, Mr. Drinnan has outlined his views upon the Workmen's Compensation, as applied to mining. Mr. Drinnan's long experience in the coal mines of Western Canada lends specific value to his opinion. Since the Toronto branch of the Canadian Mining Institute is taking up the same subject, this contribution is more than ordinarily timely.]

It is generally conceded that workmen engaged in hazardous occupations should be recompensed for loss sustained by injury. Further, that the means of awarding this compensation be such that it can be obtained promptly or without recourse to the law courts. The Workman's Compensation Act comes nearest to fulfilling these conditions; but there are some objectionable features in it which might be modified in any new Act.

In the first place, the burden the Act imposes must be borne entirely by the employer. Naturally, he protects himself by placing his "risk" with an insurance company. The insurance company (a soulless corporation) is therefore responsible for the payment of claims. It is the business of the insurance company to make it as difficult as possible for a workman to obtain compensation. It is done in this way:—

The Act presupposes that in cases of dispute as to liability the parties will agree on an arbitrator. Seldom do they agree, and it is often necessary to ask the chief justice of the province to appoint one. It lies with the workman claiming compensation to ask for this appointment by the court and that necessitates the services of a solicitor. Law costs then begin to accumulate and although the award may be in his favour the workman never receives the full amount awarded. It is often less than half this amount when the sum claimed is small. The object of this is to make a workman accept as payment of his claims an amount smaller than the Act allows him as a compromise against having to take arbitration proceedings. Clearly this is one of the things the Act was intended to circumvent.

Another way of settling claims under the Act is to appoint a committee, an equal number from each side, with power to appoint an arbitrator if they fail to agree. In practice this works out better for the workman, as he always gets paid the full amount of the award. The weakness of this arrangement lies in the fact that the workmen's representatives on the committee are elected by popular vote and generally they feel that to retain popularity they must succeed in obtaining some compensation for every claim presented.

The better plan I believe would be to have an arbitrator appointed by the Government and paid by it. He does not necessarily need to have a legal training. Ordinary common sense and some practical knowledge of conditions of work in the various industries involved are the requisite qualifications.

In the second place, accidents are more numerous since the passing of the Act. This may be accounted for to some extent by the fact that minor accidents are now reported; but the more serious accidents have not decreased. This is not the fault of the employer because the Act is an incentive to him to take every precaution and exercise all due care for the safety of his workmen—where the appeal to humanity failed the added liability has largely succeeded. The fault lies to a large extent with the workmen themselves. They know the Act protects them financially in case of injury, and this adds to the temptation when working on contract to increase their earnings by taking greater risks. Even a workman who has nothing to gain by taking risks is liable to become more careless when this knowledge is present.

To remedy this, to put a check to foolhardiness on the part of the workmen, something different from the saving clause of "serious neglect and wilful misconduct" will have to be adopted. To prove serious neglect you must show that the workman neglected to do something he knew he should have done. To prove wilful misconduct you must show he did something he was told he should not do. The Act places the onus of proof on the employer, and it rarely happens that he can establish any such proof. A broader meaning should be given to this term, not to deprive the workman of compensation, but to check needless risk and carelessness.

In the third place, the Act should make it compulsory for workmen to report all injuries, no matter how trifling, sustained by them in the course of their employment, before absenting themselves from work, so that it can be investigated on behalf of the employer. Compensation has been paid for loss sustained by injury when there has been considerable doubt as to where and when the injury actually occurred.

In the fourth place, the Act should be more explicit in the matter of a medical referee in cases of temporary incapacity. Workmen will malinger and abuse themselves to the extent of delaying recovery from injury while they are being paid compensation. Some means of checking this should be devised.

While the doctors who are attending the injured workman are paid by the workmen and appointed by them, it will be impossible to get them to handle this matter impartially. When a workman sustains injuries necessitating the payment of compensation he should at once be placed under the care of an independent doctor and when discharged by him payment of compensation should cease. Any failure to comply with instructions from this doctor should be cause for non-payment of compensation.

The medical referee should be a permanent appointment therefore and not one called in only in cases of dispute after the workman is supposed to have recovered.

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*Mining Engineer, Vancouver, B.C.

The Bluebell Mine, Kootenay Lake, B.C.

At the last general meeting of the Western Branch of the Canadian Mining Institute, held at New Denver, British Columbia, on September 13, Mr. S. S. Fowler, general manager for the New Canadian Metal Company, Limited, owning the Bluebell mine, situated on the east shore of Kootenay Lake, B.C., read an interesting and instructive paper, entitled "Costs and Conditions at Bluebell Mine, B.C." The costs submitted were those over a period from July 1, 1909, to March 31, 1910, inclusive. They cover the cost of extracting from the mine 43,067 tons of ore, plus 100 feet of drift deadwork, and of concentration of that quantity of ore, together with general expenses. The detailed statements of costs will not be available for publication until after they shall have been printed in the Quarterly Bulletin of the Canadian Mining Institute, but the following excerpt from the paper may be given:

The Bluebell mine is situated in a peninsula which projects from the east side of Kootenay Lake, B.C., and its orebodies, outcropping at 100 feet or less above the water-level, are attacked through an adit whose portal is within 100 yards of a wharf at which all supplies are received and from which all product is shipped. Adjacent to the portal are located the concentration plant and shops; and the office, laboratory, and living quarters, save certain cottages, are within 200 yards thereof, while the greatest distance from which the ore so far developed has to be hauled does not exceed 300 yards. It will be seen, therefore, that accessibility is practically perfect.

The living quarters comprise (a) several 4-roomed cottages, all plastered and painted, situated not more than 500 yards from any part of the work, provided with light and water, and each surrounded by a fenced plot of ground about 60 by 120 feet. These are rented at $12 per month each, to employees with families. (b) A bunkhouse containing 27 bedrooms and two recreation rooms. All these are plastered and painted and open on to covered verandahs, there being no internal passages. No more than three men occupy any one room. (c) A dry-house adjoins the bunkhouse and contains in one room six shower baths with cement floors and ample sinks, laundry tubs, and hot and cold water. In a connecting room are lockers for each employee, properly ventilated and provided with steampipe below. Toilets are in a small, separate, but conveniently placed building, and are fitted with flush closets on a cement floor. All buildings are steam-heated when necessary. (d) Within 50 yards of the bunkhouse is the boarding house, with seating capacity for 100 men. In the basement of this building is a post office, and a small store supplied with the common necessities of the employees; but no employee is either compelled or influenced in any way to trade there.

The dining room is ceiled and painted white and amply lighted on north and south sides, thus being made a cheerful place, the influence of which on the dispositions of those who use it, to say nothing of their appetites is notably favourable.

An easily accessible field, situated some 300 yards from the living quarters, is much used for sports, such as baseball and football. Several of the men have maintained their own canoes or small motor boats in the near-by bays.

Without reference to the natural and quite exceptional beauty of the location, such are the physical conditions surrounding the lives of those who work at Bluebell. It need hardly be said that they attracted the best class of men, who, when once they secured a position, were, with few exceptions, wise enough so to conduct their work and behaviour as to keep it.

On the part of the management, there has been no attempt at paternalism. It prohibits nothing but canvassers, gamblers, and too much intoxicating drink. It does nothing and provides nothing which can be regarded as charity. The result has been that while it is probable that all hands know that low costs are essential to a continuance of operation, we gathered together a staff and force that possesses what I may call a collective conscience, the working of which has contributed in large degree, no doubt, to the low costs in this country of high wages and expensive materials.

Wages. Practically all work was done by day labour rather than by contract, and the wages paid and regarded as "standard" for the district, were as follows:

For eight hours:		
Foremen	$5.00 to	$6.00
Shift-bosses	4.00 to	4.50
Machine miners and helpers		3.50
Hand miners		3.25
Millmen	3.00 to	4.00
Smiths and helpers	3.50 to	4.00
Compressormen		4.00
Muckers, etc.		3.00
Carpenters and machinists ..per hour		50
Nine hours—		
Outside labourers		3.00

The approximate average wages for all classes was $0.433 per hour.

Cost of Ore-Extraction.—All development charges were placed to debit of "capital" or previously written off, so the following statement includes nothing for the cost under the head of development.

As stated before, the ore was attacked through an adit-level and all stoping was done from above it; consequently no charge for hoisting, pumping, or other vince are on the surface. Mesabi transportation costs expense incidental to working from shifts appears.

The orebodies are found in the upper part of a stratum of crystalline limestone of undetermined thickness, striking north and dipping west at about 35 deg. The deposits, of which only two have been worked, while they have a sharply defined and strong roof, are irregular in plan and section and are to be classed as large in size, the workings as a whole taking the form of chambers as much as 100 feet wide, in a north-south direction, and, say, from 10 to 50 feet or more in height. This means large and free-working faces. Wherever necessary or advisable, pillars of ore have been left from time to time, for the support of roof; but subsequently some of them have been removed without difficulty or danger. In this manner, timbering for support has been successfully avoided and, practically, the only wood in the mine is in chute-timbers and track-ties. While several raises through limestone underlying ore have been put up to serve as ore-passes, the irregularity of parts of the deposits

has neeessitated much shovelling and wheeling, thus off-setting to a considerable extent the main advantages of large working faces and no timbering. As a rule, the ore may be said to "drill" and "break" well, although most of the low-grade material is so full of quartz erystals as to cause excessive wear on the steel.

Power is derived from a water supply under a static head of more than 700 feet, and compressed air is used on two 3¼-inch piston drills and one hammer drill. Generally, one of the former was in use during three shifts per day, one for two shifts, and the hammer drill, ordinarily, only one shift. These machines, with three or four hand miners in narrow work, kept the output of the mine up to the requirements of the mill, about 160 tons per day. I regret to say that I have no adequate record of the drill shifts nor the lineal feet of hole drilled.

Haulage is done in trains of five 16-foot cars drawn by a horse, except as to a few occasional cars run out by hand at night. The cars were commonly loaded by the muckers, who also assisted the driver in making up trains by various loading-chutes.

The normal underground crew consisted of:

Foremen and shift-bosses	2
Timberman	1
Driver	1
Miners	14
Muckers, etc.	15
Total	33

Here followed the detailed tables of costs and some comment on the nature of the ore.

Summary—

	Per ton.
Ore extraction	$0.984
Concentration and shipping	0.498
General	0.376
Total	$1.858

In conclusion, let me say that whilst the result just given is to be regarded as very satisfaetory under the conditions set forth, it must be remembered that the figures indieate neither a profit nor a loss. They do not consider the necessity of continuance of development of the mine, the provision of funds for further construction if found desirable, nor are they concerned at all with those items of expense the determination of which is a function of the directors — partieularly amortization and interest, which are very important factors in the final test of the value of a mine.

Hollinger Reserve Mines of Porcupine

(Written for The Canadian Mining Journal.)

About three miles in a direct line south-west from the village of Timmins, in the township of Tisdale, is the Hollinger Reserve mine in Ogden. The company owns fourteen claims in the various Porcupine townships, totalling 560 aeres. Apart from the necessary annual assessment work, all efforts of the management are being concentrated on the six claims in Ogden, which form a rectangular block of land lying on the banks of Mountjoy Creek. This little river has a width of about fifty feet, furnishes all necessary water

Mountjoy River, running through Hollinger Reserve Properties.

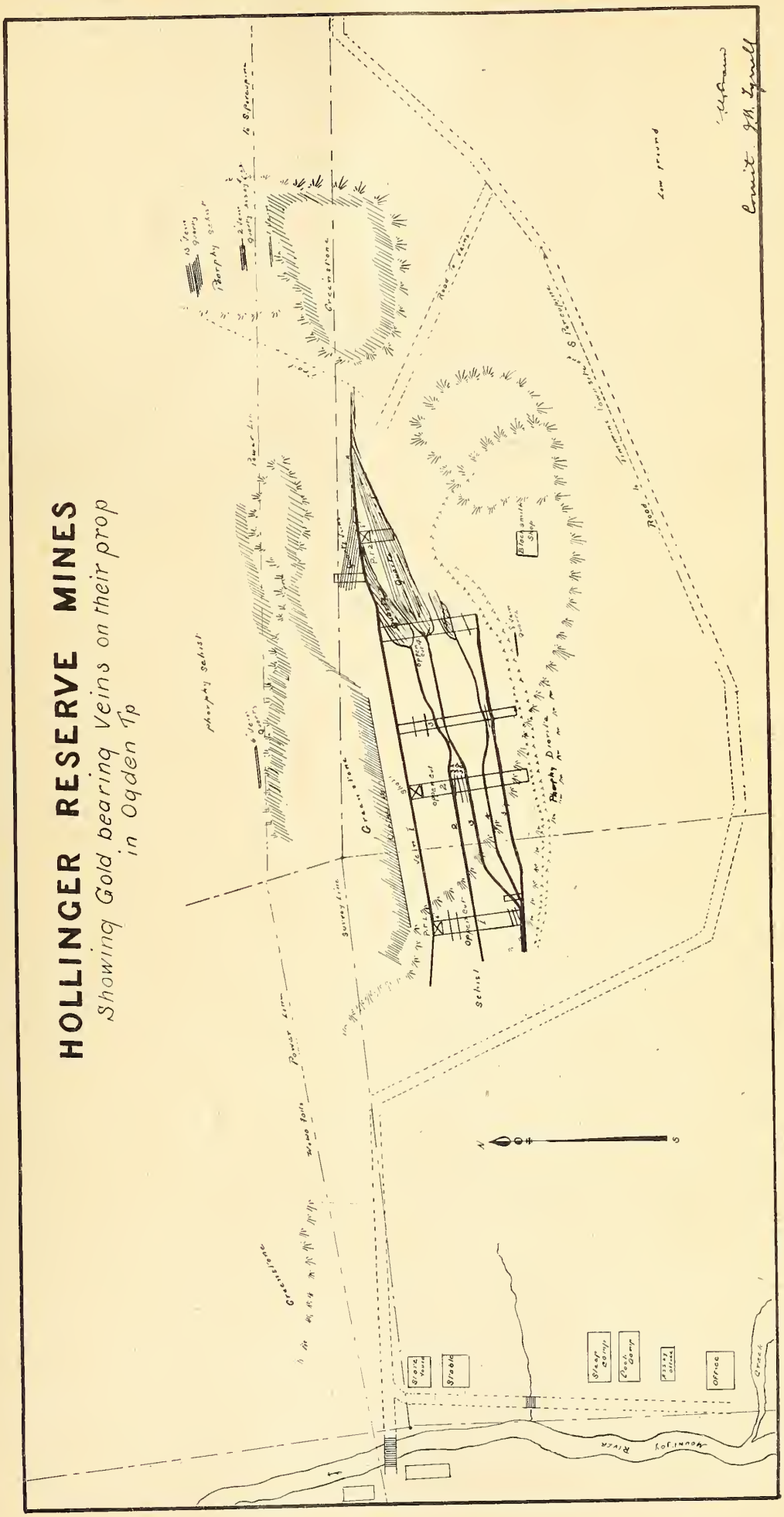
power, and when a few jams of timber have been removed, will be navigable all the way to the Metagami River.

The Ogden properties of the Hollinger Reserve are in a direct line with the Hollinger mineralized belt, and are connected with the better known camps of Porcupine by a good wagon-road cut through the forests and corduroyed aeross the swamps. They are covered with a forest of large pine and spruce, that will furnish a sufficient supply of timber for building and mining purposes; while the eleetric transmission line from Wawaitin Falls, on the Metagami River, will run directly across the property, so that power may be readily and eheaply obtained.

For the most part, this seetion of Porcupine is fairly level; but three of the elaims on the Hollinger Reserve are marked by a rocky eminence that is "pillow-like" in form. It is on this exposure that most of the prospecting has been done, and it is here that the gold discoveries have been made. On the adjoining low-lying eountry, the rock is hidden by an over-burden of stratified gravel and sand, and further work will be neeessary to see whether it also contains similar gold-bearing veins. But the veins now uncovered extend in all directions, and visible gold has been found at intervals along the strike.

The Hollinger Reserve, it may be recalled, was originally acquired by Bennie Hollinger, the discoverer of the famous Hollinger mine, and one of the prospectors that cut through the Porcupine bush. Such engineers as Messrs. J. B. Tyrrell and J. G. Harris, men who have studied carefully the geology of the district, and who are thoroughly familiar with the mineralization of Northern Ontario, agree that it offers substantial possibilities.

The mineral eonditions of these properties would indicate that all of these rocks are of the Keewatin age and the existence of the heavily mineralized rock below has doubtless been caused by the presence of harder and more resistant rocks, so that it seems not improbable that other layers, or areas, of schist may be found throughout the sand and gravel covering on the balanee of the property.


HOLLINGER RESERVE MINES
Showing Gold bearing Veins on their prop
in Ogden Tp
Granite Hill Syenite
Road to Timiskaming
Low ground
Porphyry Schist
Granite
Survey Line
Power Line
Schist
Blacksmith Shop
Stable
Boarding House
Office
Creek
Mountjoy River

The veins already uncovered on this roeky eminenee, have been earefully sampled, and as soon as the main shaft will have reaehed a reasonable depth, it will be possible to determine their downward extension.

In addition, the eompany plans an extensive diamond-drilling eampaign, and has already arranged for several drill holes in the lowland, to determine the western extension of the veins that seem to crop up in a direet line with the Hollinger mineralized zone.

Cook and Sleep Camps of the Hollinger Reserve Mine.

Probably the most pieturesque, and surely the most healthy location in the Poreupine mining distriet, is that of the Hollinger Reserve mine, so far as the health and happiness of its mine management and erew are eoneerned. The company has a complete set of eamps and mine buildings, consisting of cook-eamps, bunk-houses, offices, storehouses, assay office and stables, which are fully equipped and sufficiently large. The mine buildings and bunk-houses follow the bank of the ereek, and with the enlarged development work that is being planned, will soon beeome quite a little village.

During the past summer, an extensive campaign of surfaee prospeeting has been earried on, and during the winter most of the work will be underground. The eompany is in possession of suffieient information, how-

Showing Veins Nos. 3, 4 and 5, on the Hollinger Reserve Mines.

ever, to direct intelligently the underground work. It is hoped that before April, the work done will have proven up a body of ore that will justify more extended operations. To this end a six-drill eompressor is to be installed. Eleetrie power has already been arranged for.

Ogden township is finding considerable favour with mining men just now, on aecount of the many strikes made during the late summer.

In addition to its holdings in Ogden, the Hollinger Reserve Mines Company owns properties in both Tisdale and Deloro, on whieh, with the exception of the assessment work, nothing will be done until spring. On both of these groups of elaims, there are several apparently large veins exposed, but sufficient stripping has not been done to sample intelligently the property. One most eneouraging feature may be noted regarding the holdings along Mountjoy Creek. Surface

Ben Hollinger on the left, and No. 2 Vein Hollinger Reserve.

indieations.—There are five main veins, avering from 2 to 6 ft. in width, and from 250 to 350 ft. in length. These veins oeeur in a band of sehist, whieh is in eontaet with the greenstone to the north, and the porphyry-diorite to the south. The sehist is 125 ft. in width, separating the two formations. There are numerous other smaller veins, which show visible gold. Visible gold can be seen at intervals along the five main veins for the entire distanee uneovered, and the opinion of the engineers who have examined the property combined to give the impression that the veins as shown on top of the ground will merge in one large ore body both vertieally and laterally, and that eonsequently eonsiderably greater enrichment will be found with depth.

CORRESPONDENCE

High-grade Ore Deposits of the Portland Canal District.

The Editor Canadian Mining Journal—

Sir,—In the Journal of November 15 you publish under the above heading a eontribution from "An Occasional Correspondent." Now, the purpose of this communication is not to take any exception to the obvious advertising of the Rush-Bagg group of elaims seeured in that contribution, but to ask you to permit me to state my regret that you have seen fit to allow anonymous refleetions on the fairness of the Provincial Mineralogist for British Columbia. Surely it is not too much to ask that when serious refleetions are made in print upon Government officials, the name of the person making them shall also be published, so that his standing be made evident to the public, and from his eonnection with mineral claims, or whatever else be affected, opportunity be at the same time given to judge whether or not he is a disinterested and impartial critic.

If you will open your copy of the Annual Report of the Minister of Mines for British Columbia for 1910 you will find at the bottom of page K 66 the three lines your correspondent first quoted; then turn over three pages, and you will find the second three lines quoted. No explanation was given that between the two sentences quoted as text, there are about 1,800 words of context. Further, the second three lines quoted are a specific reference to a portion of the Portland Canal mining camp that has since been proved to be exactly what the Provincial Mineralogist expressed the opinion it would be, namely, "comparatively low-grade concentrating propositions." In fact, milling and concentrating experience has since proved that the average value recovered has been even less than that mentioned by the Provincial Mineralogist in his report. The fitness of such a manifestly unfair critic to pass opinion on the fairness or otherwise of others is, in my judgment, very doubtful.

It is not my intention to here call in question the existence of high-grade ore deposits in the part of Portland Canal mining camp your anonymous correspondent appears to be deeply interested in. I may, however, direct attention to a few points bearing upon the subject. Your correspondent, immediately after alleging that the statement of the Provincial Mineralogist "is manifestly unfair and wholly unwarranted," states that his purpose is "to remind the investing public that the ores of Portland Canal are not all low grade; that the initial expense of operating high-grade properties is negligible in comparison with the cost of necessary equipment for exploiting low-grade ore; and it is by no means proven which class of properties in this district will develop the best dividend-payers."

Just so; it is not proved that high-grade ore occurs in quantities. A little later he tells of "rawhide ores," and says the minimum assay value of such ore under present transportation facilities would be in the neighbourhood of $50 per ton," though what "present" or any other "transportation facilities" have to do with assay value is beyond my ken. Later, he tells that Rush and Bagg's camp is at an altitude of 2,000 ft. and is reached by horse trail 3½ miles from the Portland Canal mill (from which, I have been informed, there has long been a good wagon road to Stewart, and now there is a railway). Under such conditions it would seem that a few energetic claim owners could have this year, if not last, managed to ship some of the $50 per ton ore, if they have any quantity worth shipping. It is not the men who rely upon high assay returns from, perhaps, picked specimens, who make a prosperous camp, nor those who wait for someone to come along to buy undeveloped claims, but the men who will get out ore, under even much greater difficulties than your Rush-Bagg correspondent outlines, and if it lack such energetic claim-owners the "high-grade" portion of the Portland Canal camp may be expected to continue to be non-productive.

In conclusion, I would remind your correspondent, first, that the opinions expressed in his official report by the Provincial Mineralogist have thus far been found, if anything, too favourable, and, next, that after "these high-grade deposits," of which he (the correspondent) writes, shall have been developed and made productive on a commercial basis, to use his own closing words, "it will be early enough to pass judgment upon their value."

E. JACOBS.

Victoria, B.C., December 1, 1911.

Coal on Vancouver Island, B.C.

(By E. Jacobs, Victoria, B.C.)

A consular report relative to coal on Vancouver Island, British Columbia, sent to Washington, D.C., and quoted from by mining journals and newspapers, being inaccurate in one or two details, the following excerpt from a paper on "The Undeveloped Coal Resources of Canada," submitted by Mr. D. B. Dowling, of the Geological Survey of Canada, to the Annual Meeting of the Canadian Mining Institute held in the City of Quebec last March, will show accurately the situation, as presented by Mr. Dowling, who is one of the leading coal geologists of the Dominion and probably the most fully informed concerning the coal resources of Western Canada. In passing, it may be stated that the table containing an estimate of the area of known coal-bearing lands of British Columbia and their probable coal-content, which Mr. Dowling included in his paper above mentioned, was reprinted in the "Report of the Minister of Mines, British Columbia," for 1910 (p. K 176). This table shows an estimated aggregate area of 1,351 square miles, containing 40,221,000,000 tons of coal, in the following proportions: Anthracite, 61,000,000 tons; bituminous, 39,674,000,000 tons; lignite, 490,000,000 tons. It is not unlikely a revision of the figures, taking into account the results of explorations made during the year 1911, would now give a larger area and estimated coal-content to fields situated in the Skeena country, and, perhaps, also to parts lying north of Cariboo, but no extensive changes are known to have taken place that would similarly affect Vancouver Island coal-fields. Concerning the latter, Mr. Dowling wrote:

"KOSKEEMO AREA AT HEAD OF QUATSINO SOUND.

"The area occupied by rocks of lower Cretaceous age covers 10 square miles. Borings in certain localities have demonstrated that over sections of the area a 3-ft. seam is mineable. The coal is bituminous of good grade. Area, 5 square miles, with 3-ft. coal, equals 9,000,000 tons.

"SUQUASH AREA.

"This was, perhaps, the first of the Vancouver Island coal areas to be mined. The Hudson's Bay Company operated a mine near Port McNeill for a few years prior to 1851. The coal seams are thin, none found being, perhaps, more than two feet in thickness. The area occupied by Cretaceous rocks is large—14 miles along the coast and about three miles wide (not including the extension beneath the sound)—42 square miles. As the richness of the area is not proven the estimate is made for:—Area, 10 square miles; thickness of coal, 3 ft.; equals 19,000,000 tons.

"COMOX AREA.

"The northward extension of this area has not been determined. Of the part known, Mr. Richardson enumerates the following coal seams:—

"Brown's River, 7-ft. seam.

"Union Mine, 10 ft. and 4 ft. 4 in. coal.

"Trent River, 3 ft. and 3 ft. 8 in. coal.

"Baynes Sound Mine, 6 ft. and 5 ft. 10 in. coal.

"Minimum area, exclusive of that at northern end or under Baynes Sound, 300 square miles, having an estimated thickness of coal averaging 6 ft., equals 1,152,000,000 tons.

"NANAIMO AREA.

"In the Nanaimo area two seams of workable thickness are mined. The upper is called the Douglas and the lower the Newcastle seam.

"The Douglas seam, near Nanaimo, is about 8 ft. in thickness, but increases to the west to a maximum thickness of about 14 ft.

"The Newcastle seam varies from 17 ft. west of Nanaimo, to 10 ft. at the Wellington collieries, but may be said to average about 5 ft. over the major portion of the field. The basin extends south to Haro Straits, and, including the submarine portion between the islands, represents an area of about 350 square miles. Borings on Saturna Island demonstrate the presence of the coal at the southern extremity of the basin.

"Estimate of content, allowing 6 ft. each for the two seams, would give a total of 1,344,000,000 of coal.

"COWICHAN AREA.

"This is a smaller basin, of about 50 square miles, lying south-west of and adjacent to the Nanaimo coalfield. The area appears to contain beds of greater age than those bearing coal in the Nanaimo field. Small portions, where the upper measures occur, may prove productive, but for this area a small estimate only is warranted—9 square miles, 4 ft. of coal, equals 23,000,000 tons."

The consular report now under notice is quoted as having stated that "Last year the Nanaimo field produced 1,615,160 tons of coal." This would appear to be an erroneous statement. The following figures have been taken from the "Annual Report of the Minister of Mines" for 1910:

	Tons, 2,240 lbs.	
Western Fuel Company—		
No. 1 Shaft and Protection Island.	364,689	
Northfield (Brechin)	148,181	
		512,870
Canadian Collieries (Dunsmuir), Ltd.—		
Comox (Cumberland)	518,426	
Extension	380,482	
		898,908
Pacific Coast Coal Mines, Ltd.—		
Fiddick (South Wellington)	171,971	
Suquash	2,839	
		174,810
Vancouver-Nanaimo Coal Mining Co., Ltd.—		
(New East Wellington)		29,442
Total production (Vancouver Island)...		1,616,030

Of this gross production 1,094,765 long tons were produced from mines in what Mr. Dowling regards as being the Nanaimo district—including the Western Fuel Company's several mines, Extension Colliery, Fiddick Colliery, and New East Wellington Colliery. Of the remaining 521,265 tons, Comox mines produced 518,426 tons, and Suquash 2,839 tons.

It may be stated, in conclusion, that both the Western Fuel Company and the Canadian Collieries (Dunsmuir), Limited, are opening new coal mines and making large expenditures in additional plant, machinery, and other facilities for production of coal in considerably increased quantity, while the Pacific Coast Coal Mines, Ltd., is also providing for an enlarged output, though in smaller degree than the older companies.

The Economy of Power

By L. P. Hammond.*

In lode or quartz mining, and in placer mining on a large scale, the cost of power is a most important factor in the cost of operation, and the difference between the cost of operation and the selling price of the product of the mine is the only basis upon which the real success if the mining venture can be measured. Mining is a business governed by the same rules that apply to any other business, and the success of an undertaking in mining is not by any means entirely determined by the assay value of the ore found. There are four accepted ways of obtaining power for mining in our mountains.

First, steam power plants. Until recently most of our mines were operated with steam power plants, using, in a majority of cases, coal for fuel. The cost of this coal varied all the way from $3.00 a ton in mining districts like Leadville, where coal can, in many cases, be delivered directly from railroad cars into the mine's coal bin, up to $15.00, and even $18.00 a ton, where the coal has to be hauled or packed long distances from the railroad. It would be hard to place any average cost figure on wood burned for fuel, but it is safe to say that considering two cords of wood the equivalent of one ton of coal for steam-making purposes, in very few places have operators been successful in obtaining wood at a lower cost than the equivalent of $5.00 per ton for coal.

The second method is the use of a gasoline engine. In general, this method of obtaining power has been limited to out of the way, remote districts and the use of power for prospecting purposes, and consequently on a very limited scale.

The third method is the use of water power. This has been decidedly limited, partly because of the relatively high first cost of developing and equipping such a power, and partly because few of our mountain streams prove a reliable source of power during the winter months.

The fourth and last method is in the purchase of custom electric power. Colorado is now particularly fortunate in the extent to which the distribution circuits of custom electric power companies cover its mining districts.

*From the Colorado School of Mines Quarterly.

In considering the reduction in mining costs effected by this extensive power service the elements of the cost of power must be considered. These are an annual fixed charge, involving a reasonable percentage to cover:

First. A fair return to the investors upon the money wrapped up in the equipment.

Second. Another percentage charge by which the original cost of the equipment is spread over a number of years of the probable useful life of the equipment, in other words, writing off the cost of the original equipment by distributing it over a number of years operation.

Third. Percentage charges to cover insurance and taxes upon the equipment. The sum of these charges constitutes an annual fixed charge, which endures and must be counted as part of the cost of operation whether or not the equipment is used.

Next comes the cost of labour, since except in very small power plants it is, of course, necessary to provide men for the care and operation of the equipment. It should be borne in mind that so long as the plant is operating at all, this labour cost is also a fixed cost, that is, it does not fluctuate with the amount of energy actually generated by the plant.

Then comes the cost of fuel—coal, wood, gasoline—as the case may be. This will vary in some proportion to the amount of power actually generated, but not in direct proportion thereto, because the machinery of a large power plant is much less efficient at a small load than at a load approximating the capacity of the plant. In other words, it is necessary to put more fuel per unit of energy produced into a large plant working on a small load than into one working at the capacity of the plant. In addition to the cost of coal delivered at the coal mine, plus the cost of freight, plus the cost of handling from the railroad to the bins, there is another factor calculable in dollars and cents, and this factor is the extent of supervision that must be given by the mine manager to secure an adequate and reliable source of supply. Under the climatic conditions that prevail in our mountains, especially during the winter, one can readily see why in mining operations this is in itself a very considerable factor.

Next comes the cost of repairs on the power plant equipment, and last of all the cost of oil, waste, and miscellaneous supplies. It will be seen that the cost of power consists of a fixed cost, irrespective of the percentage of its capacity at which a plant is worked, and a variable cost which fluctuates to a considerable extent with the amount of work done by the plant.

Where custom power can be obtained the user thereof is certain of a continuous supply of power; he does not have to worry about snow-bound or washed-out railroads, about the quality of the fuel used, nor about obtaining and keeping skilled engineers. He does not have to see that men are at the mine an hour or two before the miners go to work in order to be certain that steam is up and custom power can not go to town to spend a holiday and fail to report for duty on the following morning.

When it comes to the first cost of equipment of the property a very great saving is invariably effected. Of course, conditions vary widely, but it is safe to say that the first cost of electrically equipped mining machinery or the installation of electric motors to drive a mill will range from 33⅓ per cent. to not more than 66 2-3 per cent. (with 50 per cent. as a fair average) of the cost of putting in steam-operated machinery with the necessary boilers. The steam end of the machinery with the boilers will cost, installed, not less than $100.00 per horse-power; while the installation of electric motors to accomplish the same work will cost not more than $40 per horse-power, and of course, a horse-power is the same in energy whether produced by an electric motor or by steam or gasoline engine. Here is a saving on a moderate sized equipment of $60.00 per horse-power. If we allow the very moderate overhead charges of 15 per cent. per annum, we already have a saving in our operation of $9.00 per horse-power per year, on the fixed charges alone before any energy whatever has been used.

The rates of the different power companies vary considerably as does the method of rate making, but it is safe to say that in almost every instance the cost of custom electric power is considerably below the cost of the necessary coal and labour to produce the same amount of energy by steam.

Another important element is that without custom electric power few of the moderate sized and small mines would use electricity because of the high first cost of the small, isolated electric plant. The facility with which electric power can be distributed to different pieces of machinery with relatively small loss of energy in such transmission is of particular importance where power is used to operate so many different machines at so many different points as in the mining industry. For instance, consider the use of the small mine pump operated by steam from boilers at the surface. To carry the steam down the shaft to the pump a great deal of the energy of the steam is lost by radiation and condensation, and such a pump will require fully three times as much steam per horse-power generated in its engines as would be required by a first-class engine located on the surface near the boiler. On the other hand, electricity can be carried down the shaft to the bottom at very high efficiency.

The manager of the Wilson Mining Company, at Robinson, Summit County, reported that during the heavy water periods it cost from $1,200 to $1,500 a month for coal for the operation of the pumps, and this with coal at about $5.00 per ton. The pumps were converted to electric operation with a resulting cost of less than $250.00 per month for power. At a large mine in Leadville, the operators of which do not care to be quoted as to their unit costs, hoisting from 600 feet depth with a steam hoist cost six and a fraction cents per ton. This company is now served with an electric hoist at the company's standard rate and the mine is now hoisting from 700 feet depth at a cost of about 2¾ cents per ton.

The Central Colorado Power Company is the first company in the state to publish its rates for service and to adhere thereto rigidly. Its standard rate is a combination rate, consisting partly of a flat rate per horse-power used and partly of a meter or energy rate, based on the actual consumption of power. In the custom power business the purchaser of power likes to purchase his power strictly on a kilowatt hour basis, paying for just what energy he actually consumes. On the other hand, the custom power company likes to sell all its energy strictly on a flat basis, that is, at a given charge per horse-power of maximum demand per month, irrespective of the extent to which the service is used. Neither basis is fair alike to the power company and to the consumer, and the reason for this can be made very plain by a brief example. Supposing you yourself were in the custom power business possessing a plant with a capacity of 1,000 horse-

power. In this event you would probably have an investment of something like $75,000 on which you would have to earn in addition to your coal, labour, repairs and supplies cost, a fixed charge of 15 per cent. per annum, in order to cover your entire cost. Suppose a man came to you and wanted to contract for power on a meter basis, and having arrived on a price per horse-power, you then proceeded to sell him 1,000 horse-power. Now, if he used this power only two hours a day, he would tie up the entire capacity of your plant, and at the same time would use only 1/12 of the energy you could generate with this investment, and in so doing he would use 2,000 horse-power hours per day. On the other hand, suppose another man came to you for power and used only 100 horse-power of your capacity, but operated 20 hours a day. He would also use 2,000 horse-power hours a day, exactly the same amount of energy as would be used by the first man, but the second man takes only 1/10 of your plant capacity. Obviously, you could not afford to sell each of these two men power at the same rate per horse-power hour. Likewise, the man who wanted 1,000 horse-power for only two hours a day could not afford to pay you the same price per horse-power month as could the man who wanted service for 20 hours per day. Consequently, the trend of all modern rate-making in custom power service is towards a compromise between these two conditions. The Wisconsin Public Utility Commission has done most excellent work in arriving at fair methods of negotiation between custom power plants and their consumers, and this commission has invariably ordered the custom power companies to base their charges partly on a flat rate on the maximum demand for power by any one customer and partly on the energy that a customer actually used. Under such a method of rate-making the cost of power to a consumer depends on what is called "load factor." The "load factor" is the percentage representing the relationship of the average load throughout a given period to the maximum load at any one time in that period.

I am not in possession of all the rates quoted by custom power companies in Colorado, but the rate of The Central Colorado Power Company, which is the largest of the several companies mentioned, is as follows:

FIXED CHARGE.

Per month Per H. P. of Maximum Demand.	
For the first 100 H. P.	$3.25
For the next 400 H. P.	2.25
For the next 500 H. P.	1.75
For all additional H. P.	1.00

ENERGY CHARGE.

Add for all energy used as shown by meter 13 mills per kilowatt hour for the first 40,000 kilowatt hours used each month, and 5 mills per kilowatt hour for all additional energy.

This rate works out as follows: If the maximum demand be 100 horse-power, and the annual load factor 60 per cent., the cost of power is then $90 per horse-power year, and the cost of $90 per horse-power year at 60 per cent. load factor is 2.3 cents per kilowatt hour, a kilowatt being the same amount of energy as in 1½ horse-power, and a kilowatt hour being the amount of energy involved in the use of 1½ horse-power steadily for one hour.

If the maximum demand be 200 horse-power, and the load factor 60 per cent. the cost of The Central Colorado Power Company's service is about $72.00 per horse-power year, which is the same thing as $1. cents per kilowatt hour.

If the maximum demand be 500 horse-power, and t load factor 60 per cent., the cost of the Central Col ado Power Company's service would be $57.00 p horse-power year, or about 1.45 cents per kilow hour.

It will be found that these rates are even lower th those given to custom power users throughout t East, where the cost of generating power is natura much less than in our mountains, because of both c matic and geographical conditions.

An instance of the saving in mining costs effect by this power service is given in the case of the lar Iron-Silver Mine at Leadville, where, after conversi from steam to electric drive, the manager reports saving of 48 per cent. in the cost of pumping, and 38 per cent. of his hoisting costs.

In the mining and milling of low grade ore bodi power becomes a very high factor in the total co A former manager of the American Zinc Extracti Company's custom mill at Leadville (mill treated l grade complex lead, zinc and iron ores) reported th in his operation the cost of power constituted 25 p cent. of his total cost. The availability, therefore, a reliable and cheap power is certain to do much ward the developing, mining and milling of low gra ore bodies that makes most for substantial and pr perous mining communities.

ELECTRIC SMELTING OF ZINC-LEAD ORE I NORWAY AND SWEDEN.

The electric smelting works at Sarpsborg, Norwa and Trollhattan, in Sweden, have been taken over an English company. At these works it is intend to treat complex sulphide ores and the mixed s phides of lead, zinc, copper and iron so frequent found in many parts of the world, but at present little commercial value in consequence of treatme difficulties. An abundant supply of hydro-electri power will be available in these works, as the countri are well supplied with rapid rivers and large lakes high altitudes. Reports by Messrs. J. C. Moulden a F. W. Harbord have been supplied, which state th the electric furnace employed has carbon electrod and the heating and melting of the charge is effect by resistance with a current of low voltage. In t first furnace 2.8 tons of roasted ore can be treated 24 hours. The horse-power per furnace is 350, and Trollhattan the cost of power by the hydro-electr company runs to 30s 3d per horse power year. The are 11 furnaces. The roasted ore, coke or anthraci dust, and flux are charged into the furnace, and mo of the zinc and some of the lead is volatilised. T greater proportion of this is condensed as a cru spelter with high lead content, but much of it is pr cipitated as metallic fume and oxide, and has to be r turned to the furnace in subsequent charges. T lead that is not volatilised is reduced as liquid met and it contains a considerable proportion of the silv Matte is formed of the iron, copper, and sulphur, present in the ore, and some of the lead, zinc and silv passes into it. Some lead also escapes with the sla The crude zinc is refined in other electric furnaces, a the final zinc product is exceptionally pure, averagi 99.9 per cent., commanding a premium price in t market. During Mr. Harbord's experience at Tro hattan 518 tons of roasted Broken Hill slime, 19 to of calamine, 22½ tons of zinc-lead powder, produc

viously produced 160.8 tons of crude zinc, which, refining, yielded 112.4 tons of pure zinc, 24.7 tons lead and 36 tons of zinc-lead powder. In addition, tons of lead tapped contained 141 ozs. of silver ton and 17 tons of "leak" lead, assaying 27 ozs. silver per ton, was recovered, also 9 tons of skimmings containing lead, zinc and silver. The recovery from the various sources was 64 per cent. of the zinc, 74 per cent. of the lead, and 46 per cent. of the silver, not counting the metal in the powder.

Character of Ore Deposit and Probable Milling Methods at Porcupine.

(Written for the CANADIAN MINING JOURNAL by Louis W. Huntoon.*

The following article on the Porcupine district of Ontario is intended primarily to discuss the ore deposits and future prospect of the camp, the character of the ore, and the probable milling methods which will ultimately be introduced.

Location and Extent.

This district, which has attracted such world-wide attention, due to the phenomenal rich strikes of gold ore, can now be reached by rail from Toronto, a distance of 473 miles. It is located north of Toronto, North Bay, and Cobalt, on the Hudson Bay slope of Northern Ontario. The district is many miles square, although most of the prospecting and development work has been confined to the township of Tisdale.

History.

Previous to three years ago the district was a vast wilderness and little was known of it. The main part of the camp is situated along an old portage route used by the Hudson Bay Company officials for a couple of centuries. In 1896 Mr. E. M. Burwash, and again in 1899, Mr. W. A. Parks, noted the occurrence of quartz veins carrying traces of gold. These observations were published by the Bureau of Mines, with the remark that the country was a promising one for the prospector. In 1906 some prospecting was done near the Hollinger vein, but evidently as no free gold was seen, and as no assays were made, work was abandoned, and it was not until 1909 that the spectacular discoveries were made on the Dome prospect by J. S. Wilson. This discovery caused a rush to the district, and in a few weeks practically all of Tisdale (6 square miles), and a large part of the adjoining townships were staked out in mining claims. These spectacular surface showings inflated the value of claims to such an extent that they changed hands at mine prices before the properties had been prospected and caused such remarks as: The price at which properties are held is determined by the number of specks of gold, and in some cases the price appears to be $0,000 per speck. One broker in Toronto stated that he had no trouble in selling properties, providing he could guarantee a cropping of rock, which is significant, inasmuch as many claims were located in swamps or on land which had a very heavy overburden of soil. During the excitement mining companies were organized and capitalized in the millions, and from the favourable reports published on the camp and by mining companies, it was easy to dispose of such stock at a handsome profit to the promoters. It is to be hoped that some day in the near future, laws will be enacted to protect the public against investments which are so over-capitalized, by requiring the promoters to furnish security, such as mortgage bonds, together with the stock for all cash invested, and that these bonds shall be paid off from the first profits derived from operating. Much of the stock of the Porcupine camp, as well as the stock of other mining districts, is worth no more than the paper upon which it is written. Only last summer many companies allowed the information to be circulated that mills were being designed and the machinery ordered, on which information the price of the stock was advanced. There were but two mines at the time these reports were circulated which had sufficient ore developed to warrant the erection of mills.

Last winter all supplies, including machinery for two mills, were hauled into the camp over the frozen lakes and snow, and this spring at the "break up" it was almost impossible for a man to walk into the camp. This fall opened with a railroad into the camp, and the Government is to be complimented on the speed with which this tremendous undertaking was accomplished. The Government is also building wagon roads through the forest, and by next summer it should be possible for a visitor to be transported by carriage around the camp. The forest fires of the summer destroyed both the Hollinger and Dome mills. The latter company duplicated its order, and the second mill has been delivered by rail to the property, and should be operating the early part of 1912.

Prospecting, Exploring and Development.

The camp is but two years old, and during this period a large amount of money has been invested in prospecting, exploring, and developing.

The method of prospecting, similar to that of the Cobalt district, consists of surface trenches and stripping. When a vein is located it is stripped and examined for specks of free gold. The surface showings are carefully guarded, as it was on these that the properties and stock were sold. At one property visited the specks were so few that it was necessary to use a tape measure to locate them, and still the reports received in New York from the manager of this property were most favourable. Another property with a surface showing of a small pocket of quartz carrying free gold, was selling last summer on the New York curb at a valuation of over $800,000. The exploration work on this property consisted of a shallow shaft located in the country rock. The ore body showing on the surface has not been found in depth after further sinking and crosscutting, although another pocket of quartz carrying values has been developed. The results from this exploratory work ap-

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parently have not been favourable, as the value of the property has decreased on the curb to $309,000.

After the veins are discovered, and sufficient money raised to explore the property, shafts are sunk. A rule which should always be followed on such uncertain deposits in exploration work is to stay with the ore. Only in a very few instances has this rule been followed. The inference is that the promoters, sinking shafts in the country rock, did so for stock speculation and for fear of destroying the beautiful showings of free gold. Diamond and shot core drills have been largely used throughout the camp, and the information derived has been most valuable.

The two principal properties which have been developed are the Dome and Hollinger mines. These properties may be classed as mines, and the capital stock of the companies will be returned with interest to the stockholders. There are only a few other properties upon which development work has been done, and before classifying them as mines, considerable more work will be required with the possible exception of one or two.

Ore Deposits, Future Prospects of Camp.

The ore deposits are of the fissure type, occurring in the Keewatin schists, Huronian conglomerate, and in Langmuir township, a contact vein between granite and schist is reported assaying from $4 to $8 per ton. The rock formations of Porcupine have been subject to much greater metamorphism than in Cobalt, resulting in some deposits of much greater extent. The Keewatin has been altered to schists and in places so badly crushed that it resembles a conglomerate. The veins forming the ore bodies cover a wide area, occurring in groups along certain lines of fissuring, although often isolated. In the township of Tisdale the results of the prospecting have shown three distinct areas.

In the vicinity of Pearl Lake the line of fissuring extends for about three miles, and has a general strike to the northeast. The Hollinger mine and some good prospects which warrant thorough prospecting, are on this line of fissuring. On this same line are also many small isolated veins which may furnish sufficient ore for a centrally located customs mill, but very few properties will warrant the erection of individual mills. A recent report on one of these properties contains the following: "The surface has been partially prospected by approximately 10,000 feet of trenching and stripping. Twenty-three veins have been discovered." This statement reminds one of the annual reports issued by the Cobalt mines and tends to prove that the area of fissuring is wide, that the individual veins are scattered, and most of them will probably be limited in extent. Before such deposits warrant the building of mills, they should contain sufficient fully developed ore to repay such an investment.

Southwest of Porcupine Lake the surface shows that the formation has been badly crushed and fissured. In this district we have the Dome mine, where the disturbance is over an area of six hundred by eight hundred feet, producing the large deposit of ore developed on the Dome property. This ore body consists of quartz veins in the disturbed formation. The general strike of the formation is north of east, and on this line, and also to the northeast, small scattered veins have been discovered, but only a large amount of stripping, followed by exploration work, will determine if they are of any commercial value.

North and northwest of Porcupine Lake we have our third area of fissuring. The general strike is east and west. The ore bodies in this section consist o scattered deposits of comparatively limited tonnage which, when developed, may furnish sufficient ore fo a customs mill. In June the surface indications wer that no one property would warrant the building of mill although further exploration work may possibl develop a large mine.

Character of Ore.

An examination of the veins and ore of the distric indicates that the original fissures were filled witl quartz containing no values. At some later period th quartz was again fissured and fractured, and the gol deposited together with quartz in the interstices. I the gold quartz we generally find ankerite, which ap pears to have been one of the important precipitatin agents. It is a fact that the greatest quantity of gol is along the fracture planes, which in some ores, suc as Rea, gives a streaky character to the ore. The dis tribution of the gold is very irregular and occur chiefly along one or both walls of the quartz, provid ing it has not been thoroughly fractured. The un fractured portions of the veins, so far as could b learned from inquiries and observations, contain n values. The pyrite associated with the quartz, ac cording to the Government report, is auriferous and one sample assayed $10.40 in gold. The mine oper ators in the district state that the pyrite contained i the gold quartz is auriferous, but that that contained i the country rock is not. The irregular mineralization o the veins is responsible for the statement of engineer and geologists, that the district will develop into a low grade camp. The ore as hoisted will probably b low grade, but there is no reason why the "run o mine" should not be hand picked and a high grad ore sent to the mill, thereby reducing costs and increas ing capacity and efficiency.

Milling.

Before a large milling plant is erected, it is much safer to erect and operate a small and complete test ing plant during the development of a mine, and from the information derived from this plant to design the large mill. It is practically impossible on most ore bodies to select one or two car loads of representative ore to be tested in an ore testing plant, as the samples should be taken from all portions as the development advances. If thorough tests are not made before the erection of the final plant, it is often necessary at a great expense to rearrange the entire plant, adding to and taking from the plant installed. The general character of the ore and ore deposit will often furnish valuable information, and especially so when compared with like ores of other districts. It is from observations made in the district and comparing the work of other districts that the following suggestions are offered.

The milling method adopted by the Dome mine, as published in the CANADIAN MINING JOURNAL, is as follows: Hoisting, breaking through two gyratories, and conveying to stamp mill bins. The second operation consists of stamping, plate amalgamation, classifying, tube milling, plate amalgamation, classifying, and dewatering. The third operation is cyaniding in Pachuca tanks, and the last is the recovery and refining of the gold from the cyanide solutions.

It would appear that the first two operations might be altered, thereby greatly increasing the capacity and efficiency of the mill.

Preliminary Hand Dressing.

The character of the deposits are such that a large amount of country rock or waste rock must be mined

with the ore. If this waste rock can be distinguished from the gold-bearing quartz, and presumably it can, it is far less expensive with such ores to discard the waste by hand than to put it through the mill. Specimen ore can be recognized and it may also be advisable to sack this both underground and on the surface for special treatment, as is done at various properties.

Reviewing hand sorting operations in various large camps we find the following: At the gold mines in South Africa, where more attention has been given to hand sorting of gold ores than in any other district, the ores are sized before picking, so as to increase the efficiency. The amount of waste discarded by hand in this district will average approximately 20 per cent. A great many of the mines are discarding over this amount. At the Ferreira mine, in South Africa, a net saving of $1,167,000 was made in ten years, and during 1903 and 1904 the annual net saving was $125,000. The annual reports from all of the mines in this district show large savings from hand dressing. In the Tonopah district of Nevada, where wages are four dollars per day, special ore sorting houses have been erected. One of the first of these was that erected by the Tonopah Mining Company, where 11 per cent. of waste is discarded at a cost of 80c. per ton of waste. The ore sorting consists of feeding the run of mine to a 1½-inch grizzly, from which the oversize is discharged to an ore bin. The ore from here is fed to a picking apron just below the bin gates. This arrangement costs practically nothing to install, as it is only a slight addition to the ore bins and is very efficient. The Tonopah-Belmont plant is of recent construction and contains ore sorting belts. Such an arrangement, the advantage of which is closer sorting, is more expensive to install. From 15 to 20 per cent. of waste is discarded at a cost of 68c. per ton of waste. At the West End mine very close sorting is required, as the ores are shipped to the smelters. The cost at this plant is $1.57 per ton of waste discarded. In the Cripple Creek district of Colorado, where labour is also high, special ore sorting plants have been erected, and it is due to these plants that many of the mines have been successfully operated.

At the following properties both high grade ore and waste rock are separated by hand: At the North Star mines in California, the rich gold ore is picked out by the specimen bosses and run through the mill at the end of the month just before making the clean-up. In the Cobalt district the waste rock is discarded by hand and the high grade ore is carefully picked out and sacked for shipment or for special treatment. In the lead silver district of Idaho, we find that hand dressing has only been introduced within the last few years and that it has been most successful in increasing the capacity and efficiency of their plants by discarding waste rock and sacking the high grade lead-silver ore underground and also sorting it out from the picking belt.

In the above districts, where labour is high, hand sorting has been most profitable, not only reducing the cost of operations, but also increasing largely the capacity of the mills. From the character of the deposits in the Porcupine district, hand dressing should be very carefully considered, and with the smaller mines it is the only method by which they can be operated at a profit.

Crushing and Pulverizing.

Rapid progress is being made in fine crushing, and the flow sheets of gold mines are being altered the world over to increase the capacity of the stamp mill. For several years past the weight of stamps in use in South Africa has been gradually increased from 1,000 to 2,000 pounds, whereas in this country the increased weight is not so pronounced. At the Dome mine it is the intention to use 1,250-pound stamps, which, with a few exceptions, are the heaviest in use in America. The use of coarser discharge screens to increase the capacity is very common, and this, in turn, necessitates the installation of some form of pulverizer. Tube mills taking the feed from the stamps have been in favour, but lately the Goldfield Consolidated Company of Nevada has installed Chilean mills between the stamps and tube mills. The installation of six 6-foot Chilean mills, at a cost of $75,000, has increased the capacity of 100 stamps from 6 tons to 8.5 tons. The installation of stamps and tube mills, together with the necessary changes for this increase in capacity, would have cost $175,000. The following comparison of costs is interesting:

100 stamps, crushing 8.5 tons, through 4 mesh, require 10 tube mills to give the desired product, whereas if the stamps are followed by six 6 foot Chilean mills crushing through 16 mesh, only 5 tube mills are required. The costs are estimated as follows:

	Two-stage Reduction.	Three-stage Reduction.
Stamping	13.4 cts.	13.4 cts.
Chilean mills	.....	10.6 cts.
Tube milling	30.0 cts.	16.6 cts.
Total, per ton	43.4 cts.	40.6 cts.

Not only has the installation of Chilean mills and accessories cost $100,000 less, but the cost of operating is also 2.8c. less per ton.

Concentration.

The Porcupine ores carry a small percentage of auriferous pyrite which is liable to increase with depth. Experience has shown that most ores containing free gold and auriferous pyrite give a higher recovery by concentrating and amalgamation and treating the sand and concentrates separately.

Reviewing the practice in other camps, we find the following: At the Perseverance mine, Juneau, Alaska, the gold ores carry only 2 per cent. of pyrite. These ores are stamped, amalgamated, and concentrated. The concentrates assaying $30 per ton are then amalgamated in pans and re-concentrated. The results at this property are reported to be most satisfactory. At the Alaska-Treadwell mill, on Douglas Island, the ores up to a year ago were stamped, amalgamated, and concentrated, and the concentrates, assaying about $30 per ton, were shipped to a smelter. Since then the concentrates have been pulverized in tube mills, passed over amalgamating plates if necessary, and cyanided, resulting in a large saving on the cost of treatment per ton. The ores on the Goldfield Consolidated mine of Nevada have given considerable trouble, due to a large percentage of the gold being carried in pyrite, which could not, without special treatment, be recovered by amalgamation or cyaniding. Their original mill consisted of stamping, amalgamating, tube milling, concentrating, and cyaniding of the tailings. The concentrates were shipped to a smelter at a heavy cost for freight and treatment. After considerable experimenting, it was found by first treating the concentrate with an acid solution, that 94 per cent. of the gold could be recovered by cyaniding, thereby reducing the cost ma-

terially. This special process is in use at the present time.

The advantages to be derived by concentration before cyaniding, are increased capacity of the plant, very often a slightly increased extraction, and increased profits. By concentrating after amalgamation any coarse grains of gold which are coated with a film, preventing amalgamation, and pyrite containing gold, are removed. This leaves a clean sand containing fine gold, which can be run through the cyanide tanks rapidly with a high extraction, thereby decreasing the number of tanks required. The concentrates which contain gold not amenable to amalgamation can then be shipped to the smelter or be given a special treatment and a high extraction obtained.

Theoretical Example.

The following theoretical example may serve to bring out the advantages to be derived by preliminary hand picking and concentration of ores. Given a gold ore assaying $10 per ton, from which 90 per cent. can be recovered by amalgamation and by cyaniding of the tailings. The capacity of the plant to be 100 tons per day, and four days to be allowed for cyaniding. The plant will then require a tank capacity of 400 tons. Allowing $2 for mining and $2 for milling, our net daily profits will then be $500.

If from the above ore 25 per cent. of waste rock, assaying $1 per ton, can be hand picked at a cost of $1 per ton of waste, we can then increase the ore mined 33⅓ per cent., or from 100 to 133⅓ tons per day, and from this we will have 100 tons to feed to the mill, assaying $13 per ton. Assuming that a recovery of 50 per cent. can be made by amalgamation, that 4 per cent. of concentrates, assaying $30 per ton, will be produced, that the sands free from pyrite and coarse gold can be cyanided in two days with a recovery of 95 per cent. of the gold contained in the sands, that a recovery of 90 per cent. of the gold in the concentrates can be extracted by a special treatment requiring six days, at a cost of $1 per ton for this special treatment, we then find from our table that our profit has been increased $247.83 per day, and that a tank capacity of only 216 tons will be required, as against 400 tons tank capacity by treating direct.

Conclusions.

In conclusion, the writer wishes to say that this article is not written to criticize the mills being designed and erected by companies in the Porcupine district, who are employing metallurgical experts, but merely to call attention to certain observations made when visiting the camp in June. Hand dressing has not been practised to any large extent in America until within the last few years, as it has always been assumed that the labour costs were entirely too high. Abroad, and especially in Germany, hand dressing is practised on a very large scale. With properly arranged plants hand dressing of waste rock from gold ores is far less expensive in most cases than milling. The references made to crushing and concentrating are improvements which have been introduced in gold milling within the last few years.

Results Hand Dressing-Concentrating.

	Tons	Time	Total
Run of Mine	100	4 days	400 tons

Tank Capacity Required.

	Tons	Time	Total
Run of Mine	133		
Mill ore	100		
Sands	96	2 days	192 tons
Concentrates	4	6 days	24 tons
Total	133	1.62 days	216 tons

Profit Milling Direct.

	Tons.	Assay.	Value.	Costs.	Loss.	Recovery.
Mining	100	10.00	1000.	200	...	...
Milling	100	10.00	1000.	200	100	900
Total	...	.....	.....	400	100	900
Loss Milling	...	.....	.....	100	...	...
Total Cost and Loss	...	.....	.....	500	...	...
Net Profit per day	...	.....	.....	500	...	...

Profit Hand Dressing—Amalgamation—Concentrating —Cyaniding.

	Tons.	Assay.	Value.	Costs.	Loss.	Recovery.
Mining	133	10.00	1333.	267.	.....	...
Waste Rock	33	1.00	33.	33.	33.00	...
Milling	100	13.00	1300.	200.	.....	650*
Concentration	100	.....	.....	10.	.....	...
Sands	96	5.52	530	...	26.50	503.50
Concentrates	4	30.00	120	4.	12.00	108
Total	...	.....	.....	514.	71.50	1261.50
Loss Milling	...	.....	.....	71.50	...	...
Total Cost and Loss	...	.....	.....	585.50	...	...
Net Profit per day	...	.....	.....	747.83	...	...

*Recovery by amalgamation.

SPECIAL CORRESPONDENCE

ONTARIO.

Cobalt, Gowganda, and South Lorrain.

Sir Henry Pellatt has secured a three months' working option on the 40-acre claim of the Dominion silver mines, near North Cobalt. A shaft has been sunk 30 feet on one of the veins and some time ago it was reported that silver had been discovered in it. A small plant will be installed and vigorous development ensue. It is also reported in this same section that the Santa Maria Mining Company, which has the Green Meehan under lease, has struck another body of ore.

The report of the Buffalo mill for the month of September reads: mill ran 550 hours, ore milled, 4.116 tons; average assay, 29.22 ounces; ounces recovered, 97,972; ounces of silver paid for during the month but shipped previously, 106,726.

In a report to the head office of the Trethewey, Mr. Chas. O'Connell reports a considerable improvement in the physical condition of that property. He states that while the mill is treating an average of a hundred tons per day, yielding approximately 2,000 ounces of silver, there is now in sight three years' supply of milling ore under ground and one year's supply on the dump. From the beginning of the year to October 31st, there had been shipped 491 tons, containing gross value of 299,121, as compared with 423 tons of gross value of $275,070 during the same period of the previous year. The financial position of the company on November 10th was: cash in bank, due from smelters, and ore on hand, $104,695.

The Beaver Consolidated has declared another dividend, payable on December 15th. It is of 3 per cent., and calls for a disbursement of $60,000. The Beaver paid its first dividend after two and a half years of work on May 15th, and has now paid 8 per cent., or, altogether, $170,000.

A. H. Brown, formerly of the Coniagas mine, Cobalt, and later manager of the Pike Lake Mining Company, at Swastika, has taken up his duties as manager of the Hudson Bay mine at Cobalt.

The McKinley-Darragh-Savage will pay its usual 10 per cent. dividend on January 1st. During the past year the McKinley-Darragh has paid 50 per cent. to shareholders, and has now returned 96 per cent. of its capitalization, or $2,156,521.

The shipments from the Cobalt camp for the month of November read: McKinley-Darragh-Savage, 258.46 tons; Coniagas, 145.86; Cobalt Lake, 162.72; Crown Reserve, 48.93; Nipissing, 358.02; Buffalo, 87.73; Cobalt Provincial, 25.05; Hudson Bay, 97.32; La Rose, 252.36; Right of Way, 41.17; Cobalt Townsite, 23.59; Temiskaming, 67.78; Chambers-Ferland, 32.00; Colonial, 22.25; Kerr Lake, 111.97; Trethewey, 29.88; O'Brien, 32.02; Drummond, 90.00; total, 887.25. The only heavy shippers of low grade ore last month were the Nipissing and the Drummond, the great bulk of the ore being concentrates and high grade ore, with about $190,000 in bullion.

Last month the Nipissing produced $225,907 net, and shipped $248,980. Of this production $90,407 was of mine ore, while $158,573 was contained in the bullion from the high grade reduction plant. While there were no new developments, the underground work on the property is proceeding very satisfactorily.

Porcupine and Swastika.

While every one is waiting expectantly for the long delayed report on the Hollinger, very favourable development is proceeding at the Miller Middleton, the next Timmins-McMartin-Dunlap flotation likely to go on the market. For 125 feet the drift at the 65-foot level is in an ore body of quartz and schist which on the first sampling ran $8 to the ton. The face of the drift is still in values.

For the last month the market has hung fire until the publication of Mr. Robbins' report. As this is the first occasion on which the property has been thoroughly sampled, it is awaited with the greatest interest. Meanwhile the work of construction is proceeding. Nearly all the camp buildings have been completed, and the mill is now up to the second story, although most of the machinery is not yet on the ground. Underground the position remains very much as it was four or five months ago. This is to say, there is 1,100 feet of drift in ore on the 100 foot level, with an average vein of eight feet. On the second level about 237 feet have been opened up, with values and width much the same. There is one more important lead located and opened up for 50 feet on the first level. This was 24 feet wide where it was cut, and as the whole of the drift is in solid quartz it is difficult to arrive at an average width. Another ore body cut consists of about a foot of quartz in a mineralized schist zone, and here it is the schist that carries the values. There is very considerable dissatisfaction with the progress that has been made lately on the Hollinger Extension branch. The Timmins syndicate, which is providing the money for the extension, was promised the railroad in at their townsite by November 1st at the latest, and now it is very probable that it will not reach that spot by February or March 1st. Many companies held back their orders for machinery until they saw that it would delay them very considerably if they did so, and they are now hauling over the roads.

In its No. 4 shaft the McIntyre has cut its vein at the 200 foot level. It is reported that the vein is at this particular point twenty feet wide, and that it runs $19 to the ton. Work is proceeding fast with the construction of the ten stamp mill, the excavations have been made and all the machinery has been ordered. Meanwhile a considerable amount of ore has been put in sight.

The Bouzan properties on the boundary line between Whitney and Cody have been sold to the Intercolonial Gold syndicate, an association of Belgian capitalists.

The vein on the Hughes Porcupine mines at 20 feet has dipped back into the shaft. It here shows eight feet of quartz and contains a considerable amount of visible gold. Thirty men are employed in sinking the shaft and in putting up camp buildings.

Plans have been prepared for the development of the 14 claims owned by the Hollinger Reserve and a plant is being installed. To date merely surface work has been undertaken, but the veins so far uncovered are of good width and show gold.

The shear zone on the Davidson property at a hundred feet proves to be as extensive as on the surface. For a hundred feet the drift is in quartz and schist. Nothing has as yet been made public of the average values at this depth, but there is a considerable amount of gold visible in the specimens brought from below.

C. W. Duncan, for a Toronto syndicate, has optioned the Lilly claim at Swastika, and also two claims to the northeast of the Lucky Cross. Development work on the Lucky Cross at Swastika has yielded very satisfactory results. Down to about the 50-foot level, where the vein dipped out the shaft, there was a remarkable showing of visible gold in a quartz lead that was from four to five feet wide.

An average rate of a hundred feet a month is being made on the Pearl Lake property. During one week over 25 feet were drilled and shot out. The shaft is rapidly approaching the 200-foot level, where the first level will be cut.

The letter of H. L. Taylor, the new president of the Imperial Gold Mining Company at Porcupine, states that "within a year we believe we will have a mill and a mine." The secretary-treasurer's report shows a balance of $3,958 in the treasury and 648,000 shares intact in a $2,000,000 company. Two crosscuts are being driven at the 100-foot level.

The Boston Development Company is opening up its claims in Deloro, where it reports good results from its surface prospecting. Camps have been erected and eighteen men are now employed.

The Hon. W. H. Hearst, Minister of Lands, Forests and Mines, has promised, among many other things, to the miners and prospectors that the townships of Ogden and Deloro shall be taken out of the Temagami Forest Reserve, so that a prospector can get a patent for his claims. He has also promised more and better roads for the mining districts, and that permits to prospect in the Reserve should be issued at the Recorders' offices in the various districts where these sections are, instead of at Toronto.

Mr. Oscar Bergstrom has taken charge of the Rea Consolidated in place of Mr. Kingsmill. Mr. Bergstrom commenced his career in the mining world at an iron property in Sweden. The first camp he saw in America was Butte, and he has since travelled to nearly all the precious metal camps of the western States. He has held important posts at Leadville, Colo., in Alaska, and he reached this country from California, where he was in charge of the Calaveras gold mine, and also the Calaveras copper mine.

It is now known that while the vein at the 300 foot level of the Rea is from 35 to 40 feet wide, the values run discouragingly low.

Since the good prospecting areas round Porcupine became delimited the army of mineral seekers in Northern Ontario are roving still wider and wider afield. There are parties covering all the good ground between Porcupine and Sudbury, and there is a little rush to the Hurricanaw River, south of the Transcontinental. Also mild excitement has been caused in Cochrane by the statement that Chief Commando had discovered quicksilver on the Ground Hog River while out prospecting. Several men of some experience have seen samples from this section, and declare that it is promising. Quicksilver is found in the Nipissing ores in uncommercial quantities, which lends some colour of probability to the statement of the Indian.

BRITISH COLUMBIA.

On November 15th the Canadian Mining Journal included in the General Mining News it printed, the following news item: "Fernie, Nov. 3.—The Riot Act was read in Fernie last night by Mayor Bleasdell after a violent outbreak on the part of the miners, when a train arrived from Coal Creek with men on board who had gone to work in the mines without waiting until the agreement now under consideration at Frank had been signed and ratified. Large numbers of miners were on hand when the train reached here, and the men who had worked were greeted with hisses and derisive language. One man was hit upon the side of the face with a stone thrown by some one in the crowd." As no mention was made, on the other hand, of the general good behaviour during a long season of suspension of work of the great majority of the mine and coke-oven workers, common justice to them would seem to make it desirable that the following "Open Letter to Dr. Warnock, M.P., Ottawa," written by Mr. J. W. Bennett, editor and manager of The District Ledger, Fernie, the official organ of District No. 18, United Mine Workers of America, be also printed in the Canadian Mining Journal. It may be mentioned that copies of this letter were sent to Hon. Robert Rogers, Minister of the Interior (who has been credited with having brought together the Operators and Mine Workers and arranged a basis of settlement of the strike): Hon. T. W. Crothers, Minister of Labour; and Mr. A. S. Goodeve, member for Kootenay in the House of Commons. Under date, November 21, Mr. Bennett addressed Dr. Warnock as follows:

"Dear Sir,—According to press notices we see that you have put in notice of questions to be asked regarding the recent disturbances in Fernie, and as the probabilities are that the reports you have obtained relative to this subject may have been more or less garbled, we fell it incumbent upon us as representing the mine workers throughout District 18, to state the case exactly as we know it to have existed.

"From April 1 to October 31 the quietness and respect for law and order shown by those out on strike was a surprise to everybody, more especially so when is taken into consideration the cosmopolitan character of those involved. We may say that every coal region of Europe has its quota of representatives, and in addition thereto a large element from southern Europe were employed here as labourers—such as Italians, Montenegrins, Roumanians, and other natives of non-coal-producing countries. The disturbances that occurred were exceedingly trifling and have been throughout, even when it was deemed necessary to read the Riot Act.

"When the report was telegraphed throughout the length and breadth of the land that the Hon. Robt. Rogers had settled the strike men came from widespread parts only to ascertain the news was premature. This, as was natural, had a tendency to create a feeling of resentment. Moreover, there was not a single piece of property belonging to the coal company destroyed or in any way injured. A few panes of glass were broken in the house occupied by the Barr family, who had received rations from the mine workers' organization until October 31 and then went to work. Four negroes who had been given permission by the local magistrate to carry firearms were also hooted and jeered at when they came off the train, one of them discharging his revolver, which, fortunately, did no damage. Another individual, named Potter, who had received consideration at the hands of the organization, followed the example of the Barrs.

"When the Riot Act was read four policemen of the city force were quite sufficient to prevent any congestion of traffic, and although there was a large crowd of people gathered together, the spirit prevailing was more of curiosity-mongering, attracted, as usual at a time when idleness prevails, to see what was going on. The reading of the Riot Act was treated more as a farcical joke.

"With the exception of the above incident and the occasional throwing of snowballs when the police escort of over 40 men were accompanying five who had been to work, there was really no disturbance.

"The above is a plain statement of facts of which you may make any use you see fit and make known the name and position of the writer."

Cariboo.—It has transpired that the placer-gold mining season of 1911 in Cariboo district was to some extent disappointing. Cold weather in the spring made a late opening of the season; then the snow melted quickly when the summer set in; finally, unusually dry weather was experienced throughout the autumn. These things combined to make the gravel-washing season very short, with the result that the quantity of gold recovered was smaller than had been expected. However, the number of properties on which placer-mining was done, and the additional construction and development work carried out in preparation for future operations, were both satisfactory, indicating that a larger total yield of gold may reasonably be looked for in the early future.

Atlin.—While detailed information relative to hydraulicking operations on the several gold-bearing creeks in Atlin camp has not yet been received, a statement has been published to the effect that less gold was removed during the season lately closed than in that of 1910. The reason assigned is that some of the larger operators were occupied during part of the season in making improvements and extensions to plant, water-supply systems, etc., so did not wash so much gravel as they might otherwise have done. The betterments made, though, are stated to make the outlook better for the recovery of more gold next and following seasons.

Slocan.—The Standard Silver-Lead Mining Company's concentrating mill, built near Silverton, on the shore of Slocan Lake, is now operating. The mill has a crushing capacity of about 200 tons per day, but as yet concentrating machinery for only half that quantity has been put in. A considerable proportion of the ore is sorted out after having been crushed and is shipped to the smeltery in its crude shape, being high-grade ore. All the surface improvements decided upon when the Standard property was acquired from Messrs. Aylard and Finch by the company nearly a year ago have been completed. These include putting in a water-supply system for operating compressor plant and concentrating mill, an air compressor, for machine drill and other power purposes at the mine, the concentrating mill above-mentioned, and an aerial tramway from the mine down to the mill, a distance of about 8,000 feet. Shipment of ore and concentrate to the smeltery at Trail will, it is expected, be regularly maintained from now on.

Nelson.—At a meeting held at Nelson on November 21, a number of resolutions were passed with the object of advancing the interests of those engaged in mining lead and zinc ores. The gathering, though not as large nor representative as some mining conventions held in the province in earlier years, was attended by a sufficient number of men prominently associated with lead and zinc mining to make the recommendations of the meeting worthy of the serious consideration of the Federal Government. These resolutions, as reported in the local newspaper, included on urging the appointment by the Dominion Government of a commission to enquire into the method best suited to encourage and protect the zinc-mining industry and to consider the question of bonus or award and rendering financial assistance to any person or persons who shall "devise and carry to commercial success works for the reduction and refining of low-grade zinc-lead ores of this country which are not at present amenable to the ordinary methods of zinc concentration." Another asked the Government "to create a portfolio of mines, the Minister to devote his attention entirely to the industry," and to strengthen the case for this proposed most important change in the policy of the Government, the resolution was moved by a local lawyer, and seconded by a prominent fruit-grower, neither actively engaged in mining. The Dominion Government may be expected to regard so serious a departure from the present order of things as at least worthy of the earnest and united support of a far larger number of men closely connected with the operations of the mining and smelting industries than were present at the meeting under notice. The appointment of Messrs. W. E. Zwicky, Oscar V. White, A. J. Becker, and T. W. Bingay on a committee to investigate the situation in regard to the desirability or otherwise of petitioning "for protection on lead and zinc, either in the shape of duty or bounty," is a matter for congratulation, for they are men deeply interested in this question, being actively engaged in connection with mining or smelting lead-zinc ores, and can speak whereof they know. Finally, the opinion may be here expressed that reference of these matters, relating essentially to the interests of the mining industry, to the Conservative convention, at that time sitting in New Westminster, for endorsement by men, few of whom know anything at all about the important subjects thus referred to them, was a move not worthy of the mining men of the country who, if they have a good case for support from the Federal Government in connection with one of the largest industries of the West, might reasonably be expected to present it on its merits, and not make it a subject for action by any purely political organization.

Coast.—It is stated that the Canadian Mining Operators, Limited, a Vancouver development company, of which Mr. Robert R. Hedley is technical adviser and mining engineer, has acquired twenty sections of coal land adjoining that of the B. C. Anthracite Company, in Ground Hog district, Upper Skeena.

Messrs. Harris Brothers, who are largely interested in the American Boy group of eight mineral claims, situated in Ninemile Mountain camp, in the Hazelton (Skeena River) district, lately stated for publication that they think the Hazelton district contains more properties giving promise of becoming producers of rich ore than were known in Slocan district at a similar stage of development eighteen years ago.

The Natural Resources Security Co., Ltd., has lately been advertising that "An immense body of anthracite coal exists at the head waters of the Skeena, about 150 miles north of Hazelton. . . . It is stated that good coal seams are known to underlie over 2,100 square miles of territory, and that the estimated capacity of the field is 43,000,000 tons per square mile." As this works out at an aggregate content of 90,300,000,000 tons of coal, it may be pointed out that Mr. D. B. Dowling, of the Geological Survey of Canada, one of the most noted coal geologists of the Dominion, in a paper he contributed to the last Annual Meeting of the Canadian Mining Institute, gave a table showing an estimate of only 1,351 square miles of coal-bearing territory in the whole of British Columbia, and an estimated aggregate coal content of 40,221,000,000 tons.

GENERAL MINING NEWS.

QUEBEC.

Montreal, Dec. 4.—A meeting of the shareholders of the Canadian Venezuelan Ore Company, Limited, was held to-day at the Windsor Hotel. This company, which consists of Montreal, Halifax, and Toronto capitalists, has secured large deposits of iron ore of bessemer quality on the Orinoco River, Venezuela. Mr. W. B. Ford, formerly in charge of the mines of the Dominion Iron & Steel Company at Wabana, Newfoundland, is the resident manager of the company in Venezuela.

The officers elected at to-day's meeting were as follows: F. P. Jones, president; Sir William C. Van Horne, vice-president; Sir Max Aitken, G. B. Bosworth, H. S. Holt, Hon. A. K. Maclean, M.P., G. Fred Pearson, John D. Patterson, and W. D. Ross, directors.

Asked as to when the company expected to commence operations, Mr. F. P. Jones, the president, said:

"We have nearly all our machinery on the ground now and with the competent staff now in charge at Imotica, I expect we will be shipping ore early in the New Year."

ONTARIO.

Cobalt.—The Northern Ontario Light and Power Company, Limited, has been formed to take over the properties of the Cobalt Power Company, Limited, and its subsidiary companies, and the Cobalt Hydraulic Power Company, Limited. The company furnishes power and light in the towns of Cobalt, North Cobalt, Haileybury, New Liskeard, Cochrane, and Porcupine.

Porcupine.—Directors of the Temiskaming have been inspecting the North Dome property, the controlling interest in which has been acquired by the Temiskaming Company. A circular has been issued to Temiskaming shareholders, giving the details of the deal and announcing the passing of the Temiskaming dividend for the current quarter. The deal is sub-

stantially as The Star gave it a couple of days ago.

The Temiskaming take over 138,000 shares, for which they will pay $229,000, or approximately $1.66 per share. This amount is payable in instalments extending over 13 months.

The North Dome is capitalized at $2,000,000, or 400,000 shares at $5 per share. There are 171,459 shares in the treasury.

The Temiskaming directors announce that it is the intention to push developments on the property, and that arrangements have already been completed for the sale of sufficient of the treasury stock at $1.66 per share, to provide necessary funds for some months to come.

Porcupine.—The most interesting news that has come out of Porcupine for some time was a despatch received by the Pearl Lake Gold Mines, Limited, recently from G. W. Thomson. It gave the first news of values at depth that has come from the camp. The Pearl Lake Company has been making an examination of its property by diamond drilling, and in several sections has encountered high values.

The despatch received yesterday was to the effect that in No. 3 hole at a depth of 1,164 feet, two feet of core assayed $6, while one foot at 1,168 feet, assayed $9. At 1,180 feet the core was still in mineralized schist.

The drilling is being continued and further developments are being awaited with the greatest interest.

Elk Lake, Dec. 4.—Another shipping mine is added to the list in this district, the Canadian-Gowganda, having let the contract for hauling a 50,000-pound car of high-grade silver ore from the mine to the T. & N. O. at Charlton. The car now being shipped was stoped out of the drifts in about four weeks by a small gang of men.

ALBERTA.

Lethbridge, Nov. 24.—To-night the price of coal for the coming winter will be fixed. This morning's train from the west brought Lewis Stockett, president of the Western Coal Operators' Association; J. K. Gram, of Coleman, Alta; William Whiteside, of Blairmore, Alta.; W. G. Smith, of Corbin; W. W. Wilson, of Fernie, and William Lloyd, of Frank, all in charge of mines at these points. They are meeting in the offices of the Alberta Railway & Irrigation Co., and P. L. Naismith, and they will finish the business of the association regarding the strike and recent decisions which will guide their transactions as an association in future.

BRITISH COLUMBIA.

Vancouver, Dec. 4.—A special from Merritt, B.C., says three men were killed in a chute of No. 7 level of No. 2 mine of the Nicola Valley Coal & Coke Co.'s Middlesboro properties on Sunday. They are Dusan Wurmirovitch, a Servian, aged 25; Robert Dishart, a Scotchman, aged 28; and Alex. Thompson, aged 17.

The accident occurred one hour after the second shift had started work. The bodies were found huddled around the fan. Thompson's work was turning the fan to force out the foul air. The men were driving a tunnel to make an air way. It is the first accident since Charles Graham was superintendent.

UNITED STATES.

New York.—The Yukon Gold Co. has declared a quarterly dividend of 7½ cents a share—equal to 1½ per cent. This is a reduction from 10c. a share, or 2 per cent., from the last previous dividend. The dividend is payable December 30. Books close December 12th, and remain closed until January 9th, to provide for the annual meeting, which comes on January 8th.

In connection with the reduction, President Samuel R. Guggenheim makes the following statement:

"At a meeting of the directors it was decided to declare the quarterly dividend at the rate of 7½c., instead of 10c. per share, which has been paid formerly; that is, the directors have decided to place the company for the present upon a 6 per cent. per annum basis, instead of 8 per cent."

"The extraordinarily dull season prevailing in different parts of the world also affected Alaska and Yukon Territories, curtailing the hydraulic operations. The two new steel dredges, which had been built upon the property this season, were not finished in time to be of much benefit. The final figures for the season's operations are not at hand, but the advance statements indicate a net operating profit of approximately $1,300,000, as against an estimated profit of $1,500,000, which, if realized, would have allowed the continuation of dividends at the 8 per cent. rate."

Knoxville, Tenn., Dec. 9.—A dust explosion imprisoned about 200 men in the coal mine of the Knoxville Iron Company, near Briceville, 34 miles north of Knoxville, at 7.30 o'clock. The explosion is about two miles from the entrance to the mines.

The Federal mine rescue crew has been summoned. It is not yet possible to ascertain the number killed, but it is feared the loss of life will be very heavy.

Cripple Creek, Colo., Dec. 2.—The gold output from the Cripple Creek district for the past month amounted to $1,356.966.50, with a gross tonnage of 77,204. This is a decrease of 513 tons, and an increase of about $54,062 over the month of October. During the month the Homestake, Jo Dandy, and Isabella, low-grade mills of the camp, were closed down for divers reasons.

Leadville, Colo., Dec. 1.—The close of the eleventh month of the year finds the district in first class condition. With more work going on than for several years at the same period, more prospecting being done for new ore bodies and extensions of old ones, and during the period more shafts have been sunk and more tunnels driven throughout the district than has taken place in a number of years.

Los Angeles, Cal., Nov. 29.—October production, 7,283,434 barrels. Such is the official announcement of the yield of the California oil fields for the past month. During the same period the consumption totalled 6,701,693 barrels, leaving a net daily surplus of 18,765 barrels.

STATISTICS AND RETURNS

LE ROI NO. 2.

The following cable has been received at the London office of the Le Roi No. 2, Ltd., company from the managers in Rossland:

"Josie mine report for October—Shipped 1,590 tons of ore and 146 tons of concentrates. Receipts from smelter are $37,138 for 1,621 tons of ore shipped; $4,126 for 181 tons of concentrates shipped. In all $41,264.

"Estimated costs for corresponding period: Development, $9,000; ore production, $10,000; milling, $1,250; total, $20,250.

"North Annie, west drift, 500 feet level: Advancement, 43 feet; vein lost west of fault.

"Diamond Drill, 700 foot level—Struck one and one-half feet of ore, continuation recent North Annie ore chute."

NIPISSING IN NOVEMBER.

In the month of November the Nipissing produced net $225,907, and shipped $248,980, of which $90,407 was mine ore, and

$158,573 bullion, from the high grade mill. The October production was $226,929, shipments $225,282. November thus showed a decrease of $1,022 in production aud an increase of $23,698 in the ore shipped.

N. S. STEEL AND COAL.

Outputs from all departmeuts of the Nova Scotia Steel & Coal Company for November were very satisfactory, and in several instances new records were established. The month was particularly good at the New Glasgow works, every department there surpassing its best previous output.

In detail the outputs were: Coal mined, Nov., 77,587; Oct., 75,521; pig iron made, Nov., 7,170; Oct., 7,258; steel ingots, Nov., 7,423; Oct., 5,453; billets cogged, Nov., 7,694; Oct., 6,456; bars and plate rolled, Nov., 5,702; Oct., 4,817.

DOMINION STEEL.

The production of the Dominion Steel Company in November was very satisfactory. Rods, especially, loomed up, the mill turning out 8,325 tons, the best production since the bounty was taken off. The month's figures are as follows:

Pig iron	22,916
Steel ingots	27,084
Blooms	23,633
Rails	7,527
Rods	8,325
Shipments	19,923

LA ROSE PROFITS.

Operating profits of La Rose Consolidated Mines Company in October are reported as $75,561, bringing the operating profits for 10 months of 1911 to $995,158, an average of practically $100,000 a month. September profits were $94,779, and August $84,561.

Production in October was $255,802 ounces of silver, having a gross value of $136,045. Other income brought the total up to $141,306. Expenses amouuted to $65,744, leaving the operating profits $75,561. From Jan. 1 to Oct. 31, La Rose produced 3,011,583 ounces, valued at $1,585,494. Income from other sources was $14,623. Expenses were $604,959, leaving the operatiug profit for the 10 months $995,158.

COBALT ORE SHIPMENTS.

The following are the shipmeuts for the week ended Dec. 2nd in pounds:

Cobalt Lake, 2 1 1 h	210,600
Nipissing, 3 1	192,937
Kerr Lake, 1 h, 1 1	121,490
Temiskaming, 1 h	86,579
McKinley-Darragh, 1 h	65,320
Hudson Bay, 1 h	67,600
O'Brien, 1 h	64,030
La Rose, 1 h	63,592
Buffalo, 1 h	60,300
Drummond, 1 1	60,000
Trethewey, 1 h	59,760
Coniagas, 1 h	54,746
	1,106,954

Bullion Shipments.

	Ounces.	Value.
Nipissing	26,332	$14,667
O'Brien	12,201	6,832
Kerr Lake	3,056	1,711
	41,589	$23,210

B. C. ORE SHIPMENTS.

Ore shipments for week ended Nov. 25th, and ore milled in the Kootenay and Boundary districts totalled 14,819 tons, making the total for the year to date 1,389,925 tons. The smelter receipts for the same periods are respectively 12,584 tons and 1,180,456 tons. The figures in detail are:

Slocan-Kootenay Shipments.

Molly Gibson	73	1,018
Van Roi, milled	800	34,449
Arlington	28	209
Panama	20	60
Lloyd	1	1
St. Eugene, milled	420	24,396
Richmond-Eureka	28	2,061
Rambler-Cariboo	29	1,427
Hewitt	30	404
Queen, milled	420	19,430
Granite-Poorman, milled	250	11,760
Nugget, milled	110	5,170
Emerald	28	1,803
Hope	40	616
Knob Hill	172	4,721
Other mines	.....	31,433
Total	2,449	139,003

Boundary Shipments.

Mother Lode	6,026	281,645
Jack Pot	271	23,454
Athelstan	140	17,359
Unnamed	1,236	11,259
Other mines	.....	680,849
Total	7,673	1,014,566

Rossland Shipments.

Centre Star	3,318	179,071
Le Roi No. 2	650	26,360
Le Roi No. 2, milled	300	14,100
Le Roi	429	16,331
Other mines	.....	494
Total	4,697	236,356

Consolidated Co.'s Receipts.
Trail, B.C.

Centre Star	3,318	179,071
Le Roi No. 2	650	26,360
Le Roi	429	16,331
Richmond-Eureka	28	2,061
Rambler-Cariboo	29	1,427
Hewitt	30	404
Emerald	28	1,803
Hope	40	616
Granite-Poorman	34	372
Knob Hill	172	4,721
Molly Gibson	73	1,018
Van Roi	31	1,434
Arlington	28	209
Panama	20	60
Lloyd	1	1
Other mines	.....	59,282
Total	4,911	295,215

B. C. Copper Co.'s Receipts.
Greenwood, B.C.

Mother Lode	6,026	281,645
Jack Pot	271	23,454
Athelstan	140	17,359
Unnamed	1,236	11,259
Other mines	.....	61,111
Total	7,673	394,828

TORONTO MARKETS.

Dec. 11—(Quotations from Canada Metal Co., Toronto):—
Spelter, 6.75 cents per pound.
Lead, 4.50 cents per pound.
Antimony, 7 to 9 cents per pound.
Tin, 44 cents per pound.
Copper, casting, 12.95 cents per pound.
Electrolytic, 12.95 cents per pound.
Ingot brass, 7 to 12 cents per pound.

Dec. 9.—Pig iron—(Quotations from Drummond, McCall & Co., Toronto):
Summerlee No. 1, $23.00, f.o.b., Toronto.
Summerlee No. 2, $22.50, f.o.b. Toronto.
Midland No. 1, $18.50 f.o.b., Toronto.
Midland No. 2, $18.00, f.o.b. Toronto.

GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼ inch lump.

Coke.

Dec. 5.—Connellsville Coke (f.o.b. ovens):
Furnace coke, prompt, $1.50 to $1.55 per ton.
Foundry coke, prompt, $1.80 to $1.90 per ton.

Dec. 5.—Tin, straits, 45.87½ cents.
Copper, prime lake, 13.20 cents.
Electrolytic copper, 13.10 cents.
Copper wire, 14.50 cents.
Lead, 4.40 to 4.50 cents.
Spelter, 6.75 cents.
Sheet zinc (f.o.b. smelter), 8.50 cents.
Antimony, Cookson's, 7.75 cents.
Aluminium, 18.50 to 19.00 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $46.00 per ounce.
Platinum, hard, $48.50 per ounce.
Bismuth, $1.80 to $2 per lb.
Quicksilver, $46 per 75-pound flask.

SILVER PRICES.

	New York. cents.	London. pence.
Nov. 18	55⅝	25⅝
" 20	56⅜	26
" 21	56⅜	26
" 22	56⅜	26
" 23	56¾	26⅛
" 24	55⅞	25¾
" 25	56⅛	25⅞
" 27	55¾	25 11/16
" 28	55⅝	25 11/16
" 29	55½	25⅝
" 30	Holiday	25 9/16
Dec. 1	55⅜	25 9/16
" 2	55⅝	25 11/16
" 4	55⅜	25 9/16
" 5	55⅛	25 7/16

SHARE MARKET.

(Courtesy of E. D. Warren & Co.)

NEW YORK CURB.

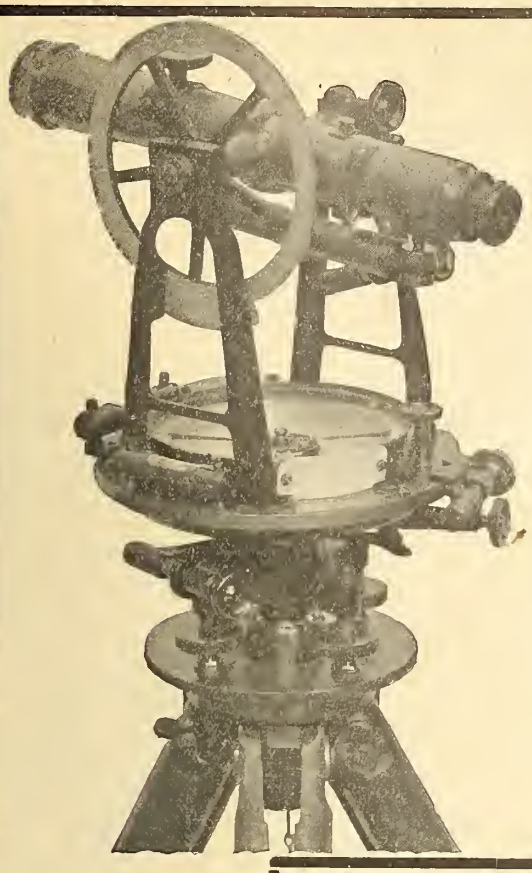
	Bid.	Ask.
Braden	5⅜	5⅝
B. C Copper	4⅜	4⅝
Butte Coal.	16¼	17
Ely Central	.02	.04
Ely Cons.	5/16	⅜
First National	1¾	2
Giroux	4	4⅛
Green-Canadian	7¼	7⅜
Inspiration	9⅜	9½
Nevada Hills	2⅜	2½
Ohio Copper	1 1/16	1⅛
Ray Central	1⅝	1 1/16
Union Mines	3/16	3½
Yukon Gold	3⅜	3½
Goldfields Cons.	4⅜	4½
Nevada Cons.	18⅛	18⅜
Miami	21⅞	22½
Granby	28	60
Cons. Min. & Smelt.	43	45½
Davis-Daly	¾	1
Cons. Arizona	½	⅝
Rawhide Coal.	...	...
Ray Cons.	14⅞	15⅛
Chino	23	23⅛
New Baltic	...	...
United Copper	2⅛	2¼

PORCUPINE STOCKS.

American Gold	.97½	.98
Apex	.09	.10
Coronation	...	...
Nor. Exploration	offered	3.50
Dobie	.80	1.00
Dome Ex.	.64	.66
Foley-O'Brien	.47	.50
Rea	2.99	3.00
Hollinger	11.00	11.10
Monita	.09 bid	
Pearl Lake	.39	.40
Central	3.40	3.50
Imperial	.04	.05½
Northern	.66	.67
Tisdale	..	offered .05¼
Preston East Dome	.15	.15⅜
Standard	.12	.13
Swastika	.25	.25¾
United	.03	.03½
Porcupine Gold	.55¼	.55½
West Dome	.70	1.00
Crown Chartered	.52¾	.53¼
Eldorado	.11	.12½
Gold Reef	...	offered .11
Porcupine Canada	.85	1.00
Porc. Southern	.55	.57
Jupiter	.46 bid	...
Dome Mines	37.50	37.50

COBALT STOCKS.

Bailey	.02	.02¼
Beaver	.37¼	.37½
Buffalo	1.35	1.55
Chambers-Ferland	.12	.12½
City of Cobalt	...	...
Cobalt Lake	.25	.26
Coniagas	5.95 bid	...
Crown Reserve	2.75	2.78
Great Northern	.10¾	.12
Green Meehan	.01½	.02
Hargraves	...	...
Kerr Lake (x.d.)	2.60 bid	...
La Rose	3.86	3.87
Little Nipissing	.01¾	.02
McKinley-Darragh	off	1.80
Nipissing	7.00	7.25
Nova Scotia	...	...
Peterson Lake	.06½	.06¾
Right of Way	.06⅞	.07
Rochester	.02½	.02¾
Silver Leaf	.03	.03½
Temiskaming	.27½	.28
Wettlaufer	.82	.83



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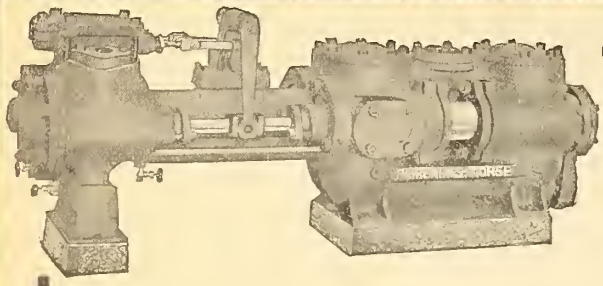

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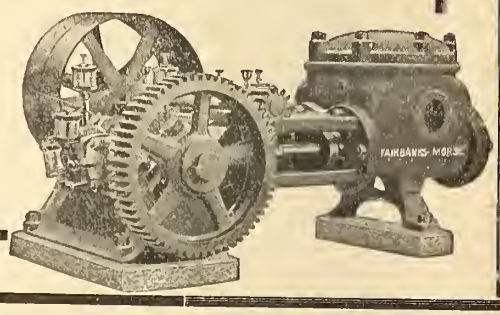

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The Geological Survey has published maps and reports dealing with a large part of Canada, with many local areas and special subjects.

A catalogue of publications will be sent free to any applicant. A single copy of a map or report that is specially desired will be sent to a Canadian applicant free of cost and to others at a nominal price. The applicant should state definitely the precise area concerning which information is desired, and it is often of assistance in filling an order for a map or report if he states the use for which it is required.

Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map of Canada, by G. A. Young and R. W. Brock.

NEW BRUNSWICK and NOVA SCOTIA

1113. Memoir No. 16. The Clay and Shale Deposits of Nova Scotia and portions of New Brunswick, by H. Ries and J. Keele.

QUEBEC

1110. Memoir No. 4. Geological reconnaissance along the line of the National Transcontinental Railway in Western Quebec, by W. J. Wilson, accompanied by a map.

1064. Geology of an area adjoining the east side of Lake Timiskaming, by Morley E. Wilson.

ONTARIO

1137. Memoir No. 10. An instrumental survey of the shore-lines of the extinct lakes Algonquin and Nipissing in South-western Ontario, by J. W. Goldthwaite.

NORTH WEST PROVINCES

1115. Memoir No. 8. The Edmonton Coal Field, Alberta, with maps, by D. B. Dowling.

BRITISH COLUMBIA

1139. Memoir 11-T Triangulation and Spirit Levelling of Vancouver Island, 1909, by R. H. Chapman.

YUKON and NORTH WEST TERRITORIES

1080. Report on a part of the North West Territories drained by the Winisk and Attawapiskat Rivers, by Wm. McInnes.

1130. Memoir No. 9. Bighorn Coal Basin, Alberta, by G. S. Malloch, accompanied by a map.

MAPS RECENTLY ISSUED:

CANADA

1042. Mineral Map of Canada. Scale 100 miles to 1 inch.

1084. Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1133. Map 13 A. Kingsport sheet, Nova Scotia, No. 84. Scale 1 mile to 1 inch.

NEW BRUNSWICK

1155. Map 24A. Millstream Iron Deposit, Gloucester County, N.B., geological and topographical. Scale 400 ft. to 1 inch.

1156. Map 25 A. Nipissiguit Iron Deposit, Gloucester County, N. B. Geology and topography, scale 400 feet to 1 inch.

QUEBEC

1066. Map 18 A. Lake Timiskaming Mining Region. Scale 1 mile to 1 inch.

1112. Map 12 A. Vicinity of the Transcontinental Railway, Abitibi District, Quebec. Scale 4 miles to 1 inch.

1180. Map 34A. Vicinity of the National Transcontinental Railway between the counties of Levis and Temiscouata, Quebec. Scale 8 miles to 1 inch.

ONTARIO

1091. Map 8 A, Lake Nipigon, Thunder Bay District, Ontario. Scale 4 miles to 1 inch.

ALBERTA

1132. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.

BRITISH COLUMBIA

791. West Kootenay sheet, B.C. Economic Minerals and glacial striae. Scale 4 miles to 1 inch.

792. West Kootenay sheet, B.C. Geological. Scale 4 miles to 1 inch.

1198. May 48A. Tulameen Coal Area, Yale District, B.C. Scale ½ mile to 1 inch.

1135. Map 15A. Phoenix, British Columbia, topographical. Scale 400 ft. to 1 inch.

1148. Map 20A. Victoria sheet, Vancouver Island, B.C., topographical. Scale 1 mile to 1 inch.

1149. Map 21A. Saanich sheet, Vancouver Island, B.C., topographical. Scale 1 mile to 1 inch.

YUKON and NORTH WEST TERRITORIES

1089. Map 9A. Explored Routes on Parts of the Albany, Severn and Winisk Rivers. Scale 8 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 10 cents is made for maps on linen.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon. Letters and samples that are of a Departmental nature, addressed to the Director may be mailed O.H.M.S. free of postage.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.

BRITISH COLUMBIA

The Mineral Province of Western Canada

Has produced Minerals valued as follows: Placer Gold, $71,213,103; Lode Gold, $60,811,067; Silver, $31,095,602; Lead, $24,645,605; Copper, $60,743,405; Other Metals (Iron, Zinc, etc.), $1,083,172; Coal and Coke, $114,012,596: Building Stone, Brick, etc., $10,593,100; making its Mineral Production at the end of 1910 show an

Aggregate Value of $374,197,650.

In 1910 the quantity of Ore mined was 2,216,428 tons, and of coal 3,139,235 long tons. The value of Minerals produced that year was: Placer Gold, $540,000; Lode Gold, $5,533,386; Silver, $1,245,016; Lead, $1,386,350; copper, $4,871,512; Coal and Coke, $11,108,335; Other Minerals, $1,692,473, making the

Total Value for 1910, $26,377,066.

Lode-mining has only been in progress for about eighteen years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those in any other Province in the Dominion, or any Colony in the British Empire.

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Province of Quebec

Department of Colonization, Mines, and Fisheries.

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, Etc.

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is $10.00 and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year and a fee of $10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of $10 an acre for SUPERIOR METALS when more than 20 miles distant from a railway and $20 an acre when less than 20 miles.

For INFERIOR METALS the prices are $2.00 and $4.00 an acre respectively.

The attention of prospectors is specially called to the territory in the North-Western part of the province of Quebec, north of the height of land, where important mineralized belts are known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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Gold mining in this Province offers good inducement for investment. Labor is cheap and plentiful; timber and fuel are abundant.

Large deposits of iron also are known to exist at various places in the Province; and considerable mining has been done in connection with this mineral, the ore being used locally and shipped to foreign ports.

Among the most important minerals occurring in economic quantities may be mentioned, Coal, Gold, Silver, Manganese, Leadsilver, Copper, Barytes, Mineral Pigments, Gypsum and Tungsten.

Licenses are issued for prospecting for Gold and Silver for a term of twelve months. The licenses are for areas 150 by 250 feet, and can be obtained for 50c. an area.

Leases can be secured for $2. an area, for a term of forty years; subject to annual rental of 50c. an area.

Licenses to search over five square miles, for a period of eighteen months, for minerals other than gold and silver, cost $30.

Leases for three renewable terms of twenty years each can be obtained for $50., and are subject to a yearly rental of $30.

Royalties are as follows:—

Gold, two per cent on the gross value thereof; Copper, four cents a unit; Lead, two cents a unit; Iron, five cents a ton; Tin and Precious Stones, five per cent; Coal, ten cents on every long ton sold or removed from the mine.

Copies of the mining law can be had gratis, by applying to the Department of Public Works and Mines, Halifax, Nova Scotia, or to Mr. John Howard, Agent General for Nova Scotia, 57a Pall Mall, London, England.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. W. H. HEARST,
Minister of Lands, Forests and Mines,
Toronto, Canada.

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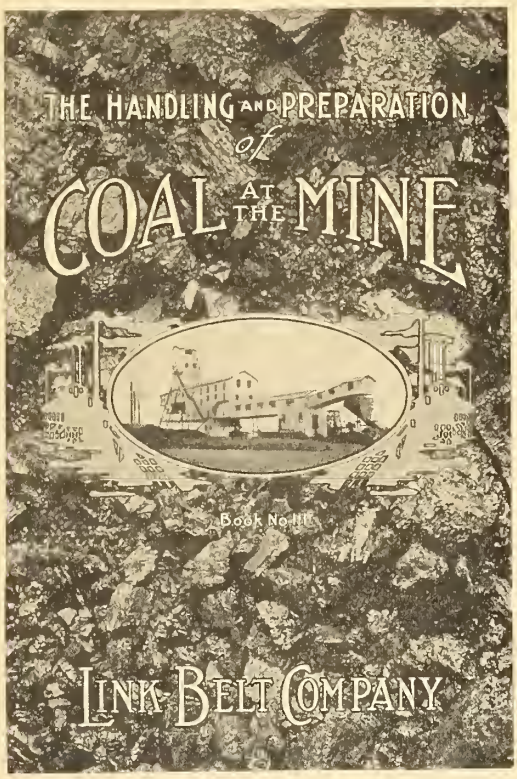

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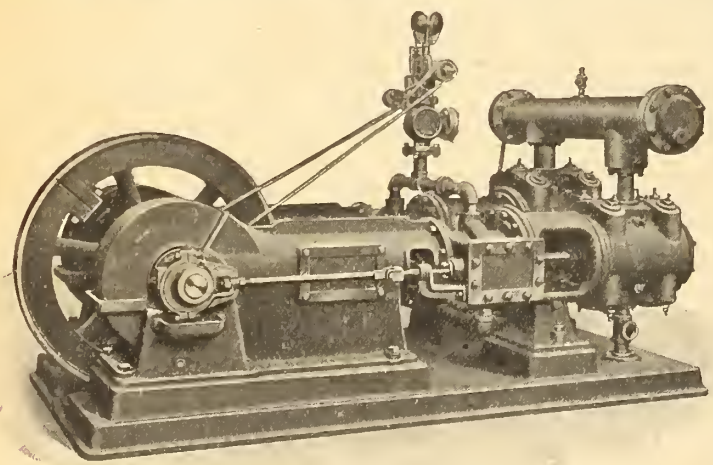

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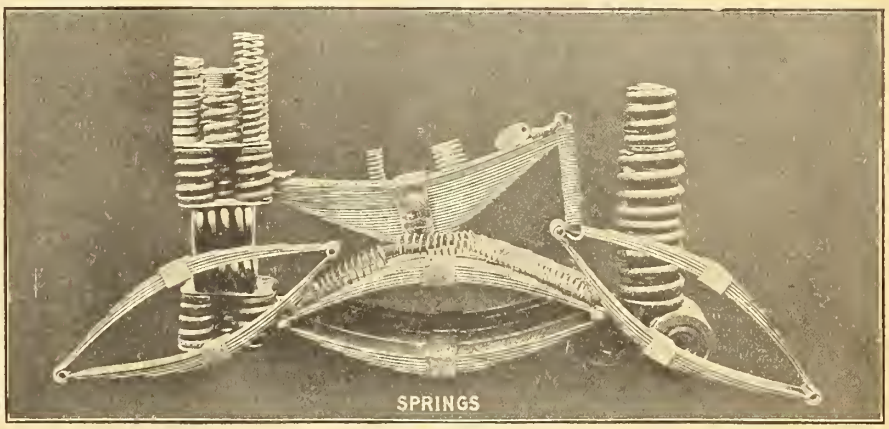

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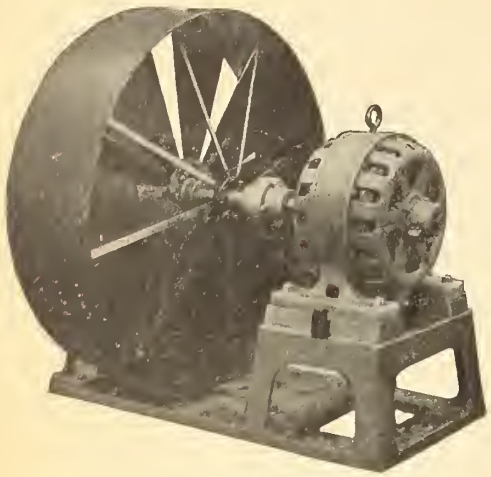

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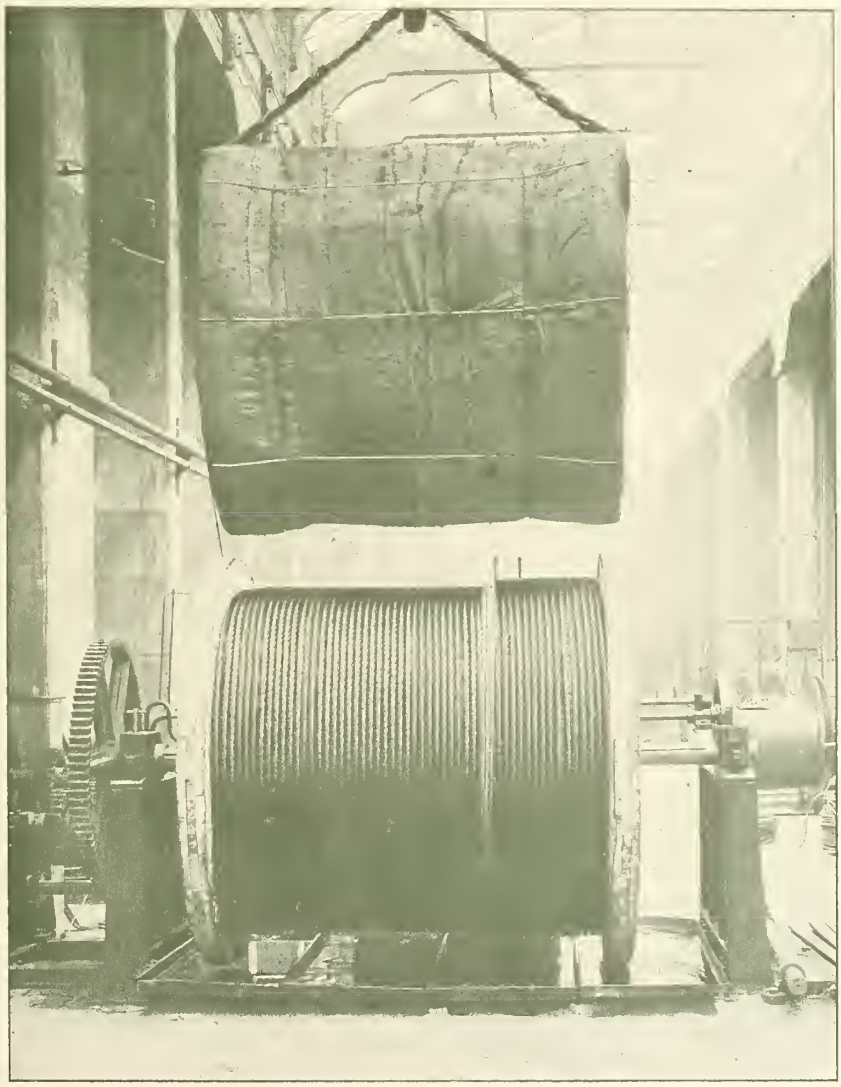

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